

SWALLOW SCHOOL DISTRICT CURRICULUM GUIDE

Curriculum Area: Algebra

Course Length: Full Year

Grade: 8th Algebra

Date Last Approved: September 2023

Stage 1: Desired Results

Course Description and Purpose:

Algebra is the language of generalizations and it is used to describe how quantities relate to each other. Algebra helps solve countless number problems. The main focus of this program is to show students why they need algebra in today's world. Along with these concepts; statistics, geometry and probability will be integrated throughout.

Enduring Understanding(s):

1. Make sense of problems and persevere in solving them
2. Reason abstractly and quantitatively
3. Construct viable arguments and critique the reasoning of others
4. Model with mathematics
5. Use appropriate tools strategically
6. Attend to precision in mathematics
7. Look for and make use of mathematical structure.
8. Look for and express regularity in repeated reasoning

Essential Question(s):

1. Why is it important to evaluate and describe equations using variables and represent these equations with graphs?
2. How can we use algebra to explain the properties of mathematics and relate it to other fields of mathematics?
3. How can we use algebra to solve linear equations and show relationships in table form, graph form and equations?
4. How can we describe relationships between linear graphs and slope? How can we use these relationships to analyze real world applications?
5. What conclusions can be made from exponential growth and decay within the business world?
6. How will we use mathematical tools to help study quadratic equations?
7. When should we use linear systems and how do they work?
8. How can the structure of the Pythagorean Theorem be used in everyday life and the world around us?
9. How can functions model relationships between quantities?
10. How can we use algebra to understand the properties of 3D objects?

Learning Targets:

Target 1 System-Students can extend prior knowledge of operations with rational, irrational numbers and variables

Target 2 Students can formulate, evaluate and solve algebraic expressions and equations.

Target 3 Students can create graphs to show the relationship of linear, exponential and quadratic functions

Target 4 Student uses the mathematical practices to solve real world mathematical problems

Stage 2: Learning Plan

I. Solving Equations and Inequalities

- A. Understand the Distributive Property and when to use it
- B. Use mathematical properties to solve algebraic equations
- C. Solving equations with one variable

Standards:

M.A.CED.A.1
M.A.CED.A.4
M.A.REI.A.1

Learning Targets Addressed:

- D. Solving literal equations
- E. Adding and subtracting like terms
- F. Multiplying and Dividing like terms

Target 1

Key Unit Resources

- Big Ideas
- IXL

Assessment Map:

Type	Level	Assessment Detail
Practice	Knowledge	<ul style="list-style-type: none"> • Daily classwork and homework.
Formative	Skill	<ul style="list-style-type: none"> • Worksheet packets.
Summative	Product	<ul style="list-style-type: none"> • Unit Test and Quiz

II. Linear Functions

- A. Graphing linear patterns
- B. Solve and create equations from graphs and tables
- C. Properties of slope to write and solve equations
- D. Relationship between rate of change and slope
- E. Write and evaluation function notation
- F. Understand domain and range of relations, functions and graphs
- G. Understand Lines of Fit
- H. Read and interpret scatter plots

Standards:

[M.F.IF.A.1](#), [M.F.IF.A.2](#), [M.F.IF.B.5](#), [M.F.LE.A.1A](#), [M.F.LE.A.1B](#), [M.SP.ID.B.6](#), [M.SP.ID.C.7](#), [M.SP.ID.C.8](#), [M.SP.IC.A.1](#)

Learning Targets Addressed:

Target 2

Target 3

Target 4

Key Unit Resources

- Big Ideas
- IXL

Assessment Map:

Type	Level	Assessment Detail
Practice	Knowledge	<ul style="list-style-type: none"> • Daily classwork and homework.
Formative	Skill	<ul style="list-style-type: none"> • Worksheet packets.
Summative	Product	<ul style="list-style-type: none"> • Unit Test and Quiz

III. Graphing Linear Functions

- A. Find slope of a line from graphs and equations
- B. Find equation for a line given 2 points or slope and one point on the line
- C. Write equations in standard form, y-intercept form and point slope form
- D. Graph inequalities
- E. Graph absolute functions
- F. Write and solve Arithmetic sequences

Standards:

[M.A.CED.A.2](#), [M.F.IF.A.3](#), [M.F.IF.C.7A](#), [M.F.BF.A.2](#)

Learning Targets Addressed:

Target 2

Target 3

Target 4

Key Unit Resources

- Big Ideas
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Assessment Map:

Type	Level	Assessment Detail
Practice	Knowledge	<ul style="list-style-type: none">• Daily classwork and homework.
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Summative	Product	<ul style="list-style-type: none">• Unit Test and Quiz

IV. Solving Systems of Linear Equations and Inequalities

- A. Solve systems of equations by elimination, substitution, or graphing
- B. Solve systems of inequalities
- C. Represent and solve equations and inequalities graphically.

Standards:

[M.F.BF.A.1](#),[M.A.REI.C.5](#),[M.A.REI.C.6](#),[M.A.REI.D.10](#),[M.A.REI.D.12](#)

Learning Targets Addressed:

Target 2

Target 3

Target 4

Key Unit Resources

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Assessment Map:

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Practice	Knowledge	<ul style="list-style-type: none">• Daily classwork and homework.
Formative	Skill	<ul style="list-style-type: none">• Worksheet packets.
Summative	Product	<ul style="list-style-type: none">• Unit Test and Quiz

V. Exponential Functions and Sequences

- A. The power of exponential growth

Standards: [M.A.SSE.B.4](#),[M.F.IF.A.3](#),[M.F.IF.C.7A](#),[M.F.IF.C.8B](#),[M.F.BF.A.1](#),[M.F.BF.A.2](#), [M.F.LE.A.1C](#)

- B. Modeling exponential growth and decay
- C. Comparing linear growth to exponential growth
- D. Use and evaluate functions
- E. Write explicit and recursive rules for geometric sequence

Learning Targets Addressed:

Target 2
Target 3
Target 4

Key Unit Resources

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Assessment Map:

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Practice	Knowledge	• Daily classwork and homework.
Formative	Skill	• Worksheet packets.
Summative	Product	• Unit Test and Quiz

VI. Powers and Roots

- A. Extend properties of exponents to rational exponents
- B. Rewrite expressions involving radicals and rational exponents
- C. Explain why sum or product of two rational or irrational numbers is rational or irrational.

Standards:

[M.N.RN.A.1](#)
[M.N.RN.A.2](#)
[M.N.RN.B.3](#)

Learning Targets Addressed:

Target 1

Key Unit Resources

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VII. Polynomials and Factoring

- A. Adding and subtracting Polynomials
- B. Multiplying polynomials
- C. Basic factoring of Polynomials
- D. Understand the relationship

Standards:

[M.A.APR.A.1](#)
[M.A.APR.B.3](#)
[M.A.APR.C.4](#)

between zeros and factors of polynomials

Learning Targets Addressed:

Target 1

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VIII. Quadratic Functions

- A. Quadratic equations to solve projectile problems
- B. Solving quadratic equations using the Quadratic Formula
- C. Analyzing solutions to the Quadratic Equation
- D. Comparing quadratic growth to linear and exponential growth

Standards:

[M.A.SSE.B.3A](#)

[M.A.SSE.B.3B](#)

[M.F.IF.C.7A](#)

[M.F.IF.C.8A](#)

Learning Targets Addressed:

Target 2

Target 3

Target 4

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