

**GEOMETRY AND SPATIAL SENSE (GEOM)
Final Course Syllabus**

Day	Time	WHAT (skill and knowledge goals/concepts)	HOW (activities)
Day 1 Community Building and Basic Terms and Use of Protractor	AM	9:00 Introductions, etc.	Check class roster. Ice-breakers: each st says name, whole class repeats; fill out interest cards (sts write full name, where they live, name of their school, what they liked about math last year, what they hope to learn in this class); play "People Meeter" activity.
		9:50 Honor Code discussion and activity	CTY Honor Code has been retyped into thirteen separate sections (one for each st) and enlarged. Sections are read by sts in order and taped to a poster; discuss meaning of ea section as it is read. Sign honor code handout and computer use policy.
		10:15 Break	
		10:25 Pre-assessment	Written pre-assessment, individual
		10:45 Scale	Teacher has made a 6x6 map grid of the local area that includes the hometown of ea st, Pasadena CTY campus, and other cities of local interest. Ea st takes one piece of the grid and enlarges it with chalk on a much larger grid made outside on the pavement. Discuss scale, do activities to see where each other lives, measure distance from hometown to Pasadena and compare with others.
11:15 Terms: point, line, line segment, ray, angle	Discuss and demonstrate terms; sts act out ea term; record vocab in notebook		

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	PM	1:00 Measure and draw angles 2:00 Pipe Cleaner angles	Teach correct use of a protractor; use to measure angles on worksheet; use to draw angles of specified measurement In pairs, sts make a set of specified angles out of pipe cleaner, taped to construction paper. Use protractors. Label angles and state where ea angle may be found in real life.
Homework: Measure angles, draw angles, practice using today's vocabulary			
Day 2 ¼ Scale, Naming figures with alpha notation, and Pentominoes investigation	AM	9:00 Scale 10:25 Origami 10:35 Naming figures; Pentominoes	What is ¼ scale? Handout to practice computations. Measure selves and draw self to ¼ scale on poster board. Use calculators. Dog Name points, lines, planes, etc. with alphabetic notation. Handout to practice. Group/partner investigation: How many different pentomino shapes are there? Draw, cut, and record findings. Test for congruence.
	PM	1:00 Spatial reasoning 2:00 Spatial reasoning; finish morning scale project	Use <i>Seeing Solids and Silhouettes</i> , Investigation 1, Session 1. Build models with multi-link cubes to given specifications. Test where specific blocks in the drawings are located on the actual "building" made out of cubes. Given base views of a building, sts are to construct the face views of the same "buildings."
	Homework: Skills packet to practice naming figures with alphabetic notation; home investigation to find objects of right angle measurement and obtuse and acute measurements.		

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Day 3 Begin <i>The Wright 3</i>, Polygons, and Sums of interior angles	AM	9:00 <i>The Wright 3</i> 9:30 Polygons 10:25 Origami 10:40 Interior angles	<p>Read Chapter 1 together. Discuss premise of book. Show photos of the Robie House to get a sense of setting. Start a chart to identify references to geometry in book and predictions of hidden patterns in the illustrations.</p> <p>What are they? Define, including convex, concave, and nonpolygons. Sort examples/non-examples.</p> <p>Bird beak Sts found sums of interior angles for an equilateral triangle and a square by tearing and reforming. Found sums of interior angles of other regular polygons by measuring. Recorded results and noted patterns that were discovered.</p>
	PM	1:00 Spatial reasoning game 2:00 Spatial reasoning	<p>Introduce “Noodlers” stick game. Leave as free-time activity. Continue morning interior angle measurements if not finished.</p> <p>Used <i>Seeing Solids and Silhouettes</i>, Investigation 1, Session 2.</p>
	<p>Homework: <i>The Wright 3</i> Read chapters 2-4 and record findings to share in class tomorrow. Re-measure any incorrect angles from Mon. night’s HW. Draw face views from given base views of “buildings.”</p>		

Day	Time	WHAT (skill and knowledge goals/concepts)	HOW (activities)
Day 4 Vertical angles, Supplementary angles, Folding pentominoes	AM	9:00 <i>The Wright 3</i> 9:20 Vertical angles 10:25 Origami 10:40 Supplementary angles	Discuss events and findings from HW reading. Record on chart. Sts draw non-perpendicular lines, measure one angle, then measure the vertical angle. Make inferences based upon everyone's findings. Define "property." Use the Property of Vertical Angles to find the measure of all angles around an intersecting point after measuring just one angle. Butterfly Discover property of supplementary angles in method similar to 9:00 lesson. Use property to test various supplementary angles drawn by sts. Use spare time to finish up other projects or use geometry games.
	PM	1:00 Folding Pentominoes 2:00 Spatial reasoning	Question: Which of the 12 pentomino shapes can be folded into an open cube? If so, which square would be the bottom? Predict first with plastic pieces, record predictions, then test with paper pentominoes. Mark predictions correct or incorrect. Used <i>Seeing Solids and Silhouettes</i> , Investigation 2, Session 3.
	Homework: <i>The Wright 3</i> Read chapters 5-7 and record findings to share in class tomorrow. Skills packet: line segments and angles		

Day	Time	WHAT (skill and knowledge goals/concepts)	HOW (activities)
Day 5 Compass Technique, Construc- tions, and Week 1 Check-up	AM	9:00 <i>The Wright 3</i> 9:30 Compass technique 10:25 Constructions	Discuss events and findings from HW reading. Record on chart. Sts free practice with tips from teacher. For artistic effect, draw 10 intersecting circles of differing radii on const paper and color the resulting sections. Tchr and PA lead sts through 4 basic constructions and record algorithm (steps) as we go. Reproduce a line segment, construct a perpendicular bisector, reproduce an angle, and find center of a circle.
	PM	1:00 Week 1 check-up 2:00 Spatial reasoning	Sts take teacher-made assessment of various topics and skills from Days 1-4. Wrap-up any unfinished projects. <i>Seeing Solids and Silhouettes, Investigation 2, Session 4.</i>
	Homework: <i>The Wright 3</i> Read chapters 8-10 and record findings to share in class on Monday.		

Day	Time	WHAT (skill and knowledge goals/concepts)	HOW (activities)
Day 6 Compass Constructions, Creating non- congruent polygons, and complemen- tary angles	AM	9:00 <i>The Wright 3</i> 9:30 More basic constructions 10:25 Origami 10:35 Continue constructions	Discuss events and findings from HW reading. Record on chart. Students continue through packet in pairs and work to form the following constructions based upon the techniques learned on Friday: <ul style="list-style-type: none"> • find midpoint of line segment • find perpendicular through given point on a line segment • find perpendicular through given point above line segment • construct a congruent triangle • find perpendicular through given endpoint of a line segment • construct a circle to intersect two given points on a line segment Jumping Frog Sts who finish early will investigate how they might inscribe a circle with an equilateral triangle and a square.
	PM	1:00 Polygons 2:00 Complementary angles	Pairs investigate and record how many different convex and concave polygons they can form with toothpicks. Define as regular or irregular. Glue findings to construction paper. Check to be sure none are congruent. Develop definition. Sts practice by constructing their own perpendicular bisectors with compass and straight-edge, then dividing the right angle with any ray and measuring the resulting angles. Make connections to vertical angles and supplementary angles. End of day: sts make corrections to Friday's assessment to solidify concepts.
	Homework: <i>The Wright 3</i> Read chapters 11-14 and record findings to share in class on Tuesday. Vertical angles worksheet. Supplementary and complementary angles worksheet.		

Day	Time	WHAT (skill and knowledge goals/concepts)	HOW (activities)
Day 7 Triangles, Inscribing polygons, and Vertical Angle Algebra	AM	9:00 <i>The Wright 3</i>	Discuss events and findings from HW reading. Record on chart.
		9:30 Inscribe polygons	Inscribe an equilateral triangle, a hexagon, and a square. Use combinations to make unique design.
		10:25 Triangles	Discover properties of triangles. Measure angles and sides, name them, classify. Revisit constructing congruent triangles with compass if students have extra time.
		11:45 Paper folding	Diego will teach the class how to fold his favorite paper airplane. Use them on the lawn at lunch break.
	PM	1:00 Spaghetti Triangles	Use spaghetti of specific lengths to explore properties of the sides of triangles.
		2:00 Vertical Angle algebra	Relate concept of vertical angles being of equal measure to algebraic equations that must "balance" on each side. Use worksheet for practice. This lesson is in response to st interest cards from first day of class.
Homework: <i>The Wright 3</i> Read chapters 15-18 and record findings to share in class on Wednesday. Triangle classification worksheet and finding triangles within a larger drawing worksheet.			

Day	Time	WHAT (skill and knowledge goals/concepts)	HOW (activities)
Day 8 Inscribing more polygons	AM	9:00 <i>The Wright 3</i>	Discuss events and findings from HW reading. Record on chart.
		9:30 Compass constructions	Inscribe a regular octagon and a regular pentagon. Make patriotic stars from the points of a pentagon—use circles with radii of 2.5 inches.
		10:25 Origami	Boat
		10:40	Continue octagon and pentagon constructions. With extra time before 12:00, sts finish spaghetti triangle measurements then may begin creating their own artistic designs utilizing any of the compass constructions we have learned.
	PM	Fourth of July Holiday	1:00 Dismissal
Homework: <i>The Wright 3</i> Read chapters 19 & 20 and record findings to share in class on Thursday.			
Day 9 Quadrilaterals and Tangrams	AM	9:00 <i>The Wright 3</i>	Discuss events and findings from HW reading. Record on chart.
		9:15 Quadrilaterals	Discuss properties and names and classification. Record classification flow chart in notebooks. Find sums of interior angles by tearing and reforming corners for 7 diff quads.
		10:25 Origami	Cicada
		10:40 Continue quadrilateral work	Investigate properties of the diagonals for 7 diff quads
	PM	1:00 Tangrams	Students form own tangrams following specific written/illustrated directions, then use them to make a variety of figures.
		2:00 Tessellations	Develop definition based on characteristics of examples. Make with pattern blocks. Practice slide tessellations with index cards.

Day	Time	WHAT (skill and knowledge goals/concepts)	HOW (activities)
	Homework: <i>The Wright 3</i> Read chapters 21 & 22 and record findings to share in class on Friday. Triangle exploration (take home “Spaghetti Triangles” worksheet for reference). Quadrilaterals: beach towel design project.		
Day 10 Circles	AM	9:00 <i>The Wright 3</i>	Discuss events and findings from HW reading. Record on chart. Sts present their “Quadrilateral Beach Towel” designs from homework.
		9:30 Circles	Investigate properties of circles. Solidify all vocabulary (radius, diameter, chord, arc, circumference, tangent line, interior angles). Develop concept of π with string, measuring, and calculating. Property of π is a constant. Use π to calculate areas and circumferences of a variety of circles (use objects in room, lids from home, and handouts).
		10:25 Origami	Crow
		10:40 Continue circles	Complete earlier investigations. Measure angles formed by 3-6 radii—what is the sum of their measures? Tessellate circles—constant radii. Experiment with different ways to make symmetrical artwork with compass (integrate constructions they have learned).
PM	1:00 Catch-up work	Use time to tie up loose ends of the week’s projects, correct work that needs fixing, and then do extensions of this week’s lessons if time permits.	
	2:00 Spatial reasoning	<i>Seeing Solids and Silhouettes</i> , Investigation 2, Session 4 (continued).	
Homework: <i>The Wright 3</i> Read chapters 23-26 and record findings to share in class on Monday. Circle skills worksheets. <i>Seeing Solids and Silhouettes</i> Student Sheet 13.			

Day	Time	WHAT (skill and knowledge goals/concepts)	HOW (activities)
Day 11 Diameter and Area of circles; Perimeter and Area of polygons	AM	9:00 <i>The Wright 3</i>	Discuss events and findings from HW reading. Record on chart.
		9:30 Calculating diameter	Review equation $C = \pi d$. How can we use that equation to find the diameter of a circle? How can we find the diameter of a tree trunk? Sts go outside to investigate and apply knowledge by measuring the circumference of five pre-marked tree trunks. Record measurements on a chart made in speckled notebooks. Convene in class and share findings.
		10:25 Origami	Whale
		10:40 Interior angles of circles	Sts construct circles, draw radii, and measure angles formed. What is the resulting sum?
		11:00 Area of circles	Develop formula $A = \pi r^2$. Why does that work? Demonstrate proof on board and through internet animation. (http://curvebank.calstatela.edu/circle/circle.htm) Worksheets to practice.
	PM	1:00 Perimeter and area of polygons	Develop algorithms. Worksheets to practice.
		2:00 Spatial reasoning	<i>Seeing Solids and Silhouettes</i> activities
Homework: <i>The Wright 3</i> Read chapters 27-30 and record findings to share in class on Tuesday. Index card slide tessellation with 2 slides—design at home and share on Tuesday. Skills worksheets: constructing circles of specified radii and constructing circles with specified interior angles.			

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Day 12 Pythagorean Theorem; Polyhedra and Nets	AM	9:00 <i>The Wright 3</i>	Discuss events and findings from HW reading. Record on chart.
		9:30	Revisit “Triangle Exploration Homework” assignment from last week. Solidify concepts. PA takes students aside who already completed assignment correctly to work with them on more advanced problems regarding area of circles.
		10:25 Pythagorean Theorem	Revisit properties of right triangles. Sts work on proof of theorem with graph paper (handout gives directions). Apply to new situations and problems to find length of hypotenuse for any right triangle.
		11:45 Origami	Balloon
	PM	1:00 Polyhedra and Nets	Develop and record vocabulary: <i>face, edge, vertices/vertex</i> . Sketch (teach 3D perspective). Predict what polyhedron a net would form. Cut and use to test predictions.
Homework: <i>The Wright 3</i> Read chapters 31-34 and record findings to share in class on Wednesday. Worksheets to practice polyhedra shapes and vocabulary.			

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Day 13 Fibonacci Day; Some Review	AM	9:00 <i>The Wright 3</i> 9:45 Fibonacci brick problem 10:25 Origami 10:40 Revisit constructions	Discuss events and findings from HW reading. Focus on conclusion of story. Record findings on chart. Sts use cut index cards (2.5"x1.25") to form brick walls 2 units tall. How many combinations can be made with 1 brick? 2 bricks? 3 bricks? 4 bricks? etc. Is there a pattern to the number of combinations possible for each? Swan Sts need to review how to perform basic and advanced constructions with their compass and straightedge. Required: bisecting a line, inscribing an equilateral triangle, and finding the center of a circle. Sts use notes to perform these constructions and others of their choosing.
	PM	1:00 Fibonacci 2:00	Sts and tchr examine realia to find examples of the Fibonacci sequence. Use whole pineapple (spirals), daisies (petals and/or sepals), pinecones (spirals), & other flowers as available. Record any findings we can. View related website for excellent examples. http://www.mcs.surrey.ac.uk/Personal/R.Knott/Fibonacci/fibnat.html#leaf Fibonacci "stumpers and puzzlers" on handouts.
	Homework: <i>The Wright 3</i> final project—square pyramid diorama		

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Day 14 Post-Assess; Final Project; Prepare for Parent Day	AM	9:00-12:00	<ul style="list-style-type: none"> • Share dioramas • Post Assessment • Student Program Evaluations (30 min.) • Origami—Penguin • Compose a coded message to parents in same format as <i>The Wright 3</i>. • Give instructions and specifications for final project; groups of 3 begin planning their bridge structure
	PM	1:00-2:30	Construct bridges
	Homework:		
Day 15 Loose Ends	AM	9:00-10:00	Complete bridge project
		10:00-10:30	Groups share their bridges and point out the specifications they included.
		10:45	Origami—Crane
		11:00-11:45	Prepare for parent presentations
	PM	1:00-1:30	Closing Ceremonies in Student Center
		1:30-2:00	Parent presentations in classroom
2:00-4:30		Tchr and PA available for informal parent conversations specific to their child	