Geometry Course Outline (8th grade they learned WHAT, now they learn WHY)

Semester 1 (September 8, 2015 – January 25,2016)

Module 1 Congruence, Proof and Constructions

- Topic A: Basic Constructions
  {construct: equilateral triangle, square, copy & bisect angle, perpendicular bisector, points of concurrency}
- Topic B: Unknown Angles
  {angles and lines at a point, transversals, angles in a triangle, writing proofs, proofs with constructions, proofs of known facts}
- Topic C: Transformations & Rigid Motions
  {next level transformations, rotations, reflections, symmetry, translations, points on a perpendicular bisector, more parallel lines, construct and apply a sequence of rigid motions, applications of congruence in terms of rigid motions}
- Topic D: Congruence
  {base angles of isosceles triangles, congruence criteria for triangles (SAS,ASA,SSS,SAA,HL), triangle congruency proofs}
- Topic E: Proving Properties of Geometric Figures
  {properties of parallelograms, special lines in triangles}
- Topic G: Axiomatic Systems

Module 2 Similarity, Proof and Trigonometry

- Topic A: Scale Drawings
  {make scale drawings using the ratio and parallel methods}
- Topic B: Dilations
  {dilations as transformations of the plane, mapping (segments, lines, rays, angles, and circles, dividing segments into *n* equal pieces, dilations from different centers}
- Topic C: Similarity and Dilations
  {similarity transformations and their properties, Similarity, (AA, SAS,SSS) Triangle Similarity, "between-" and "within-" figure ratios, angle bisector theorem, families of parallel lines (side-splitter theorem)
- Topic D: Applying Similarity to right Triangles
  {dividing a right triangle into 2 similar sub-triangles (goldilocks), special relationships within right triangles, operations (*/+-) with radicals, prove Pythagorean Theorem using similarity}
- Topic E: Trigonometry
  {trig ratios, define Sine, Cosine and Tangent, complementary and special angles, trig and the Pythagorean Theorem, use trig to determine area and side lengths of a triangle, applying the laws of Sines and Cosines}

Semester 2 (February 1, 2016-June 13, 2016)

Module 3 Extending to Three Dimensions

- Topic A: Area
  {properties & scaling principle}
- Topic B: Volume
  {3-D space, prisms, cylinders, cones, and pyramids & their cross-sections, properties & scaling principle, formulas plus sphere}

Module 4 Connecting Algebra and Geometry through Coordinates

- Topic A: Triangular & Rectangular Regions Defined by Inequalities
- Topic B: Parallel & Perpendicular Lines in the Cartesian Plane
- Topic C: Perimeters & Areas of Polygonal Regions in the Cartesian Plane
- Topic D: Partitioning & Extending Segments
  {dividing segments proportionally, distance from a point to a line}

Module 5 Circles With and Without Coordinates

- Topic A: Central & Inscribed Angles
  {circles, chords, diameters, inscribed rectangles, apps.}
- Topic B: Arcs & Sectors
  {angle meas. of arc, arcs & chords, arc length & area of sector, apps.}
- Topic C: Secants & Tangents
  {includes similar triangles in apps.}
- Topic D: Equations of circles & Their Tangents
- Topic E: Cyclic Quadrilaterals & Ptolemy's Theorem
  {inscribed/circumscribed polygons, cyclic quads and their area, properties and apps.}