



**Marietta City Schools**  
**2023–2024 District Unit Planner**

*Grade 8 Mathematics*

<b>Unit title</b>	Unit 4: Real-Life Phenomena Explored Through Systems of Linear Equations	<b>MYP year</b>	3	<b>Unit duration (hrs)</b>	5 Weeks (20 hours) MMS- (4.5 hours per week)
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**Mastering Content and Skills through INQUIRY (Establishing the purpose of the Unit): *What will students learn?***

**GA DoE Standards**

**Standards**

**8.FGR.7** Justify and use various strategies to solve systems of linear equations to model and explain real-life phenomena.

<b>Expectations</b>		<b>Evidence of Student Learning</b> (not all inclusive; see Grade Level Overview for more details)	
8.FGR.7.1	Interpret and solve relevant mathematical problems leading to two linear equations in two variables.	<b>Strategies and Methods</b> <ul style="list-style-type: none"> <li>Students should have a variety of opportunities to explore problems using technology and tools in order to strengthen their conceptual understanding of systems of linear equations as they visually analyze what happens when the variables are manipulated in the problem.</li> </ul>	<b>Examples</b> <ul style="list-style-type: none"> <li>A trampoline park that you frequently go to is \$9 per visit. You have the option to purchase a monthly membership for \$30 and then pay \$4 for each visit. Explain whether you will buy the membership, and why.  Option A: <math>y = \\$9x</math> Option B: <math>y = \\$30 + \\$4x</math></li> <li>Anya is traveling from out of town. This is the only time she will visit this trampoline park. Which option should she choose?</li> <li>Jin plans on going to the trampoline park seven times this month. Which option should he choose? What does the point of intersection of the graphs represent?</li> </ul>
8.FGR.7.2	Show and explain that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because the points of	<b>Strategies and Methods</b> <ul style="list-style-type: none"> <li>Students should be provided with opportunities to explore systems of equations represented on interactive graphs to analyze and interpret the solutions to the systems.</li> <li>Students should be able to analyze and explain solutions to systems of equations presented numerically, algebraically, and graphically.</li> </ul>	

	intersection satisfy both equations simultaneously.		
8.FGR.7.3	Approximate solutions of two linear equations in two variables by graphing the equations and solving simple cases by inspection.	<b>Strategies and Methods</b> <ul style="list-style-type: none"> <li>Students should be provided with opportunities to explore systems of equations represented on interactive graphs to analyze and interpret the solutions to the systems.</li> <li>Students should have opportunities to analyze and explore problems using technology and tools to strengthen their conceptual understanding of systems of linear equations.</li> </ul>	<b>Example</b> <ul style="list-style-type: none"> <li>A student can graph two linear equations that represent a culturally relevant problem using digital graphing tools (i.e., Desmos) and visually make sense of the graphed lines based on a given context. A student can provide a verbal or written explanation of their reasoning.</li> </ul>
8.FGR.7.4	Analyze and solve systems of two linear equations in two variables algebraically to find exact solutions.	<b>Strategies and Methods</b> <ul style="list-style-type: none"> <li>Students should be able to analyze and solve pairs of simultaneous linear equations (systems of linear equations) within realistic situations and an expressed phenomenon.</li> <li>Students should validate their graphical approximations using algebraic strategies.</li> <li>Students should use substitution and elimination to solve systems of linear equations.</li> </ul>	<b>Example</b> <ul style="list-style-type: none"> <li>Given coordinates for two pairs of points, a student can determine whether the line through the first pair of points intersects the line through the second pair.</li> </ul>
8.FGR.7.5	Create and compare the equations of two lines that are either parallel to each other, perpendicular to each other, or neither parallel nor perpendicular.	<b>Strategies and Methods</b> <ul style="list-style-type: none"> <li>Students should have the opportunity to explore visual graphs of equations that are parallel, perpendicular or neither parallel nor perpendicular to develop a deep, conceptual understanding.</li> <li>As students are comparing parallelism and perpendicularity of lines, they should see the connection as a system of equations.</li> <li>Students should be able to explain if systems are consistent or inconsistent.</li> </ul>	<b>Example</b> <ul style="list-style-type: none"> <li>A student can recognize that there is no solution to the system of equations formed by <math>3x + 2y = 5</math> and <math>3x + 2y = 6</math> because the lines are parallel and <math>3x + 2y</math> cannot simultaneously be 5 and 6.</li> </ul>

**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.

### Vocabulary

[K-12 Mathematics Glossary](#)

Systems of Equations	Point of Intersection	One Solution	No Solution	Infinitely Many Solutions	Slope Intercept
Standard Form	Substitution Method	Elimination Method	Graphing 2 Linear Functions	Parallel Lines	Perpendicular Lines

### Notation

Key concept	Related concept(s)	Global context
Logic	Justification, System	Scientific and Technical Innovation

Statement of inquiry		
Analyzing systems helps us make logical decisions.		
Inquiry questions		
<ul style="list-style-type: none"> <li>● <b>Factual</b>— What is a method for solving a system of equations? What is a solution to a system?</li> <li>● <b>Conceptual</b>— How can results of a system of equations be interpreted?</li> <li>● <b>Debatable</b>- What would be the best way to solve a system of equations?</li> </ul>		
MYP Objectives	Assessment Tasks	
<i>What specific MYP <b>objectives</b> will be addressed during this unit?</i>	<i>Relationship between summative assessment task(s) and statement of inquiry:</i>	<i>List of common formative and summative assessments.</i>
Criterion D: Applying Mathematics In real life contexts.	Students can analyze systems in order to make logical decisions.	<p><b><u>Formative Assessment(s):</u></b></p> <p>Unit 7 CFA</p> <p><b><u>Summative Assessment(s):</u></b></p> <p>Unit 7: System of Equations</p> <p>MYP: <a href="#">Plan a City</a></p>
Approaches to learning (ATL)		
<p><b>Need:</b> Give and receive meaningful feedback. Manage and resolve conflict and work collaboratively in teams.</p> <p><b>Category:</b> Communication Skills</p> <p><b>Cluster:</b> Communication</p> <p><b>Skill Indicator:</b> Exchanging thoughts, messages and information effectively through interaction</p>		

**Learning Experiences**

Add additional rows below as needed.

Objective or Content	Learning Experiences	Personalized Learning and Differentiation
<p><b>8.FGR.7</b> Justify and use various strategies to solve systems of linear equations to model and explain real-life phenomena.</p> <ul style="list-style-type: none"> <li>8.FGR.7.1- Interpret and Solve two linear equations with two variables</li> <li>8.FGR.7.4- Algebraically solve Systems of Equations (Exact Solution)</li> </ul>	<p>Fun with Tape Diagrams</p> <p>Brief Description: In this learning plan, students will explore another way to solve systems of equations through the use of diagrams. Students will be given the opportunity to reason logically with systems of equations to “eliminate” common components and find a solution.</p> <p>Learning Goals:</p> <ul style="list-style-type: none"> <li>I can solve a system of equations.</li> <li>I can interpret the solution to a system of equations.</li> </ul>	<p>In this learning plan, students will explore another way to solve systems of equations through the use of diagrams. Students will be given the opportunity to reason logically with systems of equations to “eliminate” common components and find a solution.</p>
<p><b>8.FGR.7</b> Justify and use various strategies to solve systems of linear equations to model and explain real-life phenomena.</p> <ul style="list-style-type: none"> <li>8.FGR.7.1- Interpret and Solve two linear equations with two variables</li> <li>8.FGR.7.2- Explain solutions for Systems of Equations (Point of Intersections)</li> <li>8.FGR.7.3- Graphing Systems of Equations (Approximate Solution Point)</li> </ul>	<p>Equivalent Expressions</p> <p>Brief Description: In this learning plan, students will use multiple representations to demonstrate their understanding of a system of linear functions. They will be able to identify problems that lend themselves to making use of equivalent expressions in systems of equations such as when two equations equal the same variable (for example, both equations equal to <math>y</math>) or when a variable is written in terms of the other variable (for example, <math>c=2a+4</math> and <math>2c+a=18</math>). Students will explore the power of the equal sign as a way to identify equivalency between isolated variables and variable expressions.</p> <p>Learning Goals:</p> <ul style="list-style-type: none"> <li>I can use equivalent expressions to solve systems of equations.</li> <li>I can solve systems of equations algebraically using equivalent expressions.</li> </ul>	<p>In this learning plan, students will use multiple representations to demonstrate their understanding of a system of linear functions. They will be able to identify problems that lend themselves to making use of equivalent expressions in systems of equations such as <math>c = 2a+4</math> and <math>2c+a = 18</math>. Students will explore the power of the equal sign as a way to identify equivalency between isolated variables and variable expressions.</p>
<p><b>8.FGR.7</b> Justify and use various strategies to solve systems of linear equations to model and explain real-life phenomena.</p> <ul style="list-style-type: none"> <li>8.FGR.7.3- Graphing Systems of Equations (Approximate Solution Point)</li> </ul>	<p>Parallel and Perpendicular Lines</p> <p>Brief Description: This lesson unit is intended to help you assess how well students understand the relationship between the slopes of parallel and perpendicular lines and in particular, to help identify students who find it difficult to:</p> <ul style="list-style-type: none"> <li>Find, from their equations, lines that are parallel and perpendicular.</li> </ul>	<p>This learning plan is intended to help you assess how well students understand the relationship between the slopes of parallel and perpendicular lines and in particular and to help identify students who find it difficult to find, from their equations, lines that are parallel and perpendicular and identify and</p>

<ul style="list-style-type: none"> <li>● 8.FGR.7.5- Create and Compare Parallel and Perpendicular Lines</li> </ul>	<ul style="list-style-type: none"> <li>● Identify and use intercepts. It also aims to encourage discussion on some common misconceptions about equations of lines.</li> </ul> <p>Learning Goals:</p> <ul style="list-style-type: none"> <li>● I can find lines that are parallel and perpendicular to a given equation.</li> <li>● I can identify and use intercepts.</li> </ul>	<p>use intercepts. It also aims to encourage discussion on some common misconceptions about equations of lines.</p>
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**Content Resources**

[DOE Unit 4 Link](#)

**Savvas Math 8 Correlation Link:**

[Savvas Correlation Link](#)

**Savvas Lessons**