

## Geometry and Its Applications Syllabus

		What	How
<b>Day 1</b>	<b>Morning</b>	<p>Morning Opener</p> <p>Notebooks, Tone, Expectations, Honor Code, Activity Sign-Ups</p> <p><u>Ch 0 Geometry and Art</u></p> <ul style="list-style-type: none"> <li>discover geometry in nature, art, and culture</li> <li>introduce and practice with geometric tool</li> <li>differentiate between a ruler and a straightedge</li> </ul> <p><u>Ch 1 Building Blocks</u></p> <p>1.1 point, line, plane, etc...</p> <ul style="list-style-type: none"> <li>writing solid definitions</li> <li>What makes a good definition?</li> <li>Categorizing</li> </ul> <p>Midpoint</p> <p>1.2 Angles and Measure</p> <ul style="list-style-type: none"> <li>terminology</li> <li>practice writing definitions</li> <li>use of a protractor</li> </ul> <p>1.3 What's a widget?</p> <ul style="list-style-type: none"> <li>Proper classifications</li> <li>Disproving with counterexamples</li> <li>Differentiating terms; when to reference prior knowledge of definitions</li> </ul>	<p>view samples</p> <p>0.2 create Astrid {8-pointed star} independently with group support (P)</p> <p>set 0.2 # 1, 2, 4, 5 {#3 <i>or</i> use as model to create unique design}</p> <p>Group to create, compare, and counterexample definitions</p> <p>UYAS 1 Midpoint</p> <p>Investigate incoming / outgoing angles with ball and wall Cool Pool WKST 1.2 # 10-13, 15, 24, 32, 35-40</p> <p>1.3 #6-9,11-20, 29, 30</p> <p>Quiz 1, Ch 1</p>
	<b>Afternoon</b>	<p>1.4 Polygons</p> <ul style="list-style-type: none"> <li>Naming types of polygons</li> <li>Defining concave vs. convex</li> <li>Strengthening visual / spatial thinking with tangrams</li> </ul> <p>1.5 Triangle and Special Quadrilaterals</p> <ul style="list-style-type: none"> <li>Practice writing solid definitions with proper vocabulary</li> <li>Practice the three steps to solid definitions</li> </ul> <p>1.6 Circles</p> <ul style="list-style-type: none"> <li>Know and apply terminology of circles</li> </ul>	<p>Polygon OH to name and label concave vs. convex</p> <p>1.4 # 16, 21, 22, 28-34</p> <p>Partner work to classify samples in text of 1.5 1.5 # 2-12, 21-30</p> <p>1.6 #1-8, 13, 15</p>
	<b>Evening</b>	<p>Review of day's material</p> <ul style="list-style-type: none"> <li>Finish line designs</li> <li>Ch 1 Quiz 2</li> <li>Ch 1 Text Review pgs 88-92 # 1-16, 26-29, 31, 43, 44, 46, 51</li> <li>Tangrams</li> </ul>	<p>Ch 1 Quiz 2 Ch 1 text</p>

		<b>What</b>	<b>How</b>
<b>Day 2</b>	<b>Morning</b>	<p><u>Ch 2 Reasoning</u> Opener – Magic Triangles</p> <p>“Name that line”</p> <ul style="list-style-type: none"> <li>Investigate the Multiplication method for combinations</li> <li>Develop organization and pattern development</li> </ul> <p>“Stair Steps”</p> <ul style="list-style-type: none"> <li>Further develop patterning</li> <li>Create <math>n^{\text{th}}</math> term sequence</li> <li>Explain process in words.</li> </ul> <p>2.1 Inductive Reasoning</p> <ul style="list-style-type: none"> <li>Identify subsequent terms in patterns</li> <li>Articulate the rule used to govern the patterns</li> </ul> <p>2.3 Finding the <math>n^{\text{th}}</math> term</p> <ul style="list-style-type: none"> <li>Analyze patterns in terms of algebra through graphing</li> <li>Developing linear patterns and rule</li> <li>Synthesizing relationship between linear patterns and <math>y = Mx + b</math></li> </ul> <p>2.4 Finding the <math>n^{\text{th}}</math> term in non-linear models</p> <ul style="list-style-type: none"> <li>Analyze patterns algebraically and with factoring</li> <li>Develop <math>n^{\text{th}}</math> term patterns based on factoring</li> </ul>	<p>Magic Triangles HO</p> <p>“Name that Line” OH</p> <p>“Stair Steps” HO and OH</p> <p>Shape Shifters OH 2.1 # 3-12</p> <p>Number Sequence OH Geometric Pattern pg 108 2.3 # 1-6</p> <p>Handshake problem in text</p>
	<b>Afternoon</b>	<p><u>Problem Solving: Diagrams Make a Difference</u></p> <p>Stations of Problems with Partners</p> <ul style="list-style-type: none"> <li>Collaborate to solve complex problems in a timed situation</li> <li>Develop presentation skills with board</li> <li>Evaluate complex wording and translate into diagrams for sound problem solving approach</li> </ul>	Station Problems
	<b>Evening</b>	<p>Review of day’s material</p> <ul style="list-style-type: none"> <li>Ch 1 Test</li> <li>2.1 / 2.3 Practice of <math>n^{\text{th}}</math> term and inductive reasoning</li> </ul> <p>Geometry Games</p> <ul style="list-style-type: none"> <li>Set, Pente, Tangrams</li> </ul>	Ch 1 Test 2.1/2.3 Practice Skills
<b>Day 3</b>	<b>Morning</b>	<p>Morning Opener – patterns w/inlaid polygons</p> <p><u>Working in the Lab with GSP – foundations</u></p> <ul style="list-style-type: none"> <li>Pts, lines, segments, rays, angles: how to construct and further define</li> <li>Creating a clock: using angles to space numerals, animation of hands, proper timing</li> </ul> <p><u>Constructions of Special Segments in GSP-Ch 3</u></p> <p>3.2 Perpendicular Bisectors in GSP</p> <ul style="list-style-type: none"> <li>Conjecturing: any pt on the Perp. Bisect is equidistant from the endpoints</li> </ul>	<p>Patterns HO</p> <p>Pts, lines, angles GSP HO</p> <p>Clock GSP HO (in Angles Activity)</p> <p>3.2 GSP Text Supplement HO</p> <p>3.3 GSP Text Supplement HO</p>

		<b>What</b>	<b>How</b>
		<p>3.3 Perpendiculars to a line</p> <ul style="list-style-type: none"> <li>• Shortest distance between two points is a straight, perpendicular line.</li> </ul> <p>Sewer and Cabin problem</p> <ul style="list-style-type: none"> <li>• Application of minimal path concept</li> </ul> <p>3.7 Constructing Pts of Concurrency</p> <ul style="list-style-type: none"> <li>• Discover pts of concurrency of the angle bisectors, perpendicular bisectors, and altitudes of a triangle</li> <li>• Define pts. of concurrency for each special segment.</li> <li>• Investigate relationship bet. pts of concurrency in inscribed and circumscribed circles</li> </ul> <p>3.8 The Centroid</p> <ul style="list-style-type: none"> <li>• Discover the concurrency of the medians of a triangle and its applications</li> <li>• Analyze the length relationships among the segments created by the centroid and each median</li> </ul> <p>The Surfer and Spotter Problem</p> <ul style="list-style-type: none"> <li>• Apply pts of concurrency and problem solving skill to real-world situation.</li> <li>• Synthesize information in paragraph form through a lab summary and write-up.</li> </ul>	<p>Sewer and Cabin HO</p> <p>3.7 GSP Text Supplement HO</p> <p>3.8 GSP Text Supplement HO</p> <p>Surfer and Spotter HO</p>
	<b>Afternoon</b>	<p><u>Ch 3 Using Tools of Geometry - Constructions</u></p> <p>3.1 Duplicating Segments and Angles</p> <ul style="list-style-type: none"> <li>• Discover compass/straightedge construction of segments, angles, and polygons.</li> <li>• Distinguish between a sketch, a construction, and a drawing of geometric figures</li> </ul> <p>3.2 Constructing Perpendicular Bisectors</p> <ul style="list-style-type: none"> <li>• Discover compass/straightedge construction of perpendicular bisectors and midpoints</li> <li>• Make conjectures about perpendicular bisectors</li> </ul> <p>3.3 Constructing Perpendiculars to a Line</p> <ul style="list-style-type: none"> <li>• Discover perpendicular construction between a pt and a pt on a line</li> <li>• Minimal path concepts</li> </ul>	<p>Teacher Created HO</p> <p>3.1 # 1-6</p> <p>Teacher Created HO</p> <p>3.2 # 1-5, 11</p> <p>3.3 # 1-3</p>
	<b>Evening</b>	<p>Clock animation corrections</p> <p>Complete Remaining Lab work from morning, including refined Sewer and Cabin write-up</p>	<p>Lab time for GSP</p>
<b>Day 4</b>	<b>Morning</b>	<p><u>Summarize and Apply Pts of Concurrency</u></p> <p>3.7 Points of Concurrency</p> <ul style="list-style-type: none"> <li>• Review Lab Questions &amp; Answers</li> <li>• Distinguish between perpendicular bisectors, angle bisectors, medians, and their points of concurrency</li> <li>• Evaluate situations for best point of concurrency</li> <li>• Compass / Straightedge construction</li> </ul>	<p>3.7 Points of Concurrency GSP HO</p> <p>3.7 # 1-5</p>

		<b>What</b>	<b>How</b>
		3.8 The Centroid <ul style="list-style-type: none"> <li>• Review Lab Questions and Answers</li> <li>• Review Centroid and median relationships</li> </ul> 2.5 Angle Relationships <ul style="list-style-type: none"> <li>• New vocabulary development</li> <li>• Distinguish Vertical angles, linear pairs and their properties</li> </ul> 2.6 Special Angles on Parallel Lines Alternate interior, Alternate Exterior, Corresponding, Consecutive Interior	3.8 The Centroid GSP HO 3.8 # 1-4 Ch 3 Summary Sheet  2.5 # 1-6  2.6 Text Investigation with Patty Paper 2.6 # 1-11
	<b>Afternoon</b>	<u>Ch 4 Discovering &amp; Proving Triangle Props.</u> 4.1 Triangle Sum Conjecture <ul style="list-style-type: none"> <li>• Discover &amp; explain the Sum of Angles in Tri.</li> <li>• Inductive/deductive reasoning practice</li> <li>• Geometry tool practice</li> <li>• Develop proof writing skill</li> </ul>	Paper triangle group investigation Develop manipulative proof and paragraph proof
	<b>Evening</b>	Computer Lab – GSP Finish Surfer and Spotter Problem Geometric Art <ul style="list-style-type: none"> <li>• Create Line Designs in GSP</li> <li>• Create Daisy Designs with highlighted polygon interior regions</li> </ul>	Surfer and Spotter Problem  Line Design in GSP HO Daisy Design in GSP HO
<b>Day 5</b>	<b>Morning</b>	Opener – Doodles! <ul style="list-style-type: none"> <li>• Seeing the world from others' perspective</li> <li>• Thinking “out of the box”</li> </ul> <u>Ch 4 Discovering &amp; Proving Triangle Props.</u> 4.1 Triangle Sum Conjecture – Wrap Up <ul style="list-style-type: none"> <li>• Discover &amp; explain the Sum of Angles in Tri.</li> <li>• Inductive/deductive reasoning practice</li> <li>• Geometry tool practice</li> <li>• Develop proof writing skill</li> </ul> 4.2 Properties of Special Triangles <ul style="list-style-type: none"> <li>• Discover the relationship in base angles</li> <li>• Inductive reasoning/problem solving practice</li> <li>• New vocabulary</li> </ul> 4.4 / 4.5 Triangle Congruence & Shortcuts <ul style="list-style-type: none"> <li>• Informal proof development</li> <li>• Investigating Correspondence</li> <li>• Paragraph Proof</li> <li>• Introduction to 2-column proof</li> <li>• Develop formal proof</li> </ul>	Sample Doodle  Formal Proof with Auxiliary Line 4.1 # 2-9  4.2 #1-7  4.4 #1-14 4.5 #1-4 Proofs on Board
	<b>Afternoon</b>	4.6 CPCTC <ul style="list-style-type: none"> <li>• CPCTC</li> <li>• Deductive argument</li> <li>• Developing 2-column proof with CPCTC</li> </ul>	One-step Investigation OH 4.6 # 1-11,18  Triangle Proof HO

		<b>What</b>	<b>How</b>
		4.8 Isosceles Proof Practice <ul style="list-style-type: none"> <li>• Writing 2-column proof with isosceles triangles</li> </ul> 2.5/2.6 Angle Relationship Practice	2.5, 2.6 Practice HO
	<b>Evening</b>	4.3 Triangle Inequalities / Noodle Investigation <ul style="list-style-type: none"> <li>• Create noodle triangles to show the shortest distance between two points is a straight line.</li> <li>• Create algebraic rule to solve for 3<sup>rd</sup> side when given 2 sides</li> </ul>	Uncooked Spaghetti
<b>Day 6</b>	<b>Morning</b>	Morning Opener – more Doodles! <ul style="list-style-type: none"> <li>• Develop visual thinking</li> <li>• Apply perspective and spatial relationship in creating own doodles</li> </ul> 4.3 Triangle Inequalities <ul style="list-style-type: none"> <li>• Formally define triangle inequality conjectures and relationships</li> <li>• Develop Exterior Angle of Triangle Conjecture</li> </ul> <u>Ch 5 Discovering &amp; Proving Polygon Props</u> 5.1 Polygon Sum Conjecture <ul style="list-style-type: none"> <li>• Discover sum of angle measures in a polygon</li> <li>• Develop reasoning and problem solving as students develop <math>180(n-2)</math> rule</li> </ul> 5.2 Exterior Angles of a Polygon <ul style="list-style-type: none"> <li>• Discover sum of ext. angles in a polygon</li> <li>• Develop reasoning skills as students develop algebraic relationships for individual exterior angles and interior angle relationships</li> </ul>	Sample Doodles  Noodles for group work summary 4.3 #4-12  Group investigation to discover Polygon Sum 5.1 # 3-7, 13-14  5.2 Independent investigation with protractor to discover Ext. Angle Thm. 5.2 # 2-5, 7,8,10,11
	<b>Afternoon</b>	5.3 Trapezoid Properties <ul style="list-style-type: none"> <li>• New vocab and relationships relating to trapezoids</li> </ul> Walking Tour of Campus to observe arches in architecture  Arch Project Intro <ul style="list-style-type: none"> <li>• Learn roles in collaborative grouping</li> <li>• Application of geometric properties and relationships to 3-D construction</li> </ul>	Lecture   Arch Project Rubric Lots of Poster Board Role setting for collaborative group
	<b>Evening</b>	Ch 4 Quizzes  Arch Building <ul style="list-style-type: none"> <li>• Preliminary planning continues: students develop collaborative behavior</li> <li>• Testing ideas to determine best plan</li> </ul>	Ch 4 Quiz 1 Ch 4 Quiz 2 Ch 4 Quiz 3
<b>Day 7</b>	<b>Morning</b>	Morning Opener – more of their doodles  Ch 4 Test  5.1 Polygon Sum <ul style="list-style-type: none"> <li>• Review/remind of induction</li> </ul> 5.2 Exterior Angles of a Polygon	Ch 4 Test  5.1 Practice WKST  5.2 Practice WKST

		<b>What</b>	<b>How</b>
		<ul style="list-style-type: none"> <li>Review/ Challenge Practice</li> </ul> 5.3 Kite Properties <ul style="list-style-type: none"> <li>Discover Properties of Kites</li> <li>Learn new terminology and quadrilateral relationships</li> </ul> 5.4 Properties of MidSegments <ul style="list-style-type: none"> <li>Discover relationships with midsegments in triangles and trapezoids</li> </ul>	5.3 Investigation, #1-9  5.4 Investigation 5.4 # 1-8, 10
	<b>Afternoon</b>	Start class at Dining Hall Walking Tour of Campus to investigate arches Building an Arch Project Development	
	<b>Evening</b>	GSP Computer Lab Work 5.5 Proving Props of Parallelograms <ul style="list-style-type: none"> <li>Discover properties of a parallelogram</li> <li>New Vocabulary</li> <li>Develop inductive reasoning</li> </ul> 5.6 Proving Props of Special Parallelograms <ul style="list-style-type: none"> <li>Discover properties of rhombi, rectangles, squares</li> </ul> Geometric Art <ul style="list-style-type: none"> <li>Explore the relationship between geometry and art</li> <li>Complete line, knot, and daisy designs</li> </ul> Explore origami, create a origami crane, and make a pattern for the crane in GSP	5.5 GSP Text Supplement HO  5.6 GSP Text Supplement HO  GSP Geometric Art HO  GSP Paper Crane Activity
<b>Day 8</b>	<b>Morning</b>	Morning Opener – Big Quadrilateral  Letters Home with Geometric Art  5.5 Properties of Parallelograms 5.6 Properties of Special Parallelograms <ul style="list-style-type: none"> <li>Review Answers from GSP Lab work</li> <li>Develop Visuals/Diagrams to link parallelograms and special parallelograms</li> </ul> Arch Building	Art from study hall  5.5 #1-6  5.6 # 1-13
	<b>Afternoon</b>	Arch Building	
	<b>Evening</b>	4.4, 4.5, 4.6 Review of Vocab and Application Silent Study Time	4.4, 4.5, 4.6 Practice
<b>Day 9</b>	<b>Morning</b>	Morning Opener – finish their doodles  Proof Investigation <ul style="list-style-type: none"> <li>Develop 2-column proofs with special parallelograms</li> </ul> <u>Ch 6 Circle Properties</u> GSP Lab Time 6.1 Chord Properties <ul style="list-style-type: none"> <li>Review basic properties &amp; vocab of a circle</li> <li>Discover properties of chords</li> <li>Practice construction in GSP</li> </ul> 6.2 Tangent Properties <ul style="list-style-type: none"> <li>Discover properties of tangents to Circles</li> </ul>	4.7 Proof Practice Stations of proofs for teams  6.1 GSP Text Supplement HO  6.2 GSP Text Supplement HO

		<b>What</b>	<b>How</b>
		<ul style="list-style-type: none"> <li>Application of tangents</li> <li>Practice construction in GSP</li> </ul> <p>6.3 Arcs and Angles</p> <ul style="list-style-type: none"> <li>Discover the relationship between an inscribed angle and its intercepted arc.</li> </ul>	6.3 GSP Text Supplement HO
	<b>Afternoon</b>	More Parallelogram Proof Practice Ch 4 Test Revisions	Proof HO
	<b>Evening</b>	Arch Building	
<b>Day 10</b>	<b>Morning</b>	Proof Practice!	Stations, Independent Work, and Self Creation
	<b>Afternoon</b>	6.1, 6.2, 6.3 GSP Wrap-Up Discussion / Review of Properties, Notes <ul style="list-style-type: none"> <li>Apply concepts learned in lab work to problems, application</li> </ul>	Practice 6.1, 6.2, 6.3
	<b>Evening</b>	Circle Quizzes Geometry Games	
<b>Day 11</b>	<b>Morning</b>	6.4 Proving Circle Conjectures Intertwine properties and theorems of circles to two-column proof  Practice with Circle Proofs <ul style="list-style-type: none"> <li>Develop Collaborate Grouping Skill and Interdependence</li> </ul>	Practice 6.4 #1-3  6.4 Text  6.4 Station problems
	<b>Afternoon</b>	6.5 Circumference/Diameter ratio <ul style="list-style-type: none"> <li>Investigate the relationship between circumference and diameter; develop pi</li> <li>Solve math modeling problems with Circumference and diameter</li> </ul> <p>6.7 Arc Length</p> <ul style="list-style-type: none"> <li>Compare and contrast arc measure and arc length</li> </ul> <p>Begin Race Track Geometry</p>	Investigation: Circular objects of varied size, string, tape measures   Practice 6.7  Racetrack Geometry HO
	<b>Evening</b>	Paint Kaleidoscopes – 1 <sup>st</sup> layer	
<b>Day 12</b>	<b>Morning</b>	Paint Kaleidoscopes – 2 <sup>nd</sup> layer  Continue Racetrack Geometry <ul style="list-style-type: none"> <li>Design Fair Racetracks</li> <li>Develop Presentation skills with posterboard, question/answer style presentation</li> </ul> <p>7.1 Transformations and Symmetry 7.2 Properties of Isometries</p>	Practice 7.1 Text 7.2
	<b>Afternoon</b>	Kaleidoscope Assembly	Tubes, cut mirror, bubble wrap, hot glue gun and glue, plexiglass disks, gems, cardboard strips, cotton balls, cotton rags, nail polish remover, latex gloves, masking tape, duck tape

		<b>What</b>	<b>How</b>
	<b>Evening</b>	Clean Up from Kaleidoscope Construction Review of 7.2 History of the Kaleidoscope Kaleidoscope Technical Paper	Practice 7.2 History of Kaleidoscope HO Paper Requirements HO
<b>Day 13</b>	<b>Morning</b>	History of the Pythagorean Thm 9.1 Pythagorean Thm <ul style="list-style-type: none"> <li>• Prove and Apply the Pythagorean Thm</li> </ul> 9.2 Converse of the Pythagorean Thm <ul style="list-style-type: none"> <li>• Develop, prove, and apply the converse of the Pythagorean Thm</li> </ul> 9.3 Special Right Triangles <ul style="list-style-type: none"> <li>• Develop 30-60-90 and 45-45-90 relationships from the related regular polygons and the Pythagorean Thm</li> <li>• Derive algebraic short-cuts to the 45-45-90 and 30-60-90 relationships</li> </ul>	Historical HO Parallelogram Proof of Pyth Thm Practice 9.1 Practice 9.2  Practice 9.3
	<b>Afternoon</b>	Continuation of 9.3: Practice and Application	
	<b>Evening</b>	12.1 Trigonometric Functions <ul style="list-style-type: none"> <li>• Apply Sine, Cosine and Tangent and their Inverse Functions</li> </ul>	Practice 12.1
<b>Day 14</b>	<b>Morning</b>	Arch Wrap-Up / Reflection  12.2 Angles of Elevation & Depression <ul style="list-style-type: none"> <li>• Translate word problems to diagrams</li> <li>• Solve word problems with basic trig</li> <li>• Collaborate to solve word problems</li> </ul> 12.3 Law of Sines <ul style="list-style-type: none"> <li>• Develop Derivation of Law of Sines</li> <li>• Apply Law of Sines to Word Problems</li> </ul>	Text 12.2  Text 12.3
	<b>Afternoon</b>	12.4 Law of Cosines <ul style="list-style-type: none"> <li>• Apply Law of Cosines to Word Problems</li> </ul> Stations for Math Modeling / Trig Word Problems	Station Signs from Glencoe Text
	<b>Evening</b>	Study hall cancelled for "Last Dance"	
<b>Day 15</b>	<b>Morning</b>	Camp Surveys Wrap Station Problems from Previous Day Clinometer Investigations	CTY/CAA Handouts Clinometer Pieces: Protractor, Straws, Tape, Floss, Paper Clips, HO