



Geometry

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Hazelwood School District

Mission Statement

We are a collaborative learning community guided by a relentless focus to ensure each student achieves maximum growth.

Vision Statement

HSD will foster lifelong learners, productive citizens and responsible leaders for an ever-evolving society.

Board of Education on January 5, 2010

Goals

Goal #1: Hazelwood students will meet or exceed state standards in all curricular areas with emphasis in reading, writing, mathematics, science and social studies.

Goal #2: Hazelwood staff will acquire and apply skills necessary for improving student achievement.

Goal #3: Hazelwood School District, the community and all families will support the learning of all children.

Curriculum Overview

The HSD Geometry curriculum has not been updated in more than 7 years. Since that time, mathematics standards, learning progressions and best practices informed by research has drastically changed. This rewrite is to comply with MSIP V and to help ensure that all HSD students are receiving a high quality mathematics education.

The Geometry course includes an in-depth analysis of plane, solid, and coordinate geometry as they relate to both abstract mathematical concepts as well as real-world problem situations. Topics include logic and proof, parallel lines and polygons, perimeter and area analysis, volume and surface area analysis, similarity and congruence, trigonometry, and analytic geometry. Emphasis will be placed on developing critical thinking skills as they relate to logical reasoning and argument. Students will be required to use different technological tools and manipulatives to discover and explain much of the course content.

Geometry is a critical component of a mathematics education because students are required to relate concepts from Algebra I and Algebra II to geometric phenomena. This course requires students to focus on logical proof and critical thinking when solving problems or evaluating arguments. Post-secondary institutions require students to take a geometry course in high school because this subject provides the necessary mathematical tools for complex reasoning and solving problems in the sciences, technology, engineering, and many skilled trades and professions.

The curriculum contains unit assessments that are rigorous and outline clear expectations. As the curriculum is implemented and taught, the assessments will be revised. **The assessments are required**; the learning activities are suggested. Teachers are encouraged to select the learning activities which meet the needs of their students. Some of the learning activities are very sequential and, when all of them are used, a student should be able to successfully complete the unit assessment. Other activities provide a menu of suggestions, and the teacher should select from those offered or design his/her own.

The plan for professional development includes multiple opportunities for training to help ensure that the high school mathematics curricula are implemented effectively and with fidelity. Initial training will be provided during district professional development opportunities to cover content and pedagogy. In addition to professional development days, ongoing training will be provided during Professional Learning Community (PLC) meetings to assist with upcoming skills and nuances in learning objectives. The Mathematics District Curriculum Coach and District Coordinator will provide teachers training to familiarize them with curriculum

activities and expectations. Finally, ongoing training during PLC meetings will assist teachers with upcoming skills and with nuances in the learning objectives.

COURSE TITLE: Geometry

GRADE LEVEL: 9 – 12

CONTENT AREA: Mathematics

Course Description:

In Geometry, students use the tools of geometry to conduct investigations, compare ideas, and make conjectures about geometric relationships. Through the investigative process, students discover important principles of geometry and develop conceptual understanding. They prepare for formal proof by beginning with paragraph, flowchart, and algebraic proofs. Students experience an active, hands-on approach of investigation and exploration. Algebra is incorporated throughout this course. Technology is integrated throughout this using graphing calculators in algebra applications and *The Geometer's Sketchpad* in geometry investigations. Geometric concepts include geometric design, reasoning, construction, triangle, polygon, and circle properties, transformations, area, volume, similarity, and trigonometry.

Course Rationale:

Geometry is a critical component of a mathematics education because students are required to relate concepts from Algebra I and Algebra II to geometric phenomena. This course requires students to focus on logical proof and critical thinking when solving problems or evaluating arguments. Post-secondary institutions require students to take a geometry course in high school because this subject provides the necessary mathematical tools for complex reasoning and solving problems in the sciences, technology, engineering, and many skilled trades and professions.

Course Scope and Sequence

Unit 1: Transformations, Similarity and Congruence (Approx. 22 class periods)	Unit 2: Triangles and Polygons – Proofs and Similarity (Approx. 22 class periods)	Unit 3: Circles – Proofs and Constructions (Approx. 22 class periods)
Unit 4: Extending to Three Dimensions (Approx. 22 class periods)	Unit 5: Coordinate Geometry and Geometric Measure (Approx. 22 class periods)	Unit 6: Applications of Probabilities (Approx. 22 class periods)

Essential Terminology/Vocabulary

Tangent, Line, Circle, Arc, Sector, Intersection, Supplementary, Complimentary, Vertical, Perpendicular, Parallel, Center, Line segment, Reflection, Translation, Rotation, Symmetry, Skew, Angle, Point, Dilation, Rigid Motion, Point, Bisector, Polygon, Inscribed, Circumscribed, Pyramid, Cone, Sphere, Slant Height, Data, Sample, Population, Independent, Dependent, Event, Outcome, Probability, Union, Intersection, Sub Set, Permutation, Combination, Conditional.

Unit Objectives:

Unit 1: Transformations, Similarity and Congruence

- Experiment with transformations in the plane
- Understand congruence in terms of rigid motions
- Prove geometric theorems
- Make geometric constructions

Unit 2: Triangles and Polygons – Proofs and Similarity

- Understand similarity in terms of similarity transforms
- Prove theorems involving similarity
- Define trig ratios and solve problems with right triangles
- Use coordinates to prove simple geometric theorems algebraically

Unit 3: Circles – Proofs and Constructions

- Understand and apply theorems about circles
- Make geometric constructions
- Use coordinates to prove simple geometric theorems algebraically

Unit 4: Extending to Three Dimensions

- Visualize relationships between 2 dimensional and 3 dimensional objects
- Explain volume formulas and use them to solve problems
- Apply geometric concepts in modeling situations

Unit 5: Coordinate Geometry and Geometric Measure

- Use coordinates to prove simple geometric theorems algebraically
- Apply geometric concepts in modeling situations
- Translate between the geometric description and the equation for a conic section

Unit 6: Applications of Probabilities

- Understand independence and conditional probability and use them to interpret data
- Use the rules of probability to compute probabilities of compound events in a uniform probability model
- Use probability to evaluate outcomes of decisions

Proposed Course Materials and Resources:

Glencoe Geometry
McGraw-Hill Education
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