**ALGEBRA 1 LESSON PLAN**

**Date** November 3-November 7  
**Unit 3**

**Essential Question(s)**  
Why are linear functions useful in real world settings?  
How do the key features help us identify graphs and their transformations?

**Measureable Objective.** See daily objectives

**Learning Goal:** Students will be able to determine key features of linear functions, and recognize transformations of these functions both graphically and algebraically. In this unit students will review forms of linear functions and their graphs and investigate key features. Students will also be introduced to the idea that graphs of linear functions can be thought of as transformations on the graphs of other functions. Students will explore continuous functions and investigate sequences as functions also.

**Benchmarks**

**MAFS.912.A-CED.1.2 (DOK 2)**  
Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.  
Identify the quantities in a mathematical problem or real world situation that should be represented by distinct variables and describe what quantities the variables represent.  
- Graph one or more created equations on coordinate axes with appropriate labels and scales.  
- Create at least two equations in two or more variables to represent relationships between quantities.  
- Justify which quantities in a mathematical problem or real world situation are dependent and independent of one another and which operations represent those relationships.  
- Determine appropriate units for the labels and scale of a graph depicting the relationship between equations created in two or more variables.

**MAFS.912.A-REI.4.10 (DOK 1)**  
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).  
- Recognize that the graphical representation of an equation in two variables is a curve, which may be a straight line.  
- Explain why each point on a curve is a solution to its equation.

**MAFS.912.F-BF.1.1:.a, b (DOK 3)**  
Write a function that describes a relationship between two quantities.  
a. Determine an explicit expression, a recursive process, or steps for calculation from a context.  
- Define explicit function and recursive process.  
- Write a function that describes a relationship between two quantities by determining an explicit expression, a recursive process, or steps for calculation from a context.  
b. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.  
- Combine two functions using the operations of addition, subtraction, multiplication, and division.  
- Evaluate the domain of the combined function.
• Given a real-world situation or mathematical problem, build standard functions to represent relevant relationships/quantities.
• Given a real-world situation or mathematical problem, determine which arithmetic operation should be performed to build the appropriate combined function.

MAFS.912.F-BF.1.2: (DOK 2)
Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.
• Identify arithmetic and geometric patterns in given sequences.
• Generate arithmetic and geometric sequences from recursive and explicit formulas.
• Given an arithmetic or geometric sequence in recursive form, translate into the explicit formula.
• Given an arithmetic or geometric sequence as an explicit formula, translate into the recursive form.
• Use given and constructed arithmetic and geometric sequences, expressed both recursively and with explicit formulas, to model real-life situations.
• Determine the recursive rule given arithmetic and geometric) sequences.
• Determine the explicit formula given arithmetic and geometric sequences.
• Justify the translation between the recursive form and explicit formula for arithmetic and geometric sequences.

MAFS.912.F-BF.2.3: (DOK 2)
Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs.
Experiment with cases and illustrate an explanation of the effects on the graph using technology.
Given a single transformation on a symbolic or graphic function, identify the effect on the graph.
• Using technology, identify effects of single transformations on graphs of functions.
• Graph a given function by replacing f(x) by f(x) + k, k f(x), f(kx), and f(x+ k) for specific values of k (both positive and negative).
• Describe the differences and similarities between a parent function and the transformed function.
• Find the value of k, given the graphs of a parent function, f(x), and the transformed function: f(x) + k, k f(x), f(kx), or f(x + k).
• Experiment with cases and illustrate an explanation of the effects on the graph, using technology.

MAFS.912.F-BF.2.4: (DOK 2)
Find inverse functions.
a. Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. For example, f(x) =2 x³ or f(x) = (x+1)/(x−1) for x ≠1.
b. Verify by composition that one function is the inverse of another.
c. Read values of an inverse function from a graph or table.
d. Produce an invertible function from a non-invertible function by restricting the domain.
• a. Define inverse function.
• b. Compose verification of inverse functions.
• c. Read values of an inverse function from a graph or table.
• d. Create and invertible function from a non-invertible function by restricting the domain.
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**MAFS.912.F-IF.1.3**: (DOK 2)
Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by \( f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) \) for \( n \geq 1 \).
- Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.

**MAFS.912.F-IF.2.6**: (DOK 2)
Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. Recognize slope as an average rate of change.
- Calculate the average rate of change of a function (presented symbolically or as a table) over a specified interval.
- Estimate the rate of change from a linear or exponential graph.
- Interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval.

**MAFS.912.F-IF.3.7**:a, (DOK 2)
Graph functions expressed symbolically and show key features of the graph, by hand in simple cases (linear and exponential) and using technology for more complicated cases.
- a. Graph linear functions and show intercepts.
- a. Graph linear functions by hand in simple cases or using technology for more complicated cases and show/label intercepts of the graph.
- a. Determine the differences between simple and complicated linear functions and know when the use of technology is appropriate.

**MAFS.912.F-LE.1.1**: (DOK 3)
Distinguish between situations that can be modeled with linear functions and with exponential functions.
- a. Prove that linear functions grow by equal differences over equal intervals Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.
- c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.
- a. Recognize that linear functions grow by equal differences over equal intervals Distinguish between situations that can be modeled with linear functions to solve mathematical and real-world problems.
- b. Recognize situations in which one quantity changes at a constant rate per unit (equal differences), relative to another to solve mathematical and real world problems

**MAFS.912.F-LE.1.2**: (DOK 2)
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).
- Recognize that arithmetic sequences can be expressed as linear functions.
- Recognize that geometric sequences can be expressed as exponential functions.
- Construct linear functions, including arithmetic sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).
- Construct exponential functions, including geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).
- Determine when a graph, a description of a relationship, or two input output pairs (include reading these from a table) represents a linear or exponential function in order to solve problems.
MAFS.912.F-LE.2.5: (DOK 2)
Interpret the parameters in a linear or exponential function in terms of a context.
• Recognize linear or exponential function including: vertical and horizontal shifts, vertical and horizontal dilations.
• Recognize rates of change and intercepts as parameters in linear or exponential functions.
• Interpret the parameters in a linear or exponential function in terms of a context.

MAFS.912.S-ID.3.7: (DOK 2)
Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.
• Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.

Higher Order Questions
How would you represent slope/ y intercept?
• How do you know your answer is correct /reasonable?
• What would happen if…?
• What trends did you notice about the different types of transformations?

Vocabulary
Slope, rate of change, y intercept, parent function, Transformed function, inverse, arithmetic sequence, parallel lines, perpendicular lines, point slope formula, standard form

November 3 Students will learn to find slope and rate of change with the slope formula and rise over run using Cornell Notes.

1. Bell ringer
2. What is my grade ( I do)
3. Cornell Notes : Slope and Rate of Change ( we do)
4. Homework: 318-319 TB even ( you do)
5. Comprehension Check - What is the slope of a line and how do you calculate it? ( you do)
6. Bring Springboard Book Tomorrow

November 4 Students will learn to find slope and rate of change with the slope formula and rise over run using Scribe and Squire.

1. Bell Ringer- Page 246 #42( we do)
2. Review Homework
3. Class discussion: What is slope and how can I calculate it? ( we do)
4. Scribe and Squire Springboard Page 137 Evens ( you do in groups)
5. Homework: Springboard Page 137 odds ( you do)
6. Comprehension Check: Create a real world problem using slope or rate of change ( you do)
# ALGEBRA 1 LESSON PLAN

### November 5

Students will learn to graph lines in slope intercept form using Cornell Notes

1. **Bell Ringer:** Write a real world problem that has a slope of \( \frac{1}{2} \) *(we do)*
2. **Review Homework** *(we do)*
3. **Cornell Notes:** Graphing Using Slope Intercept form *(we do)*
4. **Homework** Red Text Page 251(4-20 even) *(we do)*
5. **Comprehension Check:** Describe how to graph \( 4x + 2y = 12 \). Using words and illustrations. *(we do)*
6. **Bring Springboard Tomorrow**

### November 6

Students will learn how to graph a line using slope intercept form using Springboard

1. **Bell Ringer Page 175 (1-4) we do**
2. **Review Homework** *(we do)*
3. **Class Discussion** Springboard Page 176-178 *(we do)*
4. **Homework Page 178 (19-23 all)**
5. **Comprehension Check:** Explain how to graph a vertical and a horizontal line. How do they differ from lines with positive or negative slopes? *(you do)*

### November 7

Students will learn to tell if a line is parallel or perpendicular to a given line using slopes with Cornell Notes

1. **Bell Ringer – What do you know about parallel and perpendicular (Create a tree map)** *(we do)*
2. **Review Homework** *(we do)*
3. **Cornell Notes : Parallel and Perpendicular** *(we do)*
4. **Rally Robin - Worksheet on parallel and Perpendicular** *(we do)*
5. **Comprehension Check –** How can we tell if two lines are parallel or perpendicular by looking at their slopes *(we do)*
6. **Bring Springboard Monday**
## Algebra 1 Lesson Plan

### ESOL/ESE Accomodations

- Visual Aids, Concrete Objects, Gestures, Repetitions
- Written Outline, Copy of Notes
- Small Group Instruction
- Incorporation of LEP student’s Culture & Language
- Verbal and Written Directions
- Hands on Activities
- Request of Text in Student’s Language
- Correlation With ESOL/ESE Resource Personnel
- Cooperative Groups
- Peer Tutoring
- Use of Dictionary
- Avoidance of Idioms
- Copies of Notes
- Summarize & Review Frequently
- Student Translator
- Reading Aloud Questions
- Preferential Seating
- Extended Time

### 8th Grade Recursive Standards (Overview for Math)

<table>
<thead>
<tr>
<th>Reading Standards for Literary and Informational Text</th>
<th>Speaking and Listening</th>
<th>Writing and Language Standards</th>
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| 8.RL/RI.1.1 (DOK2) Text evidence that supports analysis and inferences drawn from text | 8.LS.1.1 (DOK 3) Collaborative discussions  
   a. Prepare/research material  
   b. Follow rules for collegial discussions; track progress toward goals/deadlines;  
   c. Pose questions that connect ideas, respond to others; qualify/justify own views  
   d. Acknowledge new information expressed by others; qualify or justify their own views in light of the evidence presented | 8.W.2.4 (DOK 3) Produce clear and coherent writing; organization, style are appropriate to task/purpose/audience |
| 8.RI.4.10 (DOK2) By the end of the year, read and comprehend literary nonfiction at the high end of 6-8th grade text complexity band independently and proficiently | 8.W.4.10 (DOK 3) Write routinely over extended and short time frames for a range of discipline-specific tasks/purposes/audiences | 8.RI.4.10 (DOK2) By the end of the year, read and comprehend literary nonfiction at the high end of 6-8th grade text complexity band independently and proficiently |
| 8.L.3.4 (DOK2) Determine or clarify the meaning of unknown and multiple-meaning words/phrases based on grade 8 reading and content,  
   a. Use context as clue  
   b. Use common, grade-appropriate Greek or Latin affixes and roots  
   c. Consult general and specialized reference materials  
   d. Verify the preliminary determination of the meaning of a word or phrase (e.g., checking inferred meaning in context or in a dictionary) | |