

01_Mastering Geometry Concepts

Content Area: **Math**
Course(s):
Time Period: **Semester**
Length: **3-4 Weeks**
Status: **Published**

General Overview, Course Description or Course Philosophy

This course is designed for senior students who must participate in the NJDOE Portfolio Appeal Process because they have not successfully completed the math portion of the NJ High School Graduation Assessment Requirement. In this course, students will receive targeted instruction in mathematics based on their needs as reflected in state-wide standardized testing. They will be prepared for a fall retake of the math section of the NJGPA as well as a variety of alternative assessments and then prepare a portfolio of constructed response tasks to show their proficiency in the subject. This course is mandatory for those identified students. Grades will be reflected as P/F.

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Unit Goals:

- Develop a deep understanding of key geometry concepts as outlined in the Geometry Type I, Sub-Claim A Evidence Statements.
- Enhance problem-solving and critical thinking skills through real-world applications of geometry concepts.
- Complete an independent, constructed response task (part of a larger portfolio) showcasing a mastery of geometry knowledge and skills.

Enduring Understandings:

- Geometry is present in everyday life, and understanding its concepts helps solve practical problems.
- Geometric transformations and relationships provide insights into shape properties.
- Similarity and congruence relationships underlie various geometric applications.

Essential Questions:

- How does geometry impact our surroundings and daily experiences?
- How can geometric transformations help us analyze and manipulate shapes?
- Why are similarity and congruence important in various contexts?

CONTENT AREA STANDARDS

MA.G-CO.B	Understand congruence in terms of rigid motions
MA.G-CO.C	Prove geometric theorems

MA.G-CO.C.9	Prove theorems about lines and angles.
MA.G-MG	Modeling with Geometry
MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.4	Model with mathematics.
MA.K-12.7	Look for and make use of structure.
MA.G-GMD	Geometric Measurement and Dimension
MA.G-GPE	Expressing Geometric Properties with Equations
MA.G-GPE.B	Use coordinates to prove simple geometric theorems algebraically
MA.G-SRT	Similarity, Right Triangles, and Trigonometry
MA.G-SRT.B	Prove theorems involving similarity
MA.G-SRT.C	Define trigonometric ratios and solve problems involving right triangles

Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.

RELATED STANDARDS (Technology, 21st Century Life & Careers, ELA Companion Standards are Required)

LA.RST.9-10.3	Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
LA.RST.9-10.7	Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.
WRK.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
TECH.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.

STUDENT LEARNING TARGETS

Refer to the 'Declarative Knowledge' and 'Procedural Knowledge' sections.

Declarative Knowledge

Students will understand:

- Transformation types and their effects on shapes.
- Criteria for congruence and similarity of triangles.
- Properties and applications of similar triangles.
- Pythagorean Theorem and proportional reasoning.
- Cartesian coordinate system and its components.
- Equations of lines.

Procedural Knowledge

Students will be able to:

- Perform reflections, rotations, translations, and dilations.
- Use transformational techniques to establish congruence and similarity.
- Apply similarity criteria to solve problems involving triangles and polygons.
- Utilize the Pythagorean Theorem and proportions for practical problem-solving.
- Plot points and lines on the Cartesian coordinate system.
- Derive equations for lines.

EVIDENCE OF LEARNING

Refer to the 'Formative Assessments' and 'Summative Assessments' sections.

Formative Assessments

- Formative assessments throughout each week to gauge student understanding.
- Weekly quizzes on targeted geometry concepts

Summative Assessments

- Mid-unit and end-unit tasks assessing problem-solving and real-world application skills.
- Culminating portfolio assessment evaluating the depth of understanding, clarity of explanations, and

ability to apply geometry concepts to practical scenarios.

RESOURCES (Instructional, Supplemental, Intervention Materials)

- [Illustrative Math Units](#)
- [Illustrative Math Modeling Prompts](#)
- [IXL](#)
- Sample questions and constructed response tasks aligned with the NJSLA Geometry Type I, Sub-Claim A Evidence Statements.
- Rubrics for assessing constructed response tasks

INTERDISCIPLINARY CONNECTIONS

- Career Readiness
 - Utilize critical thinking to make sense of problems and persevere in solving them.

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

See link to Accommodations & Modifications document in course folder.