## Foundations of Algebra Teaching & Learning Framework

### Semester 1

<table>
<thead>
<tr>
<th>Module 1</th>
<th>Module 2</th>
<th>Module 3</th>
<th>Module 4</th>
<th>Module 5</th>
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</thead>
<tbody>
<tr>
<td>2 weeks</td>
<td>3 weeks</td>
<td>3 weeks</td>
<td>5 weeks</td>
<td>5 weeks</td>
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</tbody>
</table>

### Number Sense & Quantity
- MFANSQ1 Irrational Numbers
- MFANSQ2 Computation

### Arithmetic to Algebra
- MFAA1 Equivalent Expressions
- MGSE9-12.A.SSE.1 Interpret expressions in context
- MGSE9-12.A.SSE.1a-b Interpret formulas & expressions in context
- MGSE9-12.A.APR.1 Add, subtract & multiply polynomials
- MGSE9-12.N.RN.2 Expressions with Radicals

### Proportional Reasoning
- MFAPR1 Equivalent Ratios
- MFAPR2 Proportions
- MFAPR3 Graphing

### Equations & Inequalities
- MFAE1 One Variable
- MGSE9-12.N.Q.1-3 Reason quantitatively & use units to solve problems
- MGSE9-12.A.REI.1 Simple equations
- MGSE9-12.A.REI.1-2 Solving equations
- MGSE9-12.A.REI.6 Solve systems
- MGSE9-12.A.REI.10-12 Solve equations & inequalities 2 variables

### Quantitative Reasoning with Functions
- MFAQR1 Characteristics
- MGSE9-12.F.BF.1 Write a function
- MGSE9-12.F.BF.1a,2 Functions
- MGSE9-12.F.IF.1 Input vs. output
- MGSE9-12.F.IF.2 Function notation
- MGSE9-12.F.IF.3-4 Sequences & characteristics
- MGSE9-12.F.IF.5-6 Rate of change
- MGSE9-12.F.IF.7,7a,9 Analyze functions

### Notes
- These units were written to build upon concepts from prior units, so later units contain tasks that depend upon the concepts addressed in earlier units.
- All units will include the Mathematical Practices and indicate skills to maintain.

### Mathematical Standards
- Mathematical standards are interwoven and should be addressed throughout the year in many different units and tasks as possible in order to stress the natural connections that exist among mathematical topics.

### Abbreviations
- NSQ: number sense & quantity
- AA: arithmetic to algebra
- PR: proportional reasoning
- EQ: equations and inequalities
- QR: quantitative reasoning with functions

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**NOTE:** Mathematical standards are interwoven and should be addressed throughout the year in many different units and tasks as possible in order to stress the natural connections that exist among mathematical topics.
<table>
<thead>
<tr>
<th>Unit 3</th>
<th>Unit 4</th>
<th>Unit 5</th>
<th>Unit 6</th>
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<tr>
<td>6 weeks</td>
<td>4 weeks</td>
<td>3 weeks</td>
<td>5 weeks</td>
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<tr>
<td>Modeling &amp; Analyzing Quadratic Functions</td>
<td>Modeling &amp; Analyzing Exponential Functions</td>
<td>Comparing &amp; Contrasting Functions</td>
<td>Describing Data Review and Extend</td>
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<tr>
<td>MGSE9-12.A.SSE.2 (Interpret the structure of expressions)</td>
<td>MGSE9-12.A.CED.1-2 (Create equations 1-2 variables)</td>
<td>MGSE9-12.F.LE.1 (Linear vs exponential)</td>
<td>MGSE9-12.S.ID.1 (Dot plots, histograms &amp; box plots)</td>
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<tr>
<td>MGSE9-12.A.SSE.3.a-b (Equivalent forms of expressions)</td>
<td>MGSE9-12.A.REI.1 (Justify how to solve an equation)</td>
<td>MGSE9-12.F.LE.1a (Growth of functions)</td>
<td>MGSE9-12.S.ID.2 (Compare data distribution)</td>
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<tr>
<td>MGSE9-12.A.CED.1-2,4 (Create equations that describe numbers or relationships)</td>
<td>MGSE9-12.F.BF.1 (Write a function)</td>
<td>MGSE9-12.F.LE.1b,c,2-3 (Changes in rate and relating to context)</td>
<td>MGSE9-12.S.ID.3 (Shape, center &amp; spread)</td>
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<tr>
<td>MGSE9-12.A.REI.1 (Justify how to solve an equation)</td>
<td>MGSE9-12.F.BF.1a,2 (Arithmetic &amp; geometric sequences)</td>
<td>MGSE9-12.F.LE.5 (Interpret parameters)</td>
<td>MGSE9-12.S.ID.5-6 (Bivariate data)</td>
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<tr>
<td>MGSE9-12.A.REI.4.a-b (Methods of solving quadratics)</td>
<td>MGSE9-12.F.BF.3 (Build new functions)</td>
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<td>MGSE9-12.S.ID.6a,c (Function of best fit)</td>
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<tr>
<td>MGSE9-12.F.BF.1,3 (Write a function &amp; build new functions)</td>
<td>MGSE9-12.F.BF.1 (Input vs. output)</td>
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<td>MGSE9-12.S.ID.7-9 (Slope, correlation coefficient, causation &amp; correlation)</td>
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<td>MGSE9-12.F.IF.1 (Input vs. output)</td>
<td>MGSE9-12.F.IF.2 (Function notation)</td>
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<td>Review: All standards by differentiating for student needs</td>
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<td>MGSE9-12.F.IF.2 (Function notation)</td>
<td>MGSE9-12.F.IF.3-4 (Sequences &amp; characteristics)</td>
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<td>Extend:</td>
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<tr>
<td>MGSE9-12.F.IF.4 (Characteristics)</td>
<td>MGSE9-12.F.IF.5-6 (Rate of change)</td>
<td>MGSE9-12.F.IF.5-6 (Rate of change)</td>
<td>MGSE9-12.G.CO.1 (Precise definitions)</td>
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<tr>
<td>MGSE9-12.F.IF.5-6 (Rate of change)</td>
<td>MGSE9-12.F.IF.7,7e (Graph functions)</td>
<td>MGSE9-12.F.IF.7 (Graph functions)</td>
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<tr>
<td>MGSE9-12.F.IF.7,7a (Graph functions)</td>
<td>MGSE9-12.F.IF.9 (Compare functions)</td>
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<tr>
<td>MGSE9-12.F.IF.8 (Write a function)</td>
<td>MGSE9-12.F.IF.3a,9 (Compare &amp; contrast functions)</td>
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Grades 9-12 Key: **Algebra Strand:** SSE = Seeing Structure in Expressions, APR = Arithmetic with Polynomial and Rational Expressions, CED = Creating Equations, REI = Reasoning with Equations and Inequalities

**Functions Strand:** IF = Interpreting Functions, LE = Linear and Exponential Models, BF = Building Functions, TF = Trigonometric Functions

**Geometry Strand:** CO = Congruence, SRT = Similarity, Right Triangles, and Trigonometry, C = Circles, GPE = Expressing Geometric Properties with Equations, GMD = Geometric Measurement and Dimension,

**MG = Modeling with Geometry**

**Statistics and Probability Strand:** ID = Interpreting Categorical and Quantitative Data, IC = Making Inferences and Justifying Conclusions, CP = Conditional Probability and the Rules of Probability, MD = Using Probability to Make Decisions