## Algebra I
### Unit 1: Solving, Graphing and Creating Linear Equations and Inequalities
#### 35 Days

<table>
<thead>
<tr>
<th>Unit Focus: At the conclusion of this unit, students will be able to analyze and solve linear equations. Students will apply properties of real numbers to various situations, graph linear equations and interpret linear models.</th>
<th>Essential Questions</th>
</tr>
</thead>
</table>
| | • How can a linear equation be manipulated?  
• How can these properties be used to solve or rewrite linear equations?  
• What relationships can a two-variable linear equation express?  
• |

| Unit Vocabulary-  
Analyze, associative, coefficient, commutative, coordinate axes, distributive, equation, equivalent expression, factor, graph, graphical, half-plane, inequality, intercept, justify, linear equation, literal equation, maximum, minimum, modeling, negative number, parameter, product, property, rational, rearrange, simplify, solution, solve, standard form, sum of terms, term, two-variable, variable, viable argument | Summative Assessment  
Consider using one or more of the following summative assessments from the Mathematics Assessment Project  
http://map.mathshell.org/materials/tasks.php?taskid=251&subpage=apprentice  
• A18: Giantburgers (useful for exponent rules, scientific notation)  
• A16: Sorting Functions  
• A20: Multiplying Cells  
E11: Table Tiling |

| Focus Common Core Standards  
A.REI.3, A.CED.4-1, A.CED.4-2, F.IF.7A-1, A.SSE.1-1, A.SSE.1-2, F.LE.2-1, F.LE.2-2 | Mathematical Practices:  
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  
7. Look for and make use of structure  
8. Look for and express regularity in repeated reasoning |
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Unit 1A: Solve one variable equations

Approximate Days: 10

Standard(s):

**A.REI.3** Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

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<tr>
<th>Student Outcomes</th>
<th>Clarifications, limits, emphasis and other information</th>
<th>Relationship to Mathematical Practices (MPs)</th>
<th>Resources</th>
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<tbody>
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<td>Students will be able to:</td>
<td>i) Tasks do not include absolute value equations or compound inequalities.</td>
<td>MP 7 Look for and make use of structure</td>
<td>Carnegie Textbook: Section 2.1 pg.85 Section 2.2 pg.90-91</td>
</tr>
</tbody>
</table>
Unit 1B: Solve literal equations                   Approximate Days: 6

Standard(s):

A.CED.4-1 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law.

A.CED.4-2 Rearrange formulas that are quadratic in the quantity of interest to highlight the quantity of interest, using the same reasoning as in solving equations.

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| Students will be able to:  
  • Solve formulas & literal equations for particular variables | i) Tasks have a real-world context.  
  ii) The quantity of interest is linear in nature. | MP 2 Reason abstractly and quantitatively  
 MP 6 Attend to precision  
 MP 7 Look for and make use of structure | Carnegie Textbook:  
 Section 3.3 pg.193  
 Resources:  
 http://learnzillion.com/lessons/2613-identify-relationships-between-variables |
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Unit 1C: Graph linear equations

Approximate Days: 8 days

Standard(s):

F.IF.7a-1 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
a) Graph linear functions and show intercepts.

A.REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line)

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| Students will be able to: | Address all aspects of standards exactly as written. | MP 1  
Make sense of problems and persevere in solving them | Carnegie Textbook:  
Section 2.2 pg.89 |
| • Graph linear equations showing x and y intercepts | MP 5  
Use appropriate tools strategically | Resources:  
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Unit 1D: Interpret expressions that represent a quantity in terms of its context

Approximate Days: 8 days

Standard(s):

A.SSE.1-1 Interpret exponential expressions, including related numerical expressions that represent a quantity in terms of its context. Interpret parts of an expression, such as terms, factors, and coefficients.
a) Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret \( P(1+r)^n \) as the product of \( P \) and a factor not depending on \( P \).

A.SSE.1-2 Interpret quadratic expressions that represent a quantity in terms of its context.
a) Interpret parts of an expression, such as terms, factors, and coefficients.
b) Interpret complicated expressions by viewing one or more of their parts as a single entity.

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<td>Students will be able to:</td>
<td>See illustrations at: <a href="http://illustrativemathematics.org/illustrations/390">http://illustrativemathematics.org/illustrations/390</a></td>
<td>MP 7 Look for and make use of structure</td>
<td>Carnegie Textbook: Section 2.1 pg.74 Section 2.2 pg.88</td>
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<tr>
<td>• Interpret numerical, exponential, and quadratic expressions that represent a quantity</td>
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# Unit 1E: Linear functions and Arithmetic Sequences

**Standard(s):**

**F.LE.2-1** Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

**F.LE.2-2** Solve multi-step contextual problems with degree of difficulty appropriate to the course by constructing linear and/or exponential function models, where exponentials are limited to integer exponents.

## Student Outcomes

Students will be able to:

- Construct linear and exponential functions from a graph with a description
- Construct arithmetic sequences
- Solve multi-step problems by constructing linear and exponential function models

## Clarifications, limits, emphasis and other information

- i) Tasks are limited to constructing linear and exponential functions with domains in the integers, in simple real-world context (not multi-step).
- ii) Prompts describe a scenario using everyday language. Mathematical language such as "function," "exponential," etc. is not used.
- iii) Students autonomously choose and apply appropriate mathematical techniques without prompting. For example, in a situation of doubling, they apply techniques of exponential functions.

## Relationship to Mathematical Practices (MPs)

- **MP 1** Make sense of problems and persevere in solving them
- **MP 2** Reason abstractly and quantitatively
- **MP 5** Use appropriate tools strategically
- **MP 6** Attend to precision

## Resources

- **Carnegie Textbook:**
  - Section 4.2 pg.224
  - Section 5.1 pg.296
  - Section 5.2 pg.306
  - Section 5.3 pg.314
- **Resources:**