

## Seventh Grade Curriculum and Assessment Guide

### Number and Computation Strand – Grade 7

Big Ideas	End-Of-Year Test Question	Resources/Investigations	On-line Resources/Other	Notes/Comments
NC.7.1- Describe, give examples of, and apply whole-number exponents and square roots. MA-M-1.1.2 MA-M-1.1.5 MA-M-1.1.6 MA-M-1.3.3 M-7-NC-5	$3^2 + 4^2$ has the same value as a) $5^2$ b) $7^2$ c) $12^2$ d) $2^2 + 5^2$ (Conrad, 2001. p. 14)	Sylvia wants to spread a rumor to the 8,000 students in her school district by March 21. If she tells 2 people on March 1, those 2 people each tell 2 more people on March 2, and those 4 people each tell 2 more people on March 3, etc., will all 8,000 people hear the rumor before March 21st?  Explain whether this statement is true or false: $x^y = y^x$  Model squares and square roots using area of a square.	Interactive Basic Instruction: Exponents <a href="http://www.math.com/school/subject1/lessons/S1U1L8GL.html">http://www.math.com/school/subject1/lessons/S1U1L8GL.html</a> Exponents Movie <a href="http://www.brainpop.com">http://www.brainpop.com</a> Powers of 10 <a href="http://micro.magnet.fsu.edu/primer/java/scienceopticsu/powersof10/">http://micro.magnet.fsu.edu/primer/java/scienceopticsu/powersof10/</a> Counting Grandparents Open Response <a href="http://www.nku.edu/~mathed/counting.pdf">http://www.nku.edu/~mathed/counting.pdf</a> 2 Interactive Scientific Notation Sites: <a href="http://www.aaamath.com/dec71i-dec2sci.html">http://www.aaamath.com/dec71i-dec2sci.html</a> <a href="http://school.discovery.com/homeworkhelp/webmath/sn_convert.html">http://school.discovery.com/homeworkhelp/webmath/sn_convert.html</a>	Spending a Million Problem: <a href="http://www.learner.org/channel/courses/teachingmath/grades6_8/session_03/section_03_d.html">http://www.learner.org/channel/courses/teachingmath/grades6_8/session_03/section_03_d.html</a>

<p>NC.7.2- Represent, apply, solve, and use <i>ratio and proportion</i>. Develop proportional thinking, rates, scaling, and similarity.</p> <p>MA-M-1.1.3 MA-M-1.1.6 MA-M-1.2.3 M-7-NC-4 M-7-NC-10 M-7-NC-13</p>	<p>At Greenlake Middle School there are 440 boys. The ratio of boys to girls is 4 to 3. Find the number of girls in the school.</p> <p style="text-align: right;">330</p>	<p>Capture/Recapture Simulation: (Count the a small number of black beans (marked deer) and mix them in with a large number of white beans (wild deer). Scoop out a sample and write a proportion to calculate the total number of white beans.)</p>	<p>Online Video: Height of a Triangle <a href="http://www.apple.com/education/dv/triangles.html">http://www.apple.com/education/dv/triangles.html</a></p> <p><i>Illuminations</i> Online Pool Table Ratios: <a href="http://illuminations.nctm.org/imath/6-8/pooltable/index.html">http://illuminations.nctm.org/imath/6-8/pooltable/index.html</a></p> <p>Connected Mathematics Project <i>Comparing and Scaling</i> Unit (Lappan, Fey, Fitzgerald, Friel, and Phillips) The Golden Ratio in Art and Architecture: <a href="http://ccins.camosun.bc.ca/~jbritton/goldslide/jbgoldslide.htm">http://ccins.camosun.bc.ca/~jbritton/goldslide/jbgoldslide.htm</a></p> <p>Deep Sea Math Hunt: <a href="http://teacher.scholastic.com/mathhunt/StartGame.asp?QuizID=1">http://teacher.scholastic.com/mathhunt/StartGame.asp?QuizID=1</a></p>	<p>Shaded/Unshaded Circles Problem <a href="http://www.learner.org/channel/courses/teachingmath/grades6_8/session_02/section_02_b.html">http://www.learner.org/channel/courses/teachingmath/grades6_8/session_02/section_02_b.html</a></p> <p>Two Different Meanings of “More”: <a href="http://www.learner.org/channel/courses/learningmath/algebra/session4/part_a/index.html">http://www.learner.org/channel/courses/learningmath/algebra/session4/part_a/index.html</a></p> <p>Comparing Mixtures: <a href="http://www.learner.org/channel/courses/learningmath/algebra/session4/part_b/index.html">http://www.learner.org/channel/courses/learningmath/algebra/session4/part_b/index.html</a></p> <p>Playing with Quadperson: <a href="http://www.learner.org/channel/courses/learningmath/algebra/session4/part_c/index.html">http://www.learner.org/channel/courses/learningmath/algebra/session4/part_c/index.html</a></p> <p>Similar Triangles <a href="http://www.learner.org/channel/courses/learningmath/geometry/session8/part_b/measuring.html">http://www.learner.org/channel/courses/learningmath/geometry/session8/part_b/measuring.html</a></p> <p>***6<sup>th</sup> Grade? Fraction Tracks Game: <a href="http://www.learner.org/channel/courses/teachingmath/grades6_8/session_02/section_01_a.html">http://www.learner.org/channel/courses/teachingmath/grades6_8/session_02/section_01_a.html</a></p> <p>***6<sup>th</sup> Grade? Fractions with Rods: <a href="http://www.learner.org/channel/courses/teachingmath/grad">http://www.learner.org/channel/courses/teachingmath/grad</a></p>
--	---	--	--	--

<p>NC.7.3- Represent, operate, estimate, compute, and develop concepts of <i>percents</i>.</p> <p>MA-M-1.1.6 MA-M-1.2.1 MA-M-1.2.2 M-7-NC-1 M-7-NC-7 M-7-NC-8 M-7-NC-9</p>	<p><b>Open Response:</b> Show <i>at least</i> 3 different ways to calculate 15% of \$28.00.</p> <p>(<a href="#">Scoring Guide</a> and <a href="#">Possible Responses</a> below)</p>	<p>Make a circle graph showing the % of each color of M&amp;M's in a bag.</p> <p>Find and generalize the better buy of 10% off or \$10 off of items priced at \$50, \$100, \$120.</p>	<p>PBS Mathline Project: <i>Alphabits</i> <a href="http://www.pbs.org/teachersource/mathline/lessonplans/msmp/alphabits/alphabits_procedure.shtm">http://www.pbs.org/teachersource/mathline/lessonplans/msmp/alphabits/alphabits_procedure.shtm</a></p> <p>Math Zapper: <i>Percents</i> <a href="http://www.studyworksonline.com/cda/content/article/0,1600,NAV2-95_SAR1867,00.shtml">http://www.studyworksonline.com/cda/content/article/0,1600,NAV2-95_SAR1867,00.shtml</a></p> <p>Basketball Field Goal/Free Throw Percents: <a href="http://oncampus.richmond.edu/academics/as/education/projects/webunits/math/basketball.html">http://oncampus.richmond.edu/academics/as/education/projects/webunits/math/basketball.html</a></p>	<p>***6<sup>th</sup> Grade? Fractions with Cuisenaire Rods <a href="http://learner.org/channel/courses/learningmath/number/session8/part_b/try.html">http://learner.org/channel/courses/learningmath/number/session8/part_b/try.html</a></p> <p>***6<sup>th</sup> Grade? Models for Multiplication and Division of Fractions: <a href="http://learner.org/channel/courses/learningmath/number/session9/part_a/try.html">http://learner.org/channel/courses/learningmath/number/session9/part_a/try.html</a></p>
--	---	---	---	---

<p>NC.7.4- Estimate, mentally compute, represent, and operate with <i>integers</i>.</p> <p>MA-M-1.1.6 MA-M-1.2.1 MA-M-1.2.2 MA-M-1.3.3 M-7-NC-1 M-7-NC-2 M-7-NC-6 M-7-NC-9</p>	<p>Which expression will give an answer greater than 0?</p> <p>a) <math>-1 + -2</math> b) <math>1 * -2</math> c) <math>-1 \div 2</math> d) <math>-1 - -2</math></p>	<p>Write programming code to make the Roamer robot illustrate operations on a number line.</p> <p>Generalize the rule for using whole number exponents with negative numbers.</p> <p>Integers and Powers Open Response: <a href="http://www.nku.edu/~mathed/intpower.pdf">http://www.nku.edu/~mathed/intpower.pdf</a></p> <p>Write a list of two-step commands for arrows on a number line and ask students to create the picture on a graphing calculator number line twice by writing two different equations.</p>	<p>Virtual Manipulatives: Circle 0 Game <a href="http://matti.usu.edu/nlvm/nav/frames_asid_122_g_3_t_1.html?open=instructions">http://matti.usu.edu/nlvm/nav/frames_asid_122_g_3_t_1.html?open=instructions</a></p> <p>Online Thermometer: <a href="http://www.ies.co.jp/math/java/geo/therm/therm.html">http://www.ies.co.jp/math/java/geo/therm/therm.html</a></p> <p>Virtual Manipulatives: Number Line Bounce <a href="http://matti.usu.edu/nlvm/nav/frames_asid_107_g_3_t_1.html">http://matti.usu.edu/nlvm/nav/frames_asid_107_g_3_t_1.html</a></p>	<p>Color Chips Addition: <a href="http://matti.usu.edu/nlvm/nav/frames_asid_161_g_2_t_1.html">http://matti.usu.edu/nlvm/nav/frames_asid_161_g_2_t_1.html</a></p> <p>Color Chips Subtraction: <a href="http://matti.usu.edu/nlvm/nav/frames_asid_162_g_2_t_1.html">http://matti.usu.edu/nlvm/nav/frames_asid_162_g_2_t_1.html</a></p>
--	---	--	---	--

<p>NC.7.5- <i>Operations</i> Explain and apply <i>properties of operations.</i> MA-M-1.3.2 Show connections between <i>inverse operations.</i> MA-M-1.3.3 M-7-NC-12 Apply <i>order of operations.</i> MA-M-1.2.5</p>	<p>Evaluate: <math>(80-2*6^2)(2+4/2)=</math>  32</p>	<p>Write fact families for fraction and decimal operations.  Apply the four digits of a birth year to a series of problems, each one employing properties of numbers, order of operations, and some raising to a whole number exponent in order to add operations with the digits and manipulate them to equal a stated numerical solution. (KDE, 1998. p. M45)</p>	<p>Interactive Basic Instruction: Order of Operation <a href="http://www.math.com/school/subject2/lessons/S2U1L2GL.html">http://www.math.com/school/subject2/lessons/S2U1L2GL.html</a> Interactive Basic Instruction: Properties <a href="http://www.math.com/school/subject2/lessons/S2U2L1GL.html">http://www.math.com/school/subject2/lessons/S2U2L1GL.html</a> Sally's Situation Open Response <a href="http://www.nku.edu/~mathed/sally.pdf">http://www.nku.edu/~mathed/sally.pdf</a></p>	
<p>NC.7.6- Compare, order, convert, and represent rational numbers, irrational numbers (<math>\pi</math>) and integers. MA-M-1.1.2 MA-M-1.1.6 M-7-NC-3</p>	<p>Which of the following fractions has a value less than <math>1/4</math>? a) 35% b) 25% c) 15% d) 40%</p>	<p>Have students order themselves on a life-size number line, each given a different number value, from a set of numbers such as: <math>8/9, 0.6, -3, -1/3, 22\%, 0.08, 1\frac{1}{12}, -0.6, 0.97, -2/3, 7/10, 7/16, -3/4, -0.8, 57\%</math>, etc.  c) Use a Venn diagram to classify the set of real numbers, including rational numbers, integers, counting numbers, whole numbers, and irrational numbers. Put number examples in each area.</p>	<p>Virtual Manipulatives: Percent/Fractions/Decimals <a href="http://matti.usu.edu/nlvm/nav/frames_asid_160_g_3_t_1.html?open=activities">http://matti.usu.edu/nlvm/nav/frames_asid_160_g_3_t_1.html?open=activities</a></p>	<p>Relative Frequencies: <a href="http://learner.org/channel/courses/learningmath/data/session2/part_e/relative.html">http://learner.org/channel/courses/learningmath/data/session2/part_e/relative.html</a>  Building the Number Line: <a href="http://learner.org/channel/courses/learningmath/number/session1/part_c/index.html">http://learner.org/channel/courses/learningmath/number/session1/part_c/index.html</a>  Number Sets: <a href="http://learner.org/channel/courses/learningmath/number/session2/part_a/operations.html">http://learner.org/channel/courses/learningmath/number/session2/part_a/operations.html</a></p>

Conrad, S. & Flegler, D., (2001) Math Contests; Grades 7 & 8 (And Algebra Course 1) Volume 3. Math League Press, P.O. Box 17, Tenafly, NJ 07670-0017.

Kentucky Department of Education (1998). Program of Studies Implementation Manual.

### Open Response for NC7.3: Percents

#### Prompt

Show *at least* 3 different ways to calculate 15% of \$28.00.

#### Scoring Guide

The open response score is equivalent to the number of correct responses.

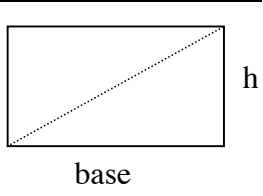
#### Possible Correct Responses



- I pushed these keys on my calculator:  $15\% \times 28 =$  and found the answer was 4.2. 4.2 in terms of money would be \$4.20.
- I converted the 15% to a decimal and multiplied:  $.15 \times 28 = 4.2$ , which is the same as \$4.20
- I found 10% of 28.00 by moving the decimal point 1 place to the left: 2.80. I then found the additional 5% by taking half of 2.80: 1.40. Next I added the 10% and the 5%:  $2.80 + 1.40 = 4.20$
- I found 10% of 28.00 by moving the decimal point 1 place to the left: 2.80. I then multiplied that number by 3 to find 30%:  $2.80 \times 3 = 6.00 + 2.40 = 8.40$ . Finally, I took half of the 30% amount to get 15%:  $\frac{1}{2} \times 8.40 = 8.40/2 = 4.20$ .
- I found that 1% of \$28.00 would be 28 cents and then multiplied that times 15.  $28 \times 15 = 200 + 80 + 100 + 40 = 420$ . 420 cents is \$4.20.
- I used a proportion  $15/100 = x/28.00$ . Then I simplified for x:  $(15/100) 28.00 = x$ ;  $\$4.20 = x$ .
- Other correct creative responses are acceptable.

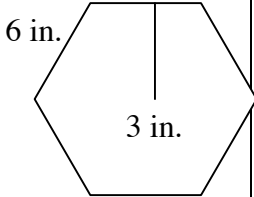

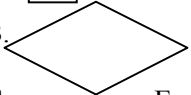
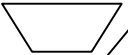


**Geometry and Measurement Strand – Grade 7**

Big Ideas	End-Of-Year Test Question	Resources/Investigations	On-line Resources/Other	Notes/Comments
<p>GM.7.1- Find <i>circle measurements</i> (radius, diameter, circumference, area) and the relationships among them.            MA-M-2.2.5            MA-M-2.3.1            M-7-GM-1</p>	<p>How does the combined area of 2 circles each with a radius of 3 cm compare to the area of 1 circle with a radius of 6 cm?            A. The area of the 2 circles is smaller than the area of the 1 circle.            B. The area of the 2 circles is larger than the area of the 1 circle.            C. The area of the 2 circles is equal to the area of the 1 circle.</p>	<p>A pizza restaurant sells small, medium, and large pizzas. A small is 9 inches in diameter, a medium is 12 inches in diameter, and a large is 15 inches in diameter. Prices for cheese pizzas are \$6.00 for small, \$9.00 for medium, and \$12.00 for large.            A. Draw a 9-inch, a 12-inch, and a 15-inch “pizza” on centimeter grid paper. Let 1 centimeter of the grid paper represent 1 inch on the pizza. Estimate the radius, circumference, and area of each pizza. (You may want to use string to help you find the circumference.)            B. Which measurement—radius, diameter, circumference, or area—seems most related to price? Explain your answer.</p> <p>In this problem you will work with a collection of circular objects.            A. Use a tape measure to find the diameter and</p>	<p><a href="http://www.nku.edu/~sheffield">www.nku.edu/~sheffield</a>  <a href="http://illuminations.nctm.org/">http://illuminations.nctm.org/</a>  <a href="http://www.cms.math.ca/Education/">http://www.cms.math.ca/Education/</a>  <a href="http://school.discovery.com/schrockguide/math.html">http://school.discovery.com/schrockguide/math.html</a>  <a href="http://matti.usu.edu/nlvm/nav/vlibrary.html">http://matti.usu.edu/nlvm/nav/vlibrary.html</a>  <i>Sir Cumference and the Dragon of Pi</i> (Cindy Neuschwander)  <i>A collection of Math Lessons</i> (Marilyn Burns &amp; Cathy Humphreys)  <i>Connected Mathematics Project: Covering and Surrounding</i> (Lappan, Fey, Fitzgerald, Friel, and Phillips)            A Slice of Pi Online:  <a href="http://www.esc20.net/etprojects/for/mats/sampler/fall99/dg12999/default.html">http://www.esc20.net/etprojects/for/mats/sampler/fall99/dg12999/default.html</a></p>	<p>Area of a Circle:  <a href="http://learner.org/channel/courses/learningmath/measurement/session7/part_b/index.html">http://learner.org/channel/courses/learningmath/measurement/session7/part_b/index.html</a></p>

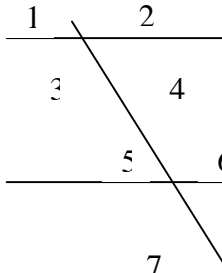
		<p>circumference of each object. Record your results in a table with the following column headings: Object, Diameter, and Circumference.</p> <p>B. Make a coordinate graph of your data. Use the horizontal axis for diameter and the vertical axis for circumference.</p> <p>C. Study your table and your graph, looking for patterns and relationships that will allow you to predict the circumference from the diameter. Test your ideas on some other circular objects. Once you think you have a pattern, answer these questions: What do you think the relationship is between the diameter and the circumference of a circle?</p>		
--	--	---	--	--

<p>GM.7.2- Develop and use the <i>formulas for area</i> of triangles, parallelograms, and trapezoids; relate to the formula for area of rectangles (<math>l \times w</math>). Investigate area of polygons, and other 2-dimensional shapes, subdivided by square units.</p> <p>MA-M-2.2.2 MA-M-2.2.5 M-7-GM-2 M-7-GM-4</p>	<p>Draw a picture showing how the formula for the area of a triangle is related to the area formula for rectangles. Explain briefly.</p>  <p>Area of a rectangle = <math>l \cdot w</math> or <math>b \cdot h</math> A triangle is half of a rectangle, therefore the area of a triangle can be found by the following formula: <math>A = \frac{b \cdot h}{2}</math> or <math>\frac{b \cdot h}{2}</math></p>	<p>Draw two nonrectangular parallelograms on a sheet of paper, and cut them out. Cut one of your parallelograms into two pieces so that the pieces can be reassembled to form a rectangle. Do the same for the second parallelogram. Use one of your parallelograms to complete parts A-C.</p> <ol style="list-style-type: none"> <li>Record the base, height, perimeter, and area of the original parallelogram.</li> <li>Record the length, width, perimeter, and area of the rectangle you made from the parallelogram pieces.</li> <li>What relationship do you see between the measures for the rectangle and the measures for the parallelogram from which it was made?</li> </ol> <p>Draw two triangles on a sheet of grid paper. Make sure the triangles are very different from one another. For each triangle, complete parts A-C.</p>	<p><i>Pythagoras's Bow Tie</i> (Ron Ritchhart) <i>Connected Mathematics Project: Covering and Surrounding</i> (Lappan, Fey, Fitzgerald, Friel, and Phillips) <i>Elementary School Mathematics: Teaching Developmentally</i> (John A. Van De Walle)</p>	
--	--	--	--	--

<p>GM.7.3- Find and generalize rules for <i>area with changing perimeter</i> and <i>fixed perimeter with changing area</i>.</p> <p>MA-M-2.2.5 MA-M-2.3.1 M-7-GM-3</p>	<p><b>Open Response</b> A friend tells you that she has discovered that as the perimeter of a shape increases, so does the area. She shows you these two pictures:</p> <p>2cm  4 cm P = 12 cm A = 8 cm<sup>2</sup></p> <p>3 cm  5 cm P = 16 cm A = 15 cm<sup>2</sup></p> <p>You decide to investigate her claim. A) Draw at least 3 more rectangles and compute the area and perimeter of each. B) Is your friend's conclusion correct? Why or why not? C) Write a response to your friend based upon your findings. (based upon Laping Ma)</p>	<p>Draw a triangle with a base of 5 cm and a height of 6 cm. Then, try to draw a different triangle with these same dimensions. Do the triangles have the same area? If you couldn't draw a different triangle, explain why.</p> <p>Draw a triangle with an area of 15 cm<sup>2</sup>. Then, try to draw a different triangle with an area of 15 cm<sup>2</sup>. Do the triangles have the same perimeter? If you couldn't draw a different triangle, explain why.</p> <p>Find a rectangle with whole-number side lengths, a perimeter of 20 units, and the largest possible area.</p> <p>Draw a parallelogram-shaped flower bed with an area of 24 square feet.</p> <p>Of all the rectangles with a perimeter of 60 cm, which one has the greatest area?</p>	<p><i>Middle Grades mathematics Project: Mouse and Elephant: Measuring Growth</i> (Janet Shroyer &amp; William Fitzgerald) <i>Connected Mathematics Project: Covering and Surrounding</i> (Lappan, Fey, Fitzgerald, Friel, and Phillips) <i>Illuminations</i> Online Comparison of area &amp; perimeter: <a href="http://standards.nctm.org/document/examples/chap6/6.3/index.htm">http://standards.nctm.org/document/examples/chap6/6.3/index.htm</a> Online Java Applet: Conservation of Area: <a href="http://www.ies.co.jp/math/java/geo/cava/cava.html">http://www.ies.co.jp/math/java/geo/cava/cava.html</a> Virtual Manipulatives: Geoboard Activities <a href="http://matti.usu.edu/nlvm/nav/frame_s_asid_282_g_3_t_4.html?open=activities">http://matti.usu.edu/nlvm/nav/frame_s_asid_282_g_3_t_4.html?open=activities</a> <i>Elementary School Mathematics: Teaching Developmentally</i> (John A. Van De Walle) Virtual Manipulatives: Pattern Blocks <a href="http://matti.usu.edu/nlvm/nav/frame_s_asid_171_g_3_t_2.html?open=activities">http://matti.usu.edu/nlvm/nav/frame_s_asid_171_g_3_t_2.html?open=activities</a> Study Buddies Worksheets--Area of Quadrilaterals: <a href="http://www.sbgmath.com/studdy_buds/MA98bHC6p071-072.pdf">http://www.sbgmath.com/studdy_buds/MA98bHC6p071-072.pdf</a></p>	<p>Area and Perimeter: <a href="http://learner.org/channel/courses/learningmath/measurement/session9/part_a/constant.html">http://learner.org/channel/courses/learningmath/measurement/session9/part_a/constant.html</a></p>
---	---	---	---	--

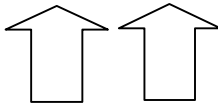
<p>GM.7.4 Investigate area of polygons and other two-dimensional shapes. MA-M-2.2.2 M-7-GM-4</p>	<p>What is the area of this regular hexagon?</p>  <p>.....</p> $A = \left( \frac{b \cdot h}{2} \right) -$ $= \frac{6 \cdot 3}{2} = 6$ $= 54 \text{ in}^2$	<p>Explain how you would find the area and perimeter of a hexagon.</p> <p>Use a geoboard and dot paper to find and record at least 20 polygons with an area of 2 square units.</p> <p>Construct and use Pick's Theorem to find the area of geoboard polygons and irregular shapes, such as puddles, leaves, or flowers.  <math>B/2 + I - 1 = \text{Area}</math>  <i>B is the number of boundary points; I is the number of interior points.</i></p>	<p><i>Elementary School Mathematics: Teaching Developmentally</i> (John A. Van De Walle)  Virtual Manipulatives: Pattern Blocks  <a href="http://matti.usu.edu/nlvm/nav/frame_s_asid_171_g_3_t_2.html?open=activities">http://matti.usu.edu/nlvm/nav/frame_s_asid_171_g_3_t_2.html?open=activities</a>  Study Buddies Worksheets--Area of Quadrilaterals:  <a href="http://www.sbgmath.com/studdy_buds/MA98bHC6p071-072.pdf">http://www.sbgmath.com/studdy_buds/MA98bHC6p071-072.pdf</a></p>	<p>Exploring Area with a Geoboard:  <a href="http://learner.org/channel/courses/learningmath/measurement/session6/part_b/index.html">http://learner.org/channel/courses/learningmath/measurement/session6/part_b/index.html</a></p>
<p>GM.7.5- Identify and classify characteristics of two-dimensional shapes, such as regular and irregular quadrilaterals, special</p>	<p>Given the following shapes: A.  B.  C.  D.  E. </p> <p>Name as many as apply.</p>	<p>Make a chart showing the ways that quadrilaterals are alike.</p> <p>Look for a pattern in the interior angle size of the first six regular polygons (equilateral triangle, square, regular pentagon, regular hexagon, regular heptagon, and regular octagon.</p>	<p><i>Connected Mathematics Project: Shapes and Designs</i> (Lappan, Fey, Fitzgerald, Friel, and Phillips)  <i>Elementary School Mathematics: Teaching Developmentally</i> (John A. Van De Walle)  <i>Addenda Series: Geometry in the Middle Grades</i> (Dorothy Geddes)  Polygon Playground Online:  <a href="http://www.mathcats.com/explore/polygonplayground.html">http://www.mathcats.com/explore/polygonplayground.html</a></p>	<p>Building From Directions:  <a href="http://learner.org/channel/courses/learningmath/geometry/session1/part_b/index.html">http://learner.org/channel/courses/learningmath/geometry/session1/part_b/index.html</a></p> <p>Classifying Triangles:  <a href="http://learner.org/channel/courses/learningmath/geometry/session2/part_a/classifying.html">http://learner.org/channel/courses/learningmath/geometry/session2/part_a/classifying.html</a></p> <p>Linkage Strip Activity:</p>

<p>triangles, and regular polygons.</p> <p>MA-M-2.1.1 MA-M-2.1.2 MA-M-2.1.4 MA-M-2.2.1 M-7-GM-5</p>	<ol style="list-style-type: none"> <li>1. Which are parallelograms?</li> <li>2. Which are quadrilaterals?</li> <li>3. Which are squares?</li> <li>4. Which are rectangles?</li> <li>5. Which are rhombi? <ol style="list-style-type: none"> <li>1. <i>A, B, D, E</i></li> <li>2. <i>A, B, C, D, E</i></li> <li>3. <i>B</i></li> <li>4. <i>A, D</i></li> <li>5. <i>B, D</i></li> </ol> </li> </ol>	<p>Count the number of squares found on a geoboard.</p>		<p><a href="http://learner.org/channel/courses/learningmath/geometry/session2/part_b/index.html">http://learner.org/channel/courses/learningmath/geometry/session2/part_b/index.html</a></p> <p>Hidden Polygons: <a href="http://learner.org/channel/courses/learningmath/geometry/session3/part_a/finding.html">http://learner.org/channel/courses/learningmath/geometry/session3/part_a/finding.html</a></p> <p>Polygon Classification Game: <a href="http://learner.org/channel/courses/learningmath/geometry/session3/part_b/game.html">http://learner.org/channel/courses/learningmath/geometry/session3/part_b/game.html</a></p> <p>Counting Triangles in Convex Polygons: <a href="http://learner.org/channel/courses/learningmath/geometry/session3/part_c/triangles.html">http://learner.org/channel/courses/learningmath/geometry/session3/part_c/triangles.html</a></p> <p>Triangle Midline Cut: <a href="http://learner.org/channel/courses/learningmath/geometry/session5/part_c/index.html">http://learner.org/channel/courses/learningmath/geometry/session5/part_c/index.html</a></p>
---	---	---	--	---

<p>GM.7.6- Estimate measurement, and identify characteristics of <i>angles</i> (e.g., adjacent, vertical, corresponding, interior, exterior).</p> <p>MA-M-2.1.1 MA-M-2.2.6 M-7-GM-6</p>	<p>True or False?</p>  <p>1. <math>\angle 4</math> and <math>\angle 6</math> are corresponding angles. 2. Corresponding angles are congruent to each other. 3. <math>\angle 5</math> and <math>\angle 8</math> are vertical angles. 4. Vertical angles share a side between them. 5. <math>\angle 1</math> and <math>\angle 7</math> are supplementary angles.</p>	<p>Given a pair of parallel lines, a transversal and the measure of one angle, determine the measures of the other seven angles.</p> <p>Write programming code to make the Roamer Robot draw regular polygons. The turns are the exterior angles.</p>	<p><i>Addenda Series: Geometry in the Middle Grades</i> (Dorothy Geddes) Virtual Manipulatives: Circular Geoboard for Angles <a href="http://matti.usu.edu/nlvm/nav/frame_s_asid_284_g_3_t_4.html?open=activities">http://matti.usu.edu/nlvm/nav/frame_s_asid_284_g_3_t_4.html?open=activities</a></p>	<p>Properties of Angles: <a href="http://learner.org/channel/courses/learningmath/geometry/session4/part_b/index.html">http://learner.org/channel/courses/learningmath/geometry/session4/part_b/index.html</a></p> <p>Inscribed Angles: <a href="http://learner.org/channel/courses/learningmath/geometry/session4/part_c/index.html">http://learner.org/channel/courses/learningmath/geometry/session4/part_c/index.html</a></p> <p>GeoLogo: <a href="http://learner.org/channel/courses/learningmath/measurement/session4/part_c/index.html">http://learner.org/channel/courses/learningmath/measurement/session4/part_c/index.html</a></p> <p>Metric System Units and Prefixes? <a href="http://learner.org/channel/courses/learningmath/measurement/session3/part_a/units.html">http://learner.org/channel/courses/learningmath/measurement/session3/part_a/units.html</a></p>
---	---	---	--	--

<p>GM.7.7 Represent <i>three-dimensional geometric figures</i> with special attention to developing spatial sense (e.g., top view, side view, three-dimensional shapes drawn on isometric dot paper). MA-M-2.3.2 M-7-GM-7</p>	<p>See NCTM Navigating geometry book p. 113 #1.</p> <p>Or</p> <table border="1" data-bbox="472 414 678 516"> <tr> <td>4</td> <td>3</td> <td>2</td> </tr> <tr> <td>1</td> <td>5</td> <td></td> </tr> </table> <p>Draw a front view of the building shown above.</p> <p style="text-align: right;">1,5,2</p>	4	3	2	1	5		<p>Use isometric dot paper to represent 3-dimensional figures.</p> <p>Using isometric dot paper, represent all possible buildings that can be made using 4 cubes.</p>	<p>Connected Mathematics Project: <u>Ruins of Montarek</u> (Lappan, Fey, Fitzgerald, Friel, and Phillips) Middle Grades Mathematics Project: <u>Spatial Visualization</u> (Winter, Lappan, Phillips, and Fitzgerald) <u>Navigating through Geometry</u> (NCTM) Virtual Manipulatives: Platonic Solids <a href="http://matti.usu.edu/nlvm/nav/frames.asid_128_g_3_t_3.html?open=instructions">http://matti.usu.edu/nlvm/nav/frames.asid_128_g_3_t_3.html?open=instructions</a> Illuminations Online Interactive 3-D Shapes: <a href="http://illuminations.nctm.org/imath/6-8/isometric/index.html">http://illuminations.nctm.org/imath/6-8/isometric/index.html</a></p>	<p>Ominoes/Cube Problem: <a href="http://www.learner.org/channel/courses/teachingmath/grades6_8/session_03/section_01_c.html">http://www.learner.org/channel/courses/teachingmath/grades6_8/session_03/section_01_c.html</a></p> <p>Building Viewpoints Problem: <a href="http://www.learner.org/channel/courses/teachingmath/grades6_8/session_05/section_01_b.html">http://www.learner.org/channel/courses/teachingmath/grades6_8/session_05/section_01_b.html</a></p> <p>Slicing a Cube: <a href="http://learner.org/channel/courses/learningmath/geometry/session9/part_c/index.html">http://learner.org/channel/courses/learningmath/geometry/session9/part_c/index.html</a></p> <p>***8<sup>th</sup> Grade? The Largest Container Problem: <a href="http://www.learner.org/channel/courses/teachingmath/grades6_8/session_03/section_04_b.html">http://www.learner.org/channel/courses/teachingmath/grades6_8/session_03/section_04_b.html</a></p> <p>Drawing 3D Figures on Dot Paper: <a href="http://www.learner.org/channel/courses/teachingmath/grades6_8/session_06/section_02_b.html">http://www.learner.org/channel/courses/teachingmath/grades6_8/session_06/section_02_b.html</a></p>
4	3	2								
1	5									

				<p>***8<sup>th</sup> Grade? Building Rafts with Rods: <a href="http://www.learner.org/channel/courses/teachingmath/grades6_8/session_04/section_01_b.html">http://www.learner.org/channel/courses/teachingmath/grades6_8/session_04/section_01_b.html</a></p> <p>***8<sup>th</sup> Grade? The Frosted Cube Cake: <a href="http://www.learner.org/channel/courses/teachingmath/grades6_8/session_04/section_02_b.html">http://www.learner.org/channel/courses/teachingmath/grades6_8/session_04/section_02_b.html</a></p>
--	--	--	--	--

<p>GM.7.8- Move shapes in a plane (e.g., translate (slide), rotate (turn), reflect (flip)). MA-M-2.2.3 M-7-GM-8</p>	<p>A </p> <p>The relationship of figure A to figure B is</p> <p>A. A reflection B. A rotation C. A translation D. A and C E. B and C</p> <p>D.)</p>	<p>Many of the letters of our alphabet have symmetry.</p> <p>B . Identify the capital letters that have reflectional symmetry.</p> <p>B. Sketch each letter you find, and show all the lines of symmetry.</p> <p>C. What state name has reflectional symmetry when written horizontally in capital letters?</p> <p>D. What four state names have reflectional symmetry when written vertically?</p> <p>E. Write at least one word, name, or phrase that has reflectional symmetry 1) when written horizontally? 2) When written vertically?</p> <p>F. Identify the capital letters that have rotational symmetry. Sketch each letter you find, and give its angle of rotation.</p> <p>Write at least one word, name, or phrase that as rotational symmetry.</p>	<p><u>Elementary School Mathematics: Teaching Developmentally</u> (John A. Van De Walle) <u>Addenda Series: Geometry in the Middle Grades</u> (Dorothy Geddes) <u>Navigating Through Geometry</u> (NCTM) Virtual Manipulatives: Reflections <a href="http://matti.usu.edu/nlvm/nav/frames_asid_297_g_3_t_3.html?open=activities">http://matti.usu.edu/nlvm/nav/frames_asid_297_g_3_t_3.html?open=activities</a> Virtual Manipulatives: Rotations <a href="http://matti.usu.edu/nlvm/nav/frames_asid_299_g_3_t_3.html?open=activities">http://matti.usu.edu/nlvm/nav/frames_asid_299_g_3_t_3.html?open=activities</a> Virtual Manipulatives: Translations <a href="http://matti.usu.edu/nlvm/nav/frames_asid_301_g_3_t_3.html?open=activities">http://matti.usu.edu/nlvm/nav/frames_asid_301_g_3_t_3.html?open=activities</a> Tessellation Town on Tile Island: <a href="http://www.mathcats.com/explore/tessellations/tesspeople.html">http://www.mathcats.com/explore/tessellations/tesspeople.html</a> <i>Illuminations</i> Dynamic Transformations: <a href="http://standards.nctm.org/document/examples/chap6/6.4/index.htm">http://standards.nctm.org/document/examples/chap6/6.4/index.htm</a></p>	<p>***6<sup>th</sup> Grade? Symmetry: <a href="http://learner.org/channel/courses/learningmath/geometry/session7/part_a/index.html">http://learner.org/channel/courses/learningmath/geometry/session7/part_a/index.html</a></p> <p>***6<sup>th</sup> Grade? Perpendicular Bisector: <a href="http://learner.org/channel/courses/learningmath/geometry/session7/part_a/bisector.html">http://learner.org/channel/courses/learningmath/geometry/session7/part_a/bisector.html</a></p> <p>Rotational Symmetry: <a href="http://learner.org/channel/courses/learningmath/geometry/session7/part_b/index.html">http://learner.org/channel/courses/learningmath/geometry/session7/part_b/index.html</a></p> <p>Classifying Frieze Patterns: <a href="http://learner.org/channel/courses/learningmath/geometry/session7/part_c/classifying.html">http://learner.org/channel/courses/learningmath/geometry/session7/part_c/classifying.html</a></p>
---	--	---	--	---

Probability & Statistics – Grade 7

Big Ideas	End-Of-Year Test Question	Resources/ Investigations	On-line Resources/Other	Notes/Comments
<p>PS.7.1—Collect, organize, analyze, and interpret data, selecting and comparing appropriate graphs and justifying their use, in a variety of graphical methods, including circle graphs, multiple line graphs, double bar graphs, and double stem and leaf plots</p> <p>MA-M-3.1.2 MA-M-3.1.3 MA-M-3.2.1 MA-M-3.2.2 M-7-PS-1 M-7-PS-3 M-7-PS-4</p>	<p>You have just polled you class on their favorite school lunch.</p> <p>Hotdogs 2 Hamburgers 10 Pizza 8 Chicken Sandwich 11</p> <p>Graph this information using an appropriate graph. Explain your choice of graph.</p> <p><i>A histogram, a bar graph, or a circle (pie) graph would be appropriate in this situation. I would use a histogram, because they are used to show frequency. Let the y-axis, show the frequency, and let the x-axis show the choices.</i></p>	<p>Collect class data for: height, number of blocks held in hand, finger span, arm length, shoe size, head circumference, etc. Students will hypothesize a correlation between two of the measurements and graph to show the relationship.</p>	<p>Virtual Manipulatives: Box Plot <a href="http://matti.usu.edu/nlvm/nav/frames/aside_200_g_3_t_5.html?open=instructions">http://matti.usu.edu/nlvm/nav/frames/aside_200_g_3_t_5.html?open=instructions</a></p> <p>Virtual Manipulatives: Scatter Plot <a href="http://matti.usu.edu/nlvm/nav/frames/aside_144_g_3_t_5.html?open=activities">http://matti.usu.edu/nlvm/nav/frames/aside_144_g_3_t_5.html?open=activities</a></p>	<p>Collecting Data <a href="http://learner.org/channel/courses/learningmath/data/session1/part_b/index.html">http://learner.org/channel/courses/learningmath/data/session1/part_b/index.html</a></p> <p>How Long is a Minute? <a href="http://learner.org/channel/courses/learningmath/data/session1/part_b/minute.html">http://learner.org/channel/courses/learningmath/data/session1/part_b/minute.html</a></p> <p>Testing Your Measurement Bias <a href="http://learner.org/channel/courses/learningmath/data/session1/part_c/testing.html">http://learner.org/channel/courses/learningmath/data/session1/part_c/testing.html</a></p> <p>Random Sampling <a href="http://learner.org/channel/courses/learningmath/data/session1/part_d/random.html">http://learner.org/channel/courses/learningmath/data/session1/part_d/random.html</a></p> <p>Line Plot Representing the Number of Raisins <a href="http://learner.org/channel/courses/learningmath/data/session2/part_b/making.html">http://learner.org/channel/courses/learningmath/data/session2/part_b/making.html</a></p> <p>Frequency Table For Raisins <a href="http://learner.org/channel/courses/learningmath/data/session2/part_b/making.html">http://learner.org/channel/courses/learningmath/data/session2/part_b/making.html</a></p>

				<p><a href="http://learner.org/channel/courses/learningmath/data/session2/part_c/index.html">urses/learningmath/data/session2/part_c/index.html</a></p> <p>Line Plot to Frequency Bar Graph  <a href="http://learner.org/channel/courses/learningmath/data/session2/part_e/index.html">http://learner.org/channel/courses/learningmath/data/session2/part_e/index.html</a></p> <p>Making a Stem and Leaf Plot  <a href="http://learner.org/channel/courses/learningmath/data/session3/part_a/making.html">http://learner.org/channel/courses/learningmath/data/session3/part_a/making.html</a></p> <p>Creating a Histogram  <a href="http://learner.org/channel/courses/learningmath/data/session3/part_b/completing.html">http://learner.org/channel/courses/learningmath/data/session3/part_b/completing.html</a></p> <p>Ordering Hats  <a href="http://learner.org/channel/courses/learningmath/data/session3/part_d/index.html">http://learner.org/channel/courses/learningmath/data/session3/part_d/index.html</a></p> <p><a href="http://learner.org/channel/courses/learningmath/data/session4/part_b/index.html">http://learner.org/channel/courses/learningmath/data/session4/part_b/index.html</a></p>
--	--	--	--	--

<p>PS.7.2—Make predictions, draw conclusions, and verify results from statistical data and probability experiments</p> <p>MA-M-3.2.1 MA-M-3.2.5 M-7-PS-2</p>	<p>Joe is trying to decide whether to play a certain game at the carnival. A player tries to knock down two milk bottles. These are the results so far.</p> <table border="0"> <tr> <td>Both standing</td> <td>24</td> </tr> <tr> <td>One standing, One down</td> <td>14</td> </tr> <tr> <td>Both down</td> <td>2</td> </tr> </table> <p>Based on the results, what is the experimental probability of knocking down two bottles and winning the game?</p> <p style="text-align: right;">1/20</p>	Both standing	24	One standing, One down	14	Both down	2	<p>Students will plan, develop, and write a product comparison of competing brands, incorporating graphs and statistics.</p> <p>Binostat Game: <a href="http://www.nku.edu/~mathed/binostat.pdf">http://www.nku.edu/~mathed/binostat.pdf</a></p>	<p>Chances Are part 2, It's a Mystery to Me. <a href="http://www.pbs.org/teachersource/mathline/lessonplans/esmp/chances/chances2_procedures.shtm">http://www.pbs.org/teachersource/mathline/lessonplans/esmp/chances/chances2_procedures.shtm</a></p>	<p>Comparing Counts of Brands of Raisins <a href="http://learner.org/channel/courses/learningmath/data/session6/part_b/index.html">http://learner.org/channel/courses/learningmath/data/session6/part_b/index.html</a></p> <p>Short-Term Recall Experiment <a href="http://learner.org/channel/courses/learningmath/data/session6/part_c/index.html">http://learner.org/channel/courses/learningmath/data/session6/part_c/index.html</a></p> <p>Comparing Height and Arm Span <a href="http://learner.org/channel/courses/learningmath/data/session7/part_a/index.html">http://learner.org/channel/courses/learningmath/data/session7/part_a/index.html</a></p> <p>Random Samples <a href="http://learner.org/channel/courses/learningmath/data/session9/part_a/index.html">http://learner.org/channel/courses/learningmath/data/session9/part_a/index.html</a></p>
Both standing	24									
One standing, One down	14									
Both down	2									

<p>PS.7.3—Determine appropriate techniques to use when investigating solutions to probability problems (using counting techniques, tree diagrams, area models, and exhaustive, organized lists, charts, and tables</p> <p>MA-M-3.2.1 MA-M-3.2.5 M-7-PS-5</p>	<p>Jonah has 5 different shirts, 3 hat, and 4 pairs of pants. Show at least 2 different ways to find the total number of different outfits he can wear.</p>	<p>Have students count outcomes in several ways and find the theoretical and experimental probability of passing a 5 question T/F test when only guessing at the answers: <a href="http://studenthome.nku.edu/~gabbardal/lesson.htm">http://studenthome.nku.edu/~gabbardal/lesson.htm</a></p>	<p>Coin Flipping <a href="http://mathforum.org/workshop/usi/">http://mathforum.org/workshop/usi/</a> <a href="http://dataproject/usi.midlessons.html">http://dataproject/usi.midlessons.html</a></p> <p>Kickball Game Open Response <a href="http://www.nku.edu/~mathed/kickball.pdf">http://www.nku.edu/~mathed/kickball.pdf</a></p>	<p>Tossing 4 Coins <a href="http://learner.org/channel/courses/learningmath/data/session8/part_c/index.html">http://learner.org/channel/courses/learningmath/data/session8/part_c/index.html</a></p>
--	---	---	---	--

<p>PS.7.4-- Investigate and explain the role of probability in decision making</p> <p>MA-M-3.3.2 MA-M-3.3.3 MA-M-3.3.4 M-7-PS-6</p>	<p>Jason and Nikki are playing a game with a number cube. Jason can skip his turn or roll the cube. If he rolls a 3 or more he wins. If he rolls less than a 3 he loses. Use probability to decide what Jason should do.</p> <p><math>P(\geq 3) = 4/6 = 2/3</math>. <i>Jason has a better chance of winning if he rolls.</i></p>	<p>Play the game <i>Even Steven</i>: Place 2 blue cubes and 2 red cubes in a cup. Player A draws a cube and then another cube, without replacement. Player A scores if the colors match and player B scores if the colors do not match. Players alternate drawing the cubes 10 times each, but the score does <i>not</i> depend on who is drawing the cubes. The final score (sum of both players) should total 20 points. Determine if the game is fair by finding the theoretical probability of each player scoring. Discuss alterations in the rules to make the game fair.</p>	<p><i>In All Probability. Investigations in Probability and Statistics.</i> Lawrence Hall of Science, University of California at Berkeley</p>	
---	--	---	--	--

<p>PS.7.5—Determine and apply the most appropriate measures of central tendency (e.g. mean, median, mode) and /or dispersion (e.g. Range)</p> <p>MA-M-3.2.3 M-7-PS-7</p>	<p>Your math test scores are 90,78,95,94,96,85,87, and 80. When asked by your parent, "How are you doing in math?" What would be the most appropriate measure of central tendency to use and why? What specific statistic would you tell your parent?</p> <p><i>Mean = 88</i> <i>Median = 88.5 which would round to 89.</i> <i>Both are about the same, but I would tell my parent the score for the median, because it would round up to a percent higher.</i></p>	<p>Analyze the central tendency of the following salaries of employees at Acme Roofing:</p> <p>\$15,800 \$25,600 \$22,000 \$30,500 \$99,400 \$26,280 \$32,750 \$18,650 \$29,220</p> <p>If you were a manager trying to hire a new employee at Acme Roofing, what would you say is the average salary? Would you use the mean or the median to give a more favorable picture of employee salaries? Discuss the effect of any outliers on your set of data.</p>	<p>Illuminations Online comparison of mean &amp; median: <a href="http://standards.nctm.org/documents/examples/chap6/6.6/index.htm">http://standards.nctm.org/documents/examples/chap6/6.6/index.htm</a></p>	<p>The Three Noodle Summary <a href="http://learner.org/channel/courses/learningmath/data/session4/part_b/index.html">http://learner.org/channel/courses/learningmath/data/session4/part_b/index.html</a></p> <p>Five Noodle Summaries <a href="http://learner.org/channel/courses/learningmath/data/session4/part_c/review.html">http://learner.org/channel/courses/learningmath/data/session4/part_c/review.html</a></p> <p>Drawing a Box Plot <a href="http://learner.org/channel/courses/learningmath/data/session4/part_d/drawing.html">http://learner.org/channel/courses/learningmath/data/session4/part_d/drawing.html</a></p> <p>Fair and Unfair Allocations <a href="http://learner.org/channel/courses/learningmath/data/session5/part_b/index.html">http://learner.org/channel/courses/learningmath/data/session5/part_b/index.html</a></p> <p>Adjusting Mean and Median Using a Dynamic Line Plot <a href="http://learner.org/channel/courses/learningmath/data/session5/part_c/balancing.html">http://learner.org/channel/courses/learningmath/data/session5/part_c/balancing.html</a></p>
--	---	---	--	--

<p>PS.7.6—Design and conduct probability experiments MA-M-3.2.6 M-7-PS-8</p>	<p>What is the probability that Shelley will roll an even sum when she rolls 2 dice?</p> <p><math>18/36 = \underline{\quad} = 50\%</math></p>	<p>Play the game <i>Remove One</i>: Players list all the possible sums of 2 dice down the left side of the paper. Each player then places 20 cubes next to any of the sums. Roll 2 dice and each player removes a cube from that sum. Continue until one player has removed all of the cubes. Students analyze the experimental probability to gain new strategies and play again. Then they analyze the theoretical probability of getting each sum and explain the best placement of cubes for winning.</p>	<p>We're All Tuned In <a href="http://www.pbs.org/teachersource/material/lessonplans/msmp/tunedin/tunedin_procedures.shtm">http://www.pbs.org/teachersource/material/lessonplans/msmp/tunedin/tunedin_procedures.shtm</a></p>	
--	---	---	---	--

<p>PS.7.7—Determine theoretical (mathematical) probabilities, compare to experimental results, and explain reasons why there might be differences, (i.e. Express probability as a ratio, decimal, or a percent as appropriate for a give situation)</p> <p>MA-M-3.2.4 MA-M-3.2.5 M-7-PS-9</p>	<p>If you toss 3 coins, what is the theoretical probability of getting all tails?</p> <p style="text-align: right;"><i>1/8</i></p>	<p>Complete the first 6 rows of Pascal's Triangle. Play a game, <i>Give Me Five</i>, in which you flip 5 coins and get 1 point for each heads. Find all the outcomes of flipping 2 coins, 3 coins, 4 coins, and 5 coins. Graph the outcomes on a TI-73 calculator. Connect the probability of getting each score to Pascal's Triangle.</p>	<p><a href="http://mathforum.org/numbercube/">http://mathforum.org/numbercube/</a>  <a href="http://www.pbs.org/teachersource/mathline/lessonplans/msmp/fantasy/fantasy_procedure.shtm">http://www.pbs.org/teachersource/mathline/lessonplans/msmp/fantasy/fantasy_procedure.shtm</a>  <i>Illuminations</i> Probability Simulation:  <a href="http://illuminations.nctm.org/imath/6-8/BoxModel/index.html">http://illuminations.nctm.org/imath/6-8/BoxModel/index.html</a></p>	
<p>PS.7.8—Explore concepts of randomness and independent events</p> <p>MA-M-3.3.4 M-7-PS-10</p>	<p>True or False. You have a blue, red and green marble in a bag. You choose a red marble and put it back in the bag. Then you choose a blue marble. This is an independent event.</p> <p style="text-align: right;"><i>True</i></p>	<p>Investigate the probability of drawing a heart from a deck of 52 cards. Explore what happens to the probability if each card drawn is not replaced. Examine the compound probability of drawing a red card, then another red card with and without replacement.</p>		

**Algebraic Ideas– Grade 7**

<b>Big Ideas</b>	<b>End-Of-Year Test Question</b>	<b>Resources/ Investigations</b>	<b>On-line Resources/Other</b>	<b>Notes/ Comments</b>
<p>A.7.1-Recognize, create, and continue <i>patterns</i>, giving the generalization for the <i>n</i>th term. Use variables to describe numerical patterns.</p> <p style="text-align: right;">MA-M-4.2.4 MA-M-4.3.1 M-7-A-1</p>	<p>Lesley helped put numbers on new lockers at school. The numbers started at 51 and continued on consecutively. She applied the numbers one digit at a time. When finished, she had used 413 digits. How many new lockers were there?</p> <p>Explain your thinking at each step and your answer(s).</p> <p style="text-align: right;"><i>154</i></p>	<p>Find the number of handshakes required for a group of 3, 4, 5, 10, 24, and <i>n</i> students.</p> <p>Complete the next 3 rows. Find the row number and position of the number 289. Find patterns and generalizations:</p> <p style="text-align: center;">1 3 5 7 9 11 13 15 17 19</p>	<p>Explore number patterns (natural, triangular, tetrahedral, fibonacci numbers) in this interactive Pascal’s Triangle: <a href="http://mathforum.org/workshops/usi/pascal/mo.pascal.html">http://mathforum.org/workshops/usi/pascal/mo.pascal.html</a></p> <p>Total Rectangles Pattern: <a href="http://www.nku.edu/~mathed/rectangles.pdf">http://www.nku.edu/~mathed/rectangles.pdf</a></p> <p>Sir Trap’s Pattern: <a href="http://www.nku.edu/~mathed/trap.pdf">http://www.nku.edu/~mathed/trap.pdf</a></p> <p>Patterns in Figurate Numbers: <a href="http://www.nku.edu/~mathed/figurate.pdf">http://www.nku.edu/~mathed/figurate.pdf</a></p>	<p>Finding a Pattern: <a href="http://www.learner.org/channel/courses/learningmath/algebra/session2/part_a/index.html">http://www.learner.org/channel/courses/learningmath/algebra/session2/part_a/index.html</a></p> <p>Tootpick Problem: <a href="http://www.learner.org/channel/courses/learningmath/algebra/session2/part_b/index.html">http://www.learner.org/channel/courses/learningmath/algebra/session2/part_b/index.html</a></p> <p>Counting Stairs: <a href="http://www.learner.org/channel/courses/learningmath/algebra/session2/part_d/index.html">http://www.learner.org/channel/courses/learningmath/algebra/session2/part_d/index.html</a></p>

<p>A.7.2-Represent, interpret, and describe <i>functional relationships</i> through tables, graphs, equations, and verbal rules. Solve problems involving formulas.</p> <p>MA-M-4.1.2  MA-M-4.2.3  MA-M-4.2.5  MA-M-4.3.1  M-7-A-2  M-7-A-6  M-7-A-8</p>	<p>Open Response: <i>Farmer John</i>  <a href="http://www.nku.edu/~mathed/gutzwiller.pdf">http://www.nku.edu/~mathed/gutzwiller.pdf</a></p>	<p>Play <i>Guess the Function</i>. The teacher makes a table and inserts a list of values for <math>x</math> ending in <math>n</math>, and only the first two values for <math>y</math>. Students try to fill in the matching values for <math>y</math> and the generalization for <math>n</math>.</p> <p>Use the TI73 Graphing Calculator linked with the CBR (Caculator-Based Ranger) to play match the graph through physical movement.</p>	<p>Virtual Manipulatives:  Function Machine  <a href="http://matti.usu.edu/nlvm/nav/frames_asid_191_g_3_t_1.html">http://matti.usu.edu/nlvm/nav/frames_asid_191_g_3_t_1.html</a>  Virtual Manipulatives:  Function Grapher  <a href="http://matti.usu.edu/nlvm/nav/frames_asid_109_g_3_t_1.html?open=activities">http://matti.usu.edu/nlvm/nav/frames_asid_109_g_3_t_1.html?open=activities</a></p>	<p>Function Machine:  <a href="http://www.learner.org/channel/courses/learningmath/algebra/session3/part_c/index.html">http://www.learner.org/channel/courses/learningmath/algebra/session3/part_c/index.html</a>  ***8<sup>th</sup> Grade?  Guess My Rule:  <a href="http://www.learner.org/channel/courses/learningmath/algebra/session9/part_b/index.html">http://www.learner.org/channel/courses/learningmath/algebra/session9/part_b/index.html</a></p>
--	---	--	---	--

<p>A.7.3-Understand, write, and solve single-variable equations and inequalities and numeric and algebraic expressions that may be applied to everyday situations.</p> <p>MA-M-4.1.1  MA-M-4.2.1  MA-M-4.2.2  MA-M-4.2.6  M-7-A-3  M-7-A-4  M-7-A-5</p>	<p>Give a real-life example for this algebraic expression by translating it into words:  <math>5x + 3 = 28</math></p>	<p>A taxi charges \$2 for entry and \$.50 per mile. Write and graph an equation showing the cost for any number (m) of miles.</p>	<p>Virtual Manipulatives:  Algebra Tiles  <a href="http://matti.usu.edu/nlvm/nav/frames_asid_189_g_3_t_2.html?open=activities">http://matti.usu.edu/nlvm/nav/frames_asid_189_g_3_t_2.html?open=activities</a>  Two Pan Balance Scales</p>	<p>Linear Relationships:  <a href="http://www.learner.org/channel/courses/learningmath/algebra/session5/part_a/index.html">http://www.learner.org/channel/courses/learningmath/algebra/session5/part_a/index.html</a></p> <p>Interactive Balance Scales:  <a href="http://www.learner.org/channel/courses/learningmath/algebra/session6/part_c/index.html">http://www.learner.org/channel/courses/learningmath/algebra/session6/part_c/index.html</a></p> <p>***8<sup>th</sup> Grade?  Thinking About Slope:  <a href="http://www.learner.org/channel/courses/learningmath/algebra/session5/part_b/index.html">http://www.learner.org/channel/courses/learningmath/algebra/session5/part_b/index.html</a></p> <p>***8<sup>th</sup> Grade?  Putting it Together:  <a href="http://www.learner.org/channel/courses/learningmath/algebra/session5/part_d/index.html">http://www.learner.org/channel/courses/learningmath/algebra/session5/part_d/index.html</a></p>
---	---	---	---	--

<p>A.7.4—Organize data into <i>tables</i> and <i>plot points</i> onto all four quadrants of a coordinate (Cartesian) system/grid and interpret the resulting patterns or trends.</p> <p style="text-align: right;">MA-M-4.1.3 M-7-A-7</p>	<p>Plot and label the following points on a coordinate graph:  A (2, 7)  B (3, 0)  C (-2, 4)  D (5, -1)  E (0, -3)</p>	<p>Students construct symmetric artwork on a coordinate grid by putting 4 points in each quadrant and 1 point on each (positive and negative) axis. Students then list the ordered pair for each point and reproduce the picture on a graphing calculator.</p> <p>For the function <math>y = -2x + 3</math>, make a table of 5 possible solutions and then plot those points.</p> <p>Measure the head circumference and height of each student and make a scatter plot to investigate the relationship. Ask students to find the line of best fit to predict the head size of someone who is 6 ft. tall.</p>	<p>Virtual Manipulatives:  Function Grapher  <a href="http://matti.usu.edu/nlvm/nav/frames_asid_109_g_3_t_1.html?open=activities">http://matti.usu.edu/nlvm/nav/frames_asid_109_g_3_t_1.html?open=activities</a></p> <p>Maze Game:  <a href="http://www.shodor.org/interactivate/activities/coords/index.html">http://www.shodor.org/interactivate/activities/coords/index.html</a></p>	<p>Mystery Location Graphs:  <a href="http://www.learner.org/channel/courses/teachingmath/grades6_8/session_02/section_04_a.html">http://www.learner.org/channel/courses/teachingmath/grades6_8/session_02/section_04_a.html</a></p> <p>Interpreting Stories and Graphs:  <a href="http://www.learner.org/channel/courses/teachingmath/grades6_8/session_05/section_02_b.html">http://www.learner.org/channel/courses/teachingmath/grades6_8/session_05/section_02_b.html</a></p>
---	--	--	---	---

<p>A.7.5— Show how the <i>change in one variable</i> affects the change in another variable (e.g. rate/time/distance). MA-M-4.3.2</p>	<p>a) If you travel 130 miles in 2 hours, what is your rate of speed? b) If you decrease the distance by 10 miles, but keep the time the same, what happens to the rate?</p> <p>a) <math>130/2 = 65 \text{ mph}</math> b) <math>120/2 = 60 \text{ mph}</math>; <i>It is reduced by 5 mph.</i></p>	<p>Write a story about a line graph showing a trip in which the time and distance increase, then time only increases, and finally time and distance increase with a steeper slope than the first part.</p> <p>Graph a favorite King's Island roller coaster ride with time as the independent variable and rate as the dependent variable.</p>	<p>Graphing Rates: <a href="http://www.learner.org/channel/courses/learningmath/algebra/session5/part_c/index.html">http://www.learner.org/channel/courses/learningmath/algebra/session5/part_c/index.html</a></p>
---	---	--	--