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CURRICULUM MAP

Subject:	Mathematics	**May 2010**	**Grade Level:**	Geometry

Calendar	Strand/Standard/ Benchmark	Performance Standard/ Essential Question	Suggested Student Activities/Assessments	Resources/Materials
1st Nine Weeks	**GEOMETRY AND TRIGONOMETRY: Students will understand geometric concepts and applications.** A--Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships.	**Mastery** 2.A.1. Interpret and draw two-dimensional objects and find the area and perimeter of basic figures (e.g., rectangles, circles, triangles, other polygons [e.g., rhombi, parallelograms, trapezoids]) **Mastery** 2.A.2. Find the area and perimeter of a geometric figure composed of a combination of two or more rectangles, triangles, and/or semicircles with just edges in common. **Mastery** 2.A.4. Interpret and draw three-dimensional objects and find the surface area and volume of basic figures (e.g., spheres, rectangular solids, prisms, polygonal cones), and calculate the surface areas and volumes of these figures as well as figures constructed from unions of rectangular solids and prisms with faces in common, given the formulas for these figures.	Explore surface area and volume of prisms interactively online: http://www.shodor.org/interactive/activities/sa_volume/index.html **Assessment:** Find the surface area and volume of food items (boxes of cereal, soup cans, etc.), include at least ten items, and record the results in a chart or spreadsheet. **(Rep., Con., R&P)** Given the areas of the sides of a rectangular prism, assess its volume (e.g., faces of 120 cm², 72 cm², and 60 cm²) **Assessment:** Write a paragraph, clearly explaining the process of finding the volume. **(Rep., Comm., Prob. Sol.)** Using given parameters, determine which changes can be made to a trough so that it will hold more water; i.e. how changes in the length and/or base affect volume. http://www.utdanacenter.org/mathtoolkit/downloads/geoassess/geo_4_troughs.pdf **Assessment:** Write a brief explanation why the trough choice is best. **(Comm., Con., R&P, Rep., Prob. Sol.)**	Smartboard would be an excellent tool for all Math classes to help facilitate all lessons. Both the student and the teacher would greatly benefit from this interactive tool. http://www.mathsnet.net/geometry/solid/index.html nice interactive website examining the properties of solids

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1st Nine Weeks	**GEOMETRY AND TRIGONOMETRY: Students will understand geometric concepts and applications.** D. Use visualization, spatial reasoning, and geometric modeling to solve problems. ALGEBRA, FUNCTIONS, AND GRAPH: Students will understand algebraic concepts and applications. A. Represent and analyze mathematical situations and structures using algebraic symbols.	**Mastery** 2.D.1. Solve real-world problems using congruence and similarity relationships of triangles (e.g., find the height of a pole given the length of its shadow). **Mastery** 2.D.2. Solve problems involving complementary, supplementary, and congruent angles. **Mastery** 1.A.7. Know, explain, and use equivalent representations for the same real number including integers, decimals and ratios.	Use patty paper (paper folding) Allow exploration and discovery of angle relationships faster and more accurately. **Assessment:** Write a paragraph analyzing why each construction produces the desired result. **(Comm., R&P, Prob. Sol, Con., Rep.)** Use Geometer's Sketchpad so that each student can construct objects, figures and diagrams to explore their unique properties **Assessment**: Being as detailed as possible, write a summary explaining the use of angles. **(Comm., R&P, Prob. Sol, Con., Rep.)**	Patty paper "Patty Paper Geometry" by Michael Serra The Geometer's Sketchpad (Software) (The Geometer's Sketchpad can be used to support all Geometry and many Algebra Standards)

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1st Nine Weeks	**GEOMETRY AND TRIGONOMETRY: Students will understand geometric concepts and applications** B. Specify locations and describe spatial relationships using coordinate geometry and other representational systems See also Algebra Strand 1.C.1	**Mastery** 2.B.1. Demonstrate understanding of the construction of the coordinate plane, know the names of the origin, coordinate axes and four quadrants, draw and label them correctly, find the coordinates of an indicated point, and plot a point with given coordinates. **Mastery** 2.B.2. Determine the midpoint and distance between two points within a coordinate system and relate these ideas to geometric figures in the plane (e.g., find the center of a circle given two endpoints of a diameter of the circle. **Mastery** 2.B.3. Given two linear equations, determine whether the lines are parallel, perpendicular, or coincide.	The following website can be used to show different constructions such as midpoint. Teacher will need to practice the manipulation of the software to achieve desired results. Using the solution option allows the steps to be shown. **http://wims.unice.fr/wims/wims.cgi?session=1V77FB9E9B.5&+lang=en&+cmd=intro&+module=tool%2Fgeometry%2Frulecomp.en&+special_parm=1** **Assessment**: The student will copy a segment, bisect a segment, copy an angle and bisect an angle using paper, pencil and a compass. Write a short summary to describe how to draw a segment twice as long as a given segment. **(Comm., Rep., Con., R&P)**	Patty Paper Geometer's Sketchpad Compass and straightedge ML Geometry, Activity1.4, pg 33

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Calendar	Strand/Standard/ Benchmark	Performance Standard/ Essential Question	Suggested Student Activities/Assessments	Resources/Materials
2nd Nine Weeks	**GEOMETRY AND TRIGONOMETRY: Students will understand geometric concepts and applications.** D. Use visualization, spatial reasoning, and geometric modeling to solve problems.	**Mastery** 2.D.1. Solve real-world problems using congruence and similarity relationships of triangles (e.g., find the height of a pole given the length of its shadow).	On a sunny day, have students find the height of the flagpole, a tree, and a light pole using similar triangles. **Assessment**: Have the different student groups compare their results on a chart to verify their accuracy. **(Con., Comm., Rep., Prob. Sol., R&P)** The student will use inequalities in two triangles in everyday situations such as distance traveled. **http://www.classzone.com/cz/books/geometry_2007_na/resources/applications/animations/geom07_ch05_pg336.html** **Assessment:** Students will write a brief summary of how the Hinge theorem affects distance. **(Con., Comm., Rep., Prob. Sol., R&P)**	Tape measure or yardstick and a clipboard. Classzone.com

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2nd Nine Weeks	**GEOMETRY AND TRIGONOMETRY: Students will understand geometric concepts and applications.** A. Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships.	**Mastery** 2.D.4. Solve problems using the Pythagorean theorem **Mastery** 2.D.5. Understand and use elementary relationships of basic trigonometric functions defined by the angles of a right triangle **Mastery** 2.D.6. Use trigonometric functions to solve for the length of the second leg of a right triangle given the angles and the length of the first leg.	Students explore ways that the Pythagorean Theorem can be used in real-world applications http://www.regentsprep.org/Regents/math/geometry/GP13/indexGP13.htm **Assessment:** Students will write a brief explanation describing how the Pythagorean Theorem is applied in the activity. **(Rep., Con., R&P, Comm.)** **S**tudents will explore the different proofs of the Pythagorean Theorem. www.pbs.org/teachers/mathline/concepts/historyandmathematics/activity1.shtm **Assessment:** Students will write a brief paragraph about one of the three methods illustrating how the algebraic steps support the proof model chosen (may include a drawing to assist in the explanation) **(Comm., Rep., R&P)** Students will apply sine and cosine ratios to calculate distances. **www.classzone.com/cz/books/geometry_2007_na/resources/applications/animations/geom07_ch07_pg475.html** **Assessment**: Students will write a brief paragraph assessing how these concepts can answer questions in their own lives. **(Con., Comm., Rep., Prob. Sol.)** Students will find the height of a large object at school by using trig, distance from the object and angle of elevation through use of a clinometer. **Assessment**: Students will make a table with their results and compare their table to all other students and check against an established standard. **(Rep., Comm., Con., Prob. Sol.. R&P)**	Geometer's Sketchpad http://www.regentsprep.org/Regents/math/geometry/GP13/PracPyth.htm (Good interactive website for practice using Pythagorean Theorem, is multiple choice, but each answer also requires explanation) Clinometer – This apparatus is used to measure angle of elevation and depression

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2nd Nine Weeks	**DATA ANALYSIS AND PROBABILITY: Students will understand how to formulate questions, analyze data, and determine probabilities.** B. Select and use appropriate statistical methods to analyze data. D. Understand and apply basic concepts of probability	**Mastery** 3.B.3. For univariate data, be able to display the distribution and describe its shape using appropriate summary statistics, and understand the distinction between a statistic and a parameter: • construct and interpret frequency tables, histograms, stem and leaf plots, and box and whisker plots • calculate and apply measures of central tendency (mean, median, and mode) and measures of variability (range, quartiles, standard deviation) **Mastery** 3.D.3. Use simulations to compute the expected value and probabilities of random variables in simple cases.	Students will explore experimental and theoretical probability through the use of a game spinner with variable sized sectors. (Note: If the link below doesn't take you directly to this activity, add the Adjustable Spinner in the address box.) www.shodor.org/interactivate/activities/AdjusableSpinner/ **Assessment:** Students will write a brief analysis of how probability is affected based on sector sizes. **(Rep., Prob. Sol., Comm.)**	M-L Geometry pages 887-893 (These concepts will have been fully covered in previous courses so this is largely review)

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3rd Nine Weeks	**GEOMETRY AND TRIGONOMETRY: Students will understand geometric concepts and applications.** A. Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships.	**Mastery** 2.A.3. Find and use measures of sides and interior and exterior angles of triangles and polygons to classify figures (e.g., scalene, isosceles, and equilateral triangles; rectangles [square and non-square]; other convex polygons). **Mastery** 2.A.7. Write geometric proofs (including proofs by contradiction), including: • theorems involving the properties of parallel lines cut by a transversal line and the properties of quadrilaterals • theorems involving complementary, supplementary, and congruent angles • theorems involving congruence and similarity • the Pythagorean theorem (tangram proof)	Hangman Game. Students will play the word game and review vocabulary associated with quadrilaterals. Can be played using only chalk (low tech) or on computer/infocus at www.quia.com/hm/95871.html **Assessment:** Students will reinforce their vocabulary of quadrilaterals. **(Comm.)** Students will play the game "What's my Quadrilateral" Clues will be given for a mystery quadrilateral and student will have to predict the proper formal name of the quadrilateral and justify their response. A class or individual activity. **Assessment:** Students will write a brief paragraph or create a Venn diagram comparing and contrasting of any two quadrilaterals of their choice. **(Comm., Rep.,)**	This is a teacher resource page. http://www.regentsprep.org/Regents/math/geometry/GP9/TQuad.htm Resource for Venn Diagrams for this assessment. **http://illuminations.nctm.org/LessonDetail.aspx?id=L277**

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3rd Nine Weeks	**GEOMETRY AND TRIGONOMETRY: Students will understand geometric concepts and applications.** C. Apply transformations and use symmetry to analyze mathematical situations.	**Mastery** 2.C.1. Describe the effect of rigid motions on figures in the coordinate plane and space that include rotations, translations, and reflections: determine whether a given pair of figures on a coordinate plane represents the effect of a translation, reflection, rotation, and/or dilation sketch the planar figure that is the result of a given transformation of this type **Mastery** 2.C.2. Deduce properties of figures using transformations that include translations, rotations, reflections, and dilations in a coordinate system: • identify congruency and similarity in terms of transformations • determine the effects of the above transformations on linear and area measurements of the original planar figure	Please refer to this website: **http://mathforum.org/sum95/suzanne/symsusan.html** The teacher may display the top portion of the page showing examples of Rotation, Translation and reflections. This website shows great examples of rotation, translation and reflections that can be displayed on the infocus machine. At the bottom of the page there are problems (Students use capital letters in these exercises) available for the teacher to use or adapt to give the student further understanding. **Assessment:** Students will use 3 letters from their name to distinguish and verbally justify translation, rotation and reflection. **(Comm., Con., R&P)** Students will draw a tessellation using two different shapes. **http://www.classzone.com/cz/books/geometry_2007_na/resources/applications/animations/geom07_ch09_pg617.html** **Assessment:** Students will practice the activity on classzone.com and then will create a paper version of their virtual creation. **(Rep.)**	Geometer's Sketchpad will be an excellent tool to show rotation, translation and reflection. This website is a good interactive site for showing rotation, reflection and translation. Can be shown using the infocus machine. http://www.shodor.org/interactivate/activities/Transmographer/ This website has 3 good activities under **teacher strategies** which can be used as hands on activities. http://www.education.vic.gov.au/studentlearning/teachingresources/maths/mathscontinuum/space/Sp45003P.htm ML Geometry pg. 606 (An alternative method for showing rotation.) ML Geometry pg. 607 An investigating activity involving reflection and double reflection.

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3rd Nine Weeks	**GEOMETRY AND TRIGONOMETRY: Students will understand geometric concepts and applications.** B. Specify locations and describe spatial relationships using coordinate geometry and other representational systems. **DATA ANALYSIS AND PROBABILITY: Students will understand how to formulate questions, analyze data, and determine probabilities. A. Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.** D. Understand and apply basic concepts of probability	**Mastery** 2.B.4. Use basic geometric ideas (e.g., the Pythagorean theorem, area, and perimeter of objects) in the context of the Euclidean Plane, calculate the perimeter of a rectangle with integer coordinates and sides parallel to the coordinate axes and with sides not parallel.(Also covers 2.A.2) **Mastery** 3.D.2. Understand the concept of probability as relative frequency. **Mastery** 3.D.5. Understand how to compute the probability of an event using the basic rules of probability: • complement rule • addition rule (disjoint and joint events) • multiplication rule (independent events) • conditional probability	Students will design a house plan with given parameters. (Parameters might be such items as 1200sq ft total for the house, 2 bedrooms, 1 bathroom, living room, kitchen, etc.) Student will list the sq. footage for each room. Use teacher discretion in determining detail. **Assessment:** In addition to floor plan, student will justify choices in their layouts by writing a brief summary. **(Con., Comm., Prob. Sol., R&P, Rep.)** This website can be used to present area/perimeter to the class or individually. It best shows that different shapes can have the same area **http://www.shodor.org/interactivate/activities/AreaExplorer/** **Assessment:** The student will draw 2 different shapes that have the same area similar to what is shown during the activity **(Rep., Prob. Sol.)**	Smartboard would be very helpful for teacher instruction. Paper, straight edges **Graph Paper (w/ 1cm boxes)** **This website specifically addresses geometric probability.** **http://www.classzone.com/cz/books/geometry_2007_na/resources/applications/animations/geom07_ch11_pg771.html**

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Calendar	Strand/Standard/ Benchmark	Performance Standard/ Essential Question	Suggested Student Activities/Assessments	Resources/Materials
4th Nine Weeks	**GEOMETRY AND TRIGONOMETRY: Students will understand geometric concepts and applications.** A. Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships. D. Use visualization, spatial reasoning, and geometric modeling to solve problems.	**Mastery** 2.A.4. Interpret and draw three-dimensional objects and find the surface area and volume of basic figures (e.g., spheres, rectangular solids, prisms, polygonal cones), and calculate the surface areas and volumes of these figures as well as figures constructed from unions of rectangular solids and prisms with faces in common, given the formulas for these figures **Mastery** 2.D.3. Solve problems involving the perimeter, circumference, area, volume, and surface area of common geometric figures (e.g., 'Determine the surface area of a can of height h and radius r. How does the surface area change when the height is changed to 3h? How does the surface area change when the radius is changed to 3r? How does the surface area change when both h and r are doubled?').	Students will investigate geometric solids, surface area and volumes through variety of online construction and hands-on activities that will allow them to experience first-hand these concepts. **http://demonstrations.wolfram.com/MaximizingTheVolumeAndSurfaceAreaOfGeometricSolidsInscribedI/** **Assessment:** Students will record their data and compare their results to the rest of class and display and critique their constructions using a rubric supplied by the teacher. **(Rep., Comm., R&P, Prob. Sol., Con.)**	Geometer's Sketchpad will be helpful for these benchmarks. This link will take you to a 5 lesson course involving solids. It includes a very good interactive tool for showing solids. **http://illuminations.nctm.org/LessonDetail.aspx?ID=U122**

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4th Nine Weeks	**GEOMETRY AND TRIGONOMETRY: Students will understand geometric concepts and applications.** D. Use visualization, spatial reasoning, and geometric modeling to solve problems. See also Algebra Strand 1.C.1 and 1.C.9	**Mastery** 2.D.1 Solve real world problems using congruence and similarity, relationships of triangles. **Mastery** 2.D.2 Solve problems involving complementary, supplementary and congruent angles.	Students will use Geometer's Sketchpad to explore concepts related to circles and spheres**.** **http://ced.ncsu.edu/techcomps/portfolio/artifacts/unit.PDF** (This is a lesson plan only) **Assessment:** Students will create a portfolio with all sketchpad printouts that will show all objects correctly labeled. **(Comm., Rep., Con.)** Students will explore angle relationship in circles using the real world application of the phenomenon of the Northern Lights. **http://www.classzone.com/cz/books/geometry_2007_na/resources/applications/animations/geom07_ch10_pg682.html** **Assessment:** Students will write a brief summary assessing why the Northern Lights are typically seen at only certain latitudes and/or elevations. **(Comm., R&P, Con.)**	Geometer's Sketchpad is a necessity for this activity. Smartboard would be very beneficial for this activity. This website is a list of animations on the properties of circles. http://www.classzone.com/cz/books/geometry_2007_na/get_chapter_group.htm?cin=4&rg=animated_math&at=animations&var=animations

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Process Standards are cited at the end of each assessment as follows:
Problem Solving (Prob. Sol.)
Reasoning and Proof (R&P)
Communication (Comm.)
Connections (Con.)
Representation (Rep.)

Resources

- Teacher/Student Resource: Math for Morons Like Us http://library.thinkquest.org/20991/home.html
  (This is a good web site for new teachers or teachers who might need a little refreshing on a particular problem. This site covers the areas from Pre-Algebra up to Calculus. Students may also find this site helpful.)
- Geometry Games/Activities/Lessons: http://www.coolmath.com
- Geometry Games: http://www.quia.com/shared/search
- Geometry Vocabulary Word Search with key: http://education.jlab.org/indexpages/elementgames.php
- Cool Geometry Sites! Cool Math Puzzles and Cool Math Brain Teasers Sites! Cool Math Web Quest Sites! Cool Math Humor! Cool Elementary, Middle School, and High School Math Teacher Resources! http://cte.jhu.edu/techacademy/web/2000/heal/siteslist.htm
- Online Graphing Calculators: http://www.webgraphing.com/
- Lots of math resources: http://www.homeschoolmath.net/
- Lots of math resources: http://www.math.utah.edu/mathed/resources.html#Mid
- Lots of math resources (SAT/ACT test prep, AP, math tutoring, MATH CARTOONS): http://www.charlottemathtutor.com/