Course Guide
Formal Geometry
2012-2013

Washoe County School District

Every Child, By Name And Face, To Graduation

Washoe County School District

Excellence in Education, Every Student, Every Day, to Graduation.

Vision

As a courageous innovative leader in education, Washoe County School District will be one of the nation's top performing school districts, graduating all students college and/or highly skilled career ready.

Mission

To create an education system where all students achieve academic success, develop personal and civic responsibility, and achieve career and college readiness for the 21st century.

Core Beliefs

We believe:

- All students will learn and be successful.
- The achievement gap will be eliminated by ensuring every student is challenged to learn at, or above grade level.
- Effective teachers and principals, dedicated support staff, rigorous curriculum, measurable outcomes, ongoing monitoring and assessment, collaboration, professional development and a culture of continuous improvement will ensure classroom success for all students.
- Superior performance will be achieved through clear goals that set high expectations and standards for all students and employees.
- Family, school and community engagement will be required for student academic success.
- Leadership and passion, together with accountability and transparency, will be keys to reform and success.

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Philosophy of Mathematics Education

- Mathematical understandings of new concepts is taught through a planned learning progression moving from concrete to visual and finally abstract representations and reasoning.
- Student learning of new content is facilitated through problem solving situations and experiences.
- Students learn through problem solving and daily checks for understanding.
- All students should have access to advanced math and science courses prior to or after entering high school.

Assessment Philosophy

- Assessment is the continuous process of collecting information to make decisions about teaching and learning
- A balanced assessment program is essential for determining and reporting the learning needs, progress, and achievement of students at the state, district, and classroom levels
- The most impactful assessment comes from a teacher with well-planned units, lessons, and multiple strategies designed to elicit evidence of student learning
- Assessments must begin with clear purpose, targets and design to provide information from which valid inferences can be made
- Assessment use must always adhere to the intended purpose of the assessment
- Practicing for an assessment by focusing on specific items and tested skills does not promote lasting student achievement, and the assessment itself should never be the learning target.
- Formative Assessment Processes including close, purposeful observation provide valuable data integral to student learning at *every grade level*
- Self-assessment and self-monitoring activities enhance student self-efficacy
- Clear, specific, and timely feedback must accompany assessment

Below and on the following pages are guidelines and information for planning instruction around the Common Core State Standards.

Teachers should look for opportunities to incorporate the Mathematical Practices from the Common Core State Standards (CCSS) into planning and instruction where appropriate. "What students can learn at any particular grade level depends upon what they have learned before" (CCSS Introduction, p. 5). Teachers are encouraged to communicate with other grade levels and align practices and goals to support vertical transitions. Review the CCSS critical areas of focus for grades 6-12 to assist in planning short and long-range goals for student learning and strengthening teaching of the Mathematics Standards.

Mathematical Practices

1. Make sense of problems and persevere in solving them.	Explain meaning looking for a way to start Analyze and make a plan Monitor progress and adapt Use various representations / tools to explain Find a solution pathway – does this make sense Mathematical representations Persevere & stick to it, attempt different ways Explain problem Plan solution
2. Reason abstractly and quantitatively .	Ability to abstract a given idea Check back for sense making Create a meaningful quantitative representation Decompose and compose problem – represent as a symbols Coherent representations Represent a problem symbolically Create a meaningful representation
3. Construct viable arguments and critique the reasoning of others.	Use prior learning Analyze situations Communicate conclusions & respond to arguments of others Use reason to compare validity of arguments Debate tactics / reasonableness of argument Logical argument progression using evidence Analysis and training in argument rather than attack Students use previous math information to make conjectures Justify conclusions, communicate, respond to other Students can make sense through asking questions
4. Model with mathematics.	Can apply mathematics to everyday situation Judiciously apply assumptions and approximations Map or diagram important relationships – flow charts Interpret results and possibly make improvements Recognize math applications in various situations Ability to express scenarios in mathematical language and symbols Choose best math representation for each situation Apply mathematics to solve real problems Students use logical reasoning to simplify a situation Use a variety of math tools to represent an important relationship between quantities

Mathematical Practices

5. Use appropriate tools strategically.	Consider use of tools for most efficient path to solve problem Technology, concrete models, spread sheets Strategies, able to use estimation Familiarity with wide variety of ways to represent & solve problems Awareness of mathematical resources Technological tools to deepen understanding Making deliberate choices of which mathematical tools to use and when to best solve problems Strategically use estimation as a too Incorporate technological tools
6. Attend to precision.	Use clear definitions in communication State the meaning of symbols Specify units of measure Calculate accuracy Students use accurate terminology with clear understand of math symbols and meaning Complete and appropriate labels on graphical representations Recognition and expectation of proper forms Student uses clear language when communication and explaining their own reasoning State of meaning of symbols Students use accurate descriptors in math problems
7. Look for and make use of structure.	Use patterns and structure to find similarities in mathematics Use structure to help identify the parts of more complex expressions Comfortable use of numerical relationships to build understanding and flexibility with numbers Breaking complicated problems down into simpler components (solve an easier problem) Students will use their previous knowledge of patterning / structure to help them solve problems Break complex problems into several simple problems
8. Look for and express regularity in repeated reasoning.	Recognize & use repeated calculations to simplify and abstract concepts Recognize patterns Ability to use patterns to simplify solution Recognition of repeated regularity of strategy to facilitate Repeated strategy provides checkpoints for reasonableness Recognition of repeated calculations and how they relate to problem solving strategies Keep the big picture and attend to details Evaluate reasonableness of answer

Critical Areas in Formal Geometry

The fundamental purpose of the course in Geometry is to formalize and extend students' geometric experiences from the middle grades. Students explore more complex geometric situations and deepen their explanations of geometric relationships, moving towards formal mathematical arguments. Important differences exist between this Geometry course and the historical approach taken in Geometry class. For example, transformations are emphasized early in this course. Close attention should be paid to the introductory content for the Geometry conceptual category found in the high school CCSS. The Mathematical Practice Standards apply throughout each course and, together with the content standards, prescribe that students experience mathematics as a coherent, useful and logical subject that makes us of their ability to make sense of problem situations. (CCSS Appendix A, p27)

All of the content topics in the following Course Guide are grouped together to make units based on themes from the critical areas. In Semester 1 Formal Geometry students will develop a thorough understanding of the congruence and develop strategies to write many geometric proofs. In Semester 2 Formal Geometry will work with Similarity, Circles, Trigonometry, and Probability.

The following Course Guide offers references to your Course 1 textbook (sections), On Core book (OC), Common Core Curriculum Companion (CC), Hands on Activities (HO) that can be found in your book or the (CC) and Common Core State Standards (CCSS).

2012-2013 Course Guide Formal Geometry Semester 1

New coding to understand Book Sections

"OC" followed by section numbers are from the On Core Book

Section numbers followed by "R" are from the Formal Textbook but are intended for Review (they are prerequisite knowledge taught in grades 6-8)

Section numbers followed by "PD" are from the Formal Textbook but are intended for Proof Development

Book Sections	Topics (CCSS Standards)
1.1	Basic Terms and Constructions (G.CO.1, G.CO.12)
1.2/1.3	The Distance Formula (G.GPE.4)
1.3	The Midpoint Formula (G.GPE.4)
1.4R	Angle Measure
1.5	Angles (G.CO.1, G.CO.12)
2.1PD	Inductive Reasoning and Conjecture
2.3PD	Conditional Statements
2.5PD	Postulates
2.6PD	Algebraic
2.7PD	Segment Addition Postulate
2.8PD	Proving Angle Relationships
3.1/3.2	Parallel and Perpendicular Lines (G.CO.1, G.CO.12)
3.3, OC8.4	Slope and Parallel Lines (G.GPE.5)
3.4, OC8.5	Slope and Perpendicular Lines (G.GPE.5)
3.2	Proofs About Line Segments and Angles (G.CO.9)
3.5, OC1.7	Proofs About Parallel and Perpendicular Lines (G.CO.9)
OC8.6	Coordinate Proofs Using Slope (G.GPE.4)
4.1	Congruence and Triangles (G.CO.7)
4.3	Developing Congruence Criteria (G.CO.7, G.CO.8)
4.4/4.5	Using Congruence Criteria (G.SRT.5)
4.2	The Triangle Sum Theorem (G.CO.10)
4.6	The Isosceles Triangle Theorem (G.CO.10)
4.7	Congruence Transformations
4.8	Coordinate Proofs (G.CO.10, G.GPE.4)
5.1	Angle Bisectors (G.CO.2, G.CO.9)
5.1	Perpendicular Bisectors (G.CO.2, G.CO.9)
5.2, OC3.9	Medians of a Triangle (G.CO.10, G.GPE.4)
5.4PD	Indirect Proofs
5.5R	Triangle Inequality
5.6R	Inequalities in Two Triangles

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OC4.1	Symmetry (G.CO.3)
9.4	Transformations and Rigid Motions (G.CO.2)
9.1	Reflections (G.CO.2, G.CO.4, G.CO.5, G.CO.6)
9.2	Translations (G.CO.2, G.CO.4, G.CO.5, G.CO.6)
9.3	Rotations (G.CO.2, G.CO.4, G.CO.5, G.CO.6)
4.7	Congruence (G.CO.5, G.CO.6)
9.6	Properties of Dilations (G.SRT.1, G.CO.2)
Extend 9.6	Drawing Dilations (G.CO.2)

2012-2013 Course Guide Formal Geometry Semester 2

Book Sections	Topics (CCSS Standards)
7.1R	Ratios and Proportions
7.2	Similarity (G.SRT.2, G.C.1)
7.3	Similarity and Triangles (G.SRT.2, G.SRT.3)
11.5R	Ratio of Areas of Similar Polygons
7.5	Solving Problems Using Similarity (G.SRT.5, G.MG.3)
OC8.3	Partitioning a Segment (G.GPE.6)
7.4	The Triangle Proportional Theorem (G.SRT.4, G.SRT.5)
7.4	Midsegment of a Triangle (G.CO.10, G.GPE.4)
Explore 8.2	Proving the Pythagorean Theorem (G.SRT.4, G.SRT.5)
8.2, OC5.7	
8.1R	The Geometric Mean
8.4	The Tangent Ratio (G.SRT.6)
8.4	The Sine and Cosine Ratios (G.SRT.6, G.SRT.7)
8.3	Special Right Triangles (G.SRT.6, G.SRT.7)
8.5	Solving Right Triangles (G.SRT.8)
8.6	Trigonometric Ratios of Obtuse Angles (G.SRT.9+)
8.6	The Law of Sines (G.SRT.10+, (G.SRT.11+)
8.6	The Law of Cosines (G.SRT.10+, (G.SRT.11+)
6.1R	Angles of Polygons
6.2	Sides and Angles of Parallelograms (G.CO.11)
6.2	Diagonals of Parallelograms (G.CO.11)
6.3	Criteria for Parallelograms (G.CO.11)
6.4/6.5	Special Parallelograms (G.CO.11, G.SRT.5)
6.6R	Kites and Trapezoids
10.3R	Arcs and Chords
10.4	Central Angles and Inscribed Angles (G.C.2)
10.5	Constructing Circumscribed Circles (G.C.3)
10.5, OC7.3	Constructing Inscribed Polygons (G.C0.13)
10.5, OC7.4	Inscribed Quadrilaterals (G.C.3)
10.5	Tangent Lines (G.C.2, G.C.4+)
Extend 10.5	Constructing Inscribed Circles (G.C.3)
10.6R	Secants, Tangents and Angle Measures
10.7R	Special Segments in a Circle
OC9.2	Perimeter and Area on the Coordinate Plane (G.GPE.7, G.MG.1, G.MG.2)
10.1	Circumference (G.GMD.1, G.MG.1)
10.2, OC9.4	Arc Length (G.CO.1, G.C.5)
11.3, OC9.5	Area of Circles and Sectors (G.C.5, G.GMD.1)

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Explore 12.1	Visualizing Three-Dimensional Figures (G.GMD.4)
12.2R-12.3R	Surface Area
12.4	Volume of Prisms and Cylinders (G.GMD.1, G.GMD.2+, G.GMD.3, G.MG.1, G.MG.2)
12.5	Volumes of Pyramids (G.GMD.1, G.GMD.3)
12.5	Volume of Cones (G.GMD.1, G.GMD.3)
12.6	Volume of Spheres (G.GMD.2+, G.GMD.3, G.MG.2)
12.8, OC10.6	Solving Design Problems (G.GMD.3, G.MG.3)
FORMAL Book	
13.1	Probability and Set Theory (S.CP.1)
OC11.2	Random Sampling and Probability (S.MD.6+)
13.2, OC11.3	Permutations and Permutations in Probability (S.CP.9+)
13.2, OC11.4	Combinations and Combinations in Probability (S.CP.9+)
13.6	Mutually Exclusive and Overlapping Events (S.CP.7)
OC11.6	Conditional Probability (S.CP.3, S.CP.4, S.CP.5, S.CP.6)
13.5	Independent Events (S.CP.2, S.CP.3, S.CP.4, S.CP.5)
13.5	Dependent Events (S.CP.8+)
OC11.9	Making Fair Decisions (S.MD.6+)
OC11.10	Analyzing Decisions (S.CP.4, S.MD.7+)