Course Overview Geometry CP

Content Area: **Math**
Course(s):
Time Period: **Full Year**
Length: **35 weeks**
Status: **Published**

School Mission Statement

The mission of Chartertech is to provide artists the opportunity to blend principles of artistic expression with cutting-edge technology, so artists will excel in academic, career, and civic pursuits and contribute to the harmony and productivity of the 21" century.

Artistic integration: Performing arts will be accessible to all artists as a skill and content area and will serve as a vehicle for imparting, enlivening, and motivating excellence in all academic topics, as well as providing a platform for learning multicultural appreciation and empathy, not just tolerance.

Technological integration: Technology will serve as the foundation for instructional delivery systems leading to knowledge acquisition, concept understanding, and skill mastery in all academic subjects. Technology will not be studied as a separate entity but infused into the very fabric of educational pursuits, exactly as it occurs in the business world. Artists will be prepared to compete in the modern workplace or post-secondary institution.

"Education has always been torn between vocational and utilitarian purposes on one hand and creative and holistic purposes on the other... We are rapidly entering a world that is hard to imagine. By developing the problem-solving skills, creativity, and discipline required in the arts, artists can prepare for life in the 21st century."

From Understanding How the Arts Contribute to Excellent Education

National Endowment for the Arts, 1991

School Goals

Goals for Arts Education:

Artists will learn the knowledge, skills, and abilities necessary to turn their passions and gifts in the arts into vocations or serious avocations.

Objective 1: Each year, each artist will take two semesters (10 credits) of career-oriented training (80 minutes per day) in their artistic major.
Objective 2: Each marking period, each artist will perform or produce frequently, in diverse settings and for diverse audiences.

Objective 3**:** Artistic instruction will be integrated into the study of all academic subjects.
Objective 4: Each year, each artist will complete at least twenty after-school "lab" hours in their artistic major. These will constitute career-oriented service to the school and/or community, and demonstrate accomplishment of the NJCCCS crosscutting workplace readiness standards.

Goal for Technology:
Chartertech will model the technology-intense workplace and artists will be able to compete successfully and perform well in a technology-intense workplace.

Objective 5: Each artist will routinely use technology in a workplace-like manner to acquire, analyze, communicate, and present information in every subject.
Objective 6: Each artist will have access to a computer every day, every class so that automated sources will be the main conduit for educational content.
Objective 7: All administrative and instructional functions of the school will be supported by the most modern technology available.

Goals for Academic Achievement:
Artists will apply themselves in the serious pursuit of knowledge and skills, especially skills in critical thinking, problem solving, decision making, and communication.

Objective 8: Each year, and to be promoted to the next grade each artist will pass five credits in English, Health, Social Studies, Science, Mathematics, and PE/Health. Between grades 9-12 artists will also complete 1year of Spanish.

Objective 9: In each academic subject, each year, each artist will complete a significant project that involves critical thinking, problem solving, decision making, and communication skills, and which demonstrates cross-content workplace readiness skills.

Objective 10: Each year artists will develop a artist resume to guide his/her academic and artistic studies and to document his/her academic and artistic accomplishments. This work will be done under the mentorship of the faculty in the artist's artistic major.

Objective 11: Academic instruction in all subjects will be highly cross-curricular, in accordance with curricula design and continuously improved by teachers, in compliance with the New Jersey Artist Learning Standards.

Course Description

Course Title:	Geometry CP
Department:	Mathematics
Prerequisite:	Algebra I or Algebra I CP
Number of Credits:	5
Grade Level(s):	10

Standards:	Aligned to New Jersey Student Learning Standards for High School Mathematics
Description of Course	Geometry starts with the study of transformations to introduce geometric concepts since isometric transformations lead so naturally into the development of congruence. The transformations and their properties also help artists express their understanding through proof and problem solving. Unit #1 is the most radical change brought on by the common core curriculum and the New Jersey Artist Learning Standards. For years textbooks have laid an identical pathway to introduce geometry.... (1) Basic Relationships (2) Logic & Proof (3) Parallel & Perpendicular Lines (4) Proof of Triangles (5) Triangle Relationships and (6) Quadrilaterals. It seemed like there was no other way - we were approaching it the way Euclid did, very axiomatic. Well along came the Common Core, which focuses on using transformations to introduce this material. Congruence is developed not out of measurement but out of isometric transformations. Proof is developed by establishing relationships of symmetry and transformations to explain characteristics of shapes. The next unit focuses on non-isometric transformations of dilation and enlarges our understanding of similarity. Scale factors, proportionality, parallelism and many other dilation structures help artists approach concepts such as similarity, geometric mean, special right triangles and trigonometry. Artists first come to understand dilations and their characteristics and then we find that the dilation creates shapes that have proportional sides and congruent angles. Similarity also introduces great topics found in right triangles such as geometric mean, special right triangles and trigonometry. Unit #3 focuses on working with dimensions of 2D and 3D shapes. Artists will develop formulas for volume and then apply them. We will also look at the cross section of three dimensional objects and explore using rotations to form 3D shapes. This ability to visualize and describe this process will be helpful later when they take Calculus (especially at the honors level). Unit #4 is all about circles and starts by deriving the equation of a circle. By deriving the equation for the circle, it helps prepare artists to move from the general plane into the coordinate plane. We then spend time studying many aspects of circles including tangents, arc lengths, secants, and chords. Next we move into Unit #5, which focuses on the relations on the coordinate plane. It's also a nice transition into Algebra II as it links many of the Geometric concepts that we have encountered throughout the year to Algebra. In that manner, it's a great way to review the year and many of the key concepts from Algebra I. Lastly; we embark into unit 6, which is all about probability. The probability unit focuses on summarizing categorical data and therefore be able to recognize possible trends and associations of the data. Throughout the course, artists will be presented with opportunities to integrate the arts through projects, presentations, and other assignments. They will also solve problems that center upon the arts such as using trigonometry to make sure lights are at the correct angle for a show and constructing set designs.

Overview & Pacing

Unit #	Major Content	Expected Time
Unit #1	Congruence (G.CO, G.GPE, G.MG*)	14 weeks
Unit #2	Similarity and Right Triangles (G.SRT, G.GPE, G.MG*)	8 weeks
Unit #3	Volume (G.GMD, G.GPE, G.MG*)	5 weeks
Unit #4	Circle Geometry (G.C, G.GPE, G.MG*)	6 weeks
Unit #5	Geometric Modeling (G.MG)	1 week
Unit #6	Probability (S.CP)	1 week