Marietta City Schools

2023–2024 District Unit Planner

Enhanced Algebra: Concepts & Connections (Grade 8)

Unit title	*Unit 7: Algebraic Connections to Geometric Concepts*	**MYP year**	*3*	**Unit duration (hrs)**	*Enter Hours* *MSGA- (5 hours per week)* *MMS- (4.5 hours per week)* *MHS- (7.5 hours per 2 weeks)*

Mastering Content and Skills through INQUIRY (Establishing the purpose of the Unit): ***What will students learn?***

GA DoE Standards

Standards:

8.GSR.8 Solve geometric problems involving the Pythagorean Theorem and the volume of geometric figures to explain real-life phenomena.

8.MP: Display perseverance and patience in problem-solving. Demonstrate skills and strategies needed to succeed in mathematics, including critical thinking, reasoning, and effective collaboration and expression. Seek help and apply feedback. Set and monitor goals.

A.GSR.3: Solve problems involving distance, midpoint, slope, area, and perimeter to model and explain real-life phenomena.

A.GSR.3.1 Solve real-life problems involving slope, parallel lines, perpendicular lines, area, and perimeter.

Fundamentals

- Students should apply their understanding of linear relationships to solve real-life, application problems related to slope, parallel lines, perpendicular lines, area, and perimeter.
- Students should be able to calculate the area and perimeter of special parallelograms and triangles with simple, unknown side lengths.

A.GSR.3.2 Apply the distance formula, midpoint formula, and slope of line segments to solve real-world problems.

Fundamentals

- Students should be able to apply their understanding of slope and use the distance and midpoint formulas to solve real-world problems.
- In a real-life application, using a figure in the coordinate plane, students should be able to find a location using distance or midpoint.

Example

- Find the distance of a line segment plotted on the coordinate plane.

A.MM.1: Apply mathematics to real-life situations; model real-life phenomena using mathematics

A.MM.1.1 Explain applicable, mathematical problems using a mathematical model.

Fundamentals

- Students should be provided with opportunities to learn mathematics in the framework of real-life problems.
- Mathematically applicable problems are those presented in which the given framework makes sense, realistically and mathematically, and allows for students to make decisions about how to solve the problem (model with mathematics).

A.MM.1.3 Use units of measure (linear, area, capacity, rates, and time) as a way to make sense of conceptual problems; identify, use, and record appropriate units of measure within the given framework, within data displays, and on graphs; convert units and rates using proportional reasoning given a conversion factor; use units within multi-step problems and formulas; interpret units of input and resulting units of output.

Strategies and Methods

• Dimensional analysis may be used when converting units and rates.

Examples

• Units of measure may include linear, area, capacity, rates, and time.

A.MM.1.4 Use various mathematical representations and structures with this information to represent and solve real-life problems.

MCS Gifted Standards:
MSC.Gifted.S3B.
MSC.Gifted.S4B.
MSC.Gifted.S5B
MSC.Gifted.S6B.

Concepts/Skills to support mastery of standards:

8.GSR.8.1 - Explain a proof of the Pythagorean Theorem and its Converse

8.GSR.8.2 - Apply the Pythagorean Theorem to determine the unknown side lengths in right triangles.

8.GSR.8.3 - Apply the Pythagorean Theorem to find the distance between two points.

8.GSR.8.4 - Apply the formulas for the volume of Cylinders, Cones, and Spheres.

A.GSR.3.1 - Solve real world problems involving slope parallel lines, perpendicular lines, area, and perimeter.

A.GSR.3.2 - Apply the distance formula, midpoint formula, and slope of line segments to solve real world problems.

**• Approximating radicals • Calculating slopes of lines • Graphing lines • Writing equations for lines • Number sense • Computation with whole numbers and decimals, including application of order of operations • Addition and subtraction of common fractions with like denominators • Applications of the Pythagorean Theorem • Graphing on a coordinate plane • Operations with radicals

Vocabulary:

Altitude of a Triangle	**Base (of a Polygon**	**Coordinate Plane**	**Coordinate Point of a Plane**	**Converse of Pythagorean Theorem**	**Cube Root**	**Square Root**
Hypotenuse	**Leg of a Triangle**	**Perfect Squares**	**Perfect Cubes**	**Pythagorean Theorem**	**Pythagorean Triples**	

Area	**Coordinates**	**Distance**	**Distance Formula**	**Intersection**	**Line Segment**
Midpoint	**Parallel**	**Perimeter**	**Perpendicular**	**Phenomena**	**Proof**
Reciprocal	**Slope**	**Slope Relationships**	**Theorem**	**Vertices**	

Notation

Key concept	Related concept(s)	Global context
Form The shape and underlying structure of an entity or piece of work, including its organization, essential nature and external appearance.	Measurement and Models	Orientation in Time and Space

Statement of inquiry

Generalizing relationships between measurements can develop principles, processes and solutions.

Inquiry questions

Factual—

- What is the Pythagorean Theorem?
- What is a parallel line?
- What is a perpendicular line?
- What is the formula for area of a triangle?
- What is the formula for area of a rectangle?

Conceptual—

- How has the discovery of the Pythagorean Theorem shaped the world in which we live?

- What does it mean to square or cube a number?
- Why is the square root of non-perfect squares and the cube root of non-perfect cubes categorized as irrational numbers?
- What is the difference in slopes for parallel and perpendicular lines?
- Explain the difference between area and perimeter.

Debatable-

- Can the Pythagorean Theorem be applied to any Polygon? Explain?
- Can the area and the perimeter of an object be the same?

MYP Objectives	**Assessment Tasks**	
*What specific MYP **objectives** will be addressed during this unit?*	***Relationship** between summative assessment task(s) and statement of inquiry:*	*List of common formative and summative assessments.*
MYP D - City Design	The assessment and MYP project will reveal the level of understanding through math modeling and real life applications of mathematics.	**Formative Assessment(s):** MYP D - City Design Unit 7 CFA **Summative Assessment(s):** Unit 7 Summative Assessment Unit 7 Summative Retest
Approaches to learning (ATL)		
Category: Thinking Skills **Cluster:** Creative-Thinking **Skill Indicator:** Apply existing knowledge to generate new ideas, products or process **Learning Experience: City Design**		

Learning Experiences Add additional rows below as needed.		
Objective or Content	**Learning Experiences**	**Personalized Learning and Differentiation**
8.GSR.8: Solve geometric problems involving the Pythagorean Theorem and the volume of geometric figures to explain real-life phenomena. **8.GSR.8.2** Apply the Pythagorean Theorem to determine unknown side lengths in right triangles within authentic mathematical problems in two and three dimensions. **8.GSR.8.4** Apply the formulas for the volume of cones, cylinders, and spheres and use them to solve relevant, real-life problems.	**Calculate the Volume of Glasses** **Brief Description:** In this learning plan, students will solve real-world problems involving the volume of compound objects including right cylinders, right circular cones, and spheres. Students will explore the formulas for the shapes, use the Pythagorean Theorem, and use the volume formulas to determine the volume of three glasses. **Learning Goal:** ● I can use geometric and spatial reasoning to solve problems involving the Pythagorean Theorem. ● I can use models and drawings to help solve contextual problems in two- and three dimensions. ● I can compose and decompose shapes to find the volume of a compound object.	In this learning plan, students will apply volume formulas of cones, cylinders, and spheres to real-world problems.
A.GSR.3.1 Solve real-life problems involving slope, parallel lines, perpendicular lines, area, and perimeter.	**City Design** **Brief Description:** In this learning plan, students will engage in a guided discovery activity to apply the relationship between the slopes of parallel lines and the slopes of perpendicular lines. Through this task, students will verify geometric	Language Supports: The teacher can provide a list of the various ways to find slope with a sample problem as well as visuals to review parallel lines, perpendicular lines, or neither Extending the Learning: Ask students

	relationships in the coordinate plane using algebraic thinking. They will focus on applying slopes of parallel and perpendicular lines in creating a design for a city. Students will deepen their understanding of the connections between slopes, parallel lines, and perpendicular lines in the coordinate plane while building on their skills for determining area and perimeter of shapes on a coordinate grid. **Learning Goals:** ● I can show that the slopes of parallel lines are the same. ● I can show that the slopes of perpendicular lines are opposite reciprocals. ● I can find the equation of the line that passes through the point and is parallel/perpendicular to the given line.	to create their own scenario like those used in the diagnostic. Students can be creative with the story line and should be asked to create their own data based on their scenario to present to the class. Supporting the Learning: Students often struggle with the accuracy and presentation of their graphs; therefore, the teacher may want to consider allowing students to use Desmos.com to complete this activity.

Content Resources

[Grade-8-Mathematics-Unit-6-Exploring-Geometric-Relationships]

[Savvas Correlation Link]

Textbook Correlation: enVision A|G|A - Algebra 1

A.GSR.3.1 - Lesson 2-4, Geometry Lesson 2-4, 9-1
A.GSR.3.2 - Geometry Lesson 1-3, 2-4

GADOE Learning Plans