

Course Description:

Algebra I (2 of 2) explores the analysis of different types of functions presented as equations, graphs, tables, verbal descriptions, identifying key features applied to real-world problems, using key features to compare different types of functions, transformations of functions, statistics, interpreting and analyzing data sets, as well as causation and correlation.

Course Objectives:

- Identify, prove, and interpret key features of functions.
- Rewrite and interpret expressions and equations in different forms.
- Model and solve problems using function rules.
- Determine appropriate values for measurements in different situations.
- Model functions with graphs.
- Find and interpret average rates of change for functions over given intervals.
- Compare properties of functions.
- Create new functions using operations and transformations.
- Compare and interpret differences in data sets.
- Model and interpret data sets using data displays.
- Identify and interpret trends in data sets shown in data displays.
- Calculate probabilities of different subsets of the sample space and determine independence of events.

Required Materials:

Here is a list of materials that may be used for this course.

Recommended:

- 10 objects for students to measure (see Unit 3 Activity Plan for details)
- 10 measurement tools, such as a thermometer, scales, a clock, a protractor, measuring cups, micrometer, pressure gauge (see Unit 2 Activity Plan for details)
- a folder, binder, box, or other material in which students can organize their activity materials
- a hole-punch device
- a metal ring, rubber band, hair tie, or another object that students can use to bind cards
- a microphone-enabled device
- a partition such as a foldable drying rack draped with a sheet, or cardboard taped to desks
- a bathroom scale or food scale
- a board game and questions
- butcher paper
- coins
- colored paper (at least two colors)
- colored pencils
- construction paper
- dice (one pair per group)
- envelopes
- game boards (one per group)
- game cards (one deck per group)

- game tables (one per group)
- game tokens (coins, scraps of paper with player names written on them, or various classroom supplies)
- glue
- a graph template with plotted targets
- graphing paper
- heavy paper
- index cards
- Jenga® game (or see other options under Modifications in the Unit 3 Activity Plan)
- markers and highlighters
- masking tape
- measuring tape
- note cards
- objects to represent unit measurements, such as a calendar, clock, measuring tape, dry packaged goods, canned foods (see Unit 5 Activity Plan for details)
- paper
- pipe cleaners
- playing cards (one deck per group of four students)
- popsicle sticks
- poster boards
- push pins
- scrap paper
- several pairs of scissors
- a spinner
- a stapler
- sticky notes
- string
- tape
- two small containers, such as bags, bowls, or plastic cups
- whiteboards
- whiteboard markers (at least five different colors)

Optional:

- additional art supplies
- hula hoops
- paper clips

Course Overview:

The Course Outline shows the table of contents of the course and the topics and skills taught by lesson.

Unit 1: Exploring Functions

- **Lesson 1: Introduction to Functions**
 - Activity 1: Introduction to Algebra I (2 of 2)
 - Activity 2: Instruction: What Is a Function?
 - Activity 3: Practice: What Is a Function?

- Activity 4: Instruction: Functions in Tables
- Activity 5: Practice: Functions in Tables
- Activity 6: Instruction: Functions in Graphs
- Activity 7: Practice: Functions in Graphs
- Activity 8: Checkpoint: Introduction to Functions
- **Lesson 2: Properties of Functions**
 - Activity 1: Instruction: Domain
 - Activity 2: Practice: Domain
 - Activity 3: Instruction: Range
 - Activity 4: Practice: Range
 - Activity 5: Instruction: Function Notation
 - Activity 6: Practice: Function Notation
 - Activity 7: Checkpoint: Properties of Functions
- **Lesson 3: Working with Functions**
 - Activity 1: Instruction: Evaluating Functions
 - Activity 2: Practice: Evaluating Functions
 - Activity 3: Instruction: Linear Function Rules
 - Activity 4: Practice: Linear Function Rules
 - Activity 5: Instruction: Real-World Examples of Functions
 - Activity 6: Practice: Real-World Examples of Functions
 - Activity 7: Discussion: Identify Functions
 - Activity 8: Checkpoint: Working with Functions
- **Lesson 4: Sequences**
 - Activity 1: Instruction: What Are Sequences?
 - Activity 2: Practice: What Are Sequences?
 - Activity 3: Instruction: Arithmetic Sequences
 - Activity 4: Practice: Arithmetic Sequences
 - Activity 5: Instruction: Reading Recursive Formulas
 - Activity 6: Practice: Reading Recursive Formulas
 - Activity 7: Checkpoint: Sequences
- **Lesson 5: Formulas of Sequences**
 - Activity 1: Instruction: Writing Recursive Formulas
 - Activity 2: Practice: Writing Recursive Formulas
 - Activity 3: Instruction: Reading Explicit Formulas
 - Activity 4: Practice: Reading Explicit Formulas
 - Activity 5: Instruction: Writing Explicit Formulas
 - Activity 6: Practice: Writing Explicit Formulas
 - Activity 7: Notes/Work Upload: Exploring Functions
 - Activity 8: Review: Exploring Functions
 - Activity 9: Exam: Exploring Functions

Unit 2: More About Functions

- **Lesson 6: Geometric Sequences**
 - Activity 1: Instruction: What Is a Geometric Sequence?
 - Activity 2: Practice: What Is a Geometric Sequence?
 - Activity 3: Instruction: Recursive Formulas
 - Activity 4: Practice: Recursive Formulas

- Activity 5: Instruction: Explicit Formulas
- Activity 6: Practice: Explicit Formulas
- Activity 7: Checkpoint: Geometric Sequences
- **Lesson 7: Exponential Functions**
 - Activity 1: Instruction: Exponential Functions
 - Activity 2: Practice: Exponential Functions
 - Activity 3: Instruction: Graphing Exponential Functions
 - Activity 4: Practice: Graphing Exponential Functions
 - Activity 5: Instruction: Comparing Exponential Functions
 - Activity 6: Practice: Comparing Exponential Functions
 - Activity 7: Checkpoint: Exponential Functions
- **Lesson 8: Growth vs. Decay**
 - Activity 1: Instruction: Exponential Growth
 - Activity 2: Practice: Exponential Growth
 - Activity 3: Instruction: Exponential Decay
 - Activity 4: Practice: Exponential Decay
 - Activity 5: Instruction: Growth and Decay in Context
 - Activity 6: Practice: Growth and Decay in Context
 - Activity 7: Checkpoint: Growth vs. Decay
 - Activity 8: Project: Exploring Measurement, Part 1
- **Lesson 9: Variables in Exponents**
 - Activity 1: Instruction: Properties of Exponents
 - Activity 2: Practice: Properties of Exponents
 - Activity 3: Instruction: Compound Interest
 - Activity 4: Practice: Compound Interest
 - Activity 5: Instruction: Rewriting to Find Values
 - Activity 6: Practice: Rewriting to Find Values
 - Activity 7: Discussion: Exponents in Functions
 - Activity 8: Checkpoint: Variables in Exponents
- **Lesson 10: Rate of Change**
 - Activity 1: Instruction: Linear Rates of Change
 - Activity 2: Practice: Linear Rates of Change
 - Activity 3: Instruction: Average Rates of Change
 - Activity 4: Practice: Average Rates of Change
 - Activity 5: Instruction: Comparing Rates of Change
 - Activity 6: Practice: Comparing Rates of Change
 - Activity 7: Notes/Work Upload: More About Functions
 - Activity 8: Review: More About Functions
 - Activity 9: Exam: More About Functions

Unit 3: Using Functions

- **Lesson 11: Applying Functions**
 - Activity 1: Instruction: Interpreting Parameters from Context
 - Activity 2: Practice: Interpreting Parameters from Context
 - Activity 3: Instruction: Writing Functions from Context
 - Activity 4: Practice: Writing Functions from Context
 - Activity 5: Instruction: Use Linear Functions in Context

- Activity 6: Practice: Use Linear Functions in Context
- Activity 7: Checkpoint: Applying Functions
- **Lesson 12: Quadratic Functions**
 - Activity 1: Instruction: Zeros and Symmetry in Quadratics
 - Activity 2: Practice: Zeros and Symmetry in Quadratics
 - Activity 3: Instruction: Extrema and Symmetry in Quadratics
 - Activity 4: Practice: Extrema and Symmetry in Quadratics
 - Activity 5: Instruction: Interpret Quadratics in Context
 - Activity 6: Practice: Interpret Quadratics in Context
 - Activity 7: Discussion: Quadratic Equations
 - Activity 8: Checkpoint: Quadratic Functions
- **Lesson 13: Problem Solving with Functions**
 - Activity 1: Instruction: Linear, Quadratic, or Exponential
 - Activity 2: Practice: Linear, Quadratic, or Exponential
 - Activity 3: Instruction: Using the Key Features of Graphs
 - Activity 4: Practice: Using the Key Features of Graphs
 - Activity 5: Instruction: Comparing Rates of Change in Context
 - Activity 6: Practice: Comparing Rates of Change in Context
 - Activity 7: Instruction: Functions in Different Forms
 - Activity 8: Practice: Functions in Different Forms
 - Activity 9: Checkpoint: Problem Solving with Functions
 - Activity 10: Project: Exploring Measurement, Part 2
- **Lesson 14: More than One Function (or Relation)**
 - Activity 1: Instruction: Find Where Functions Are Equal
 - Activity 2: Practice: Find Where Functions Are Equal
 - Activity 3: Instruction: Graphing Systems of Inequalities
 - Activity 4: Practice: Graphing Systems of Inequalities
 - Activity 5: Instruction: Solving Systems of Inequalities
 - Activity 6: Practice: Solving Systems of Inequalities
 - Activity 7: Checkpoint: More than One Function (or Relation)
- **Lesson 15: Other Types of Functions**
 - Activity 1: Instruction: Absolute Value Functions
 - Activity 2: Practice: Absolute Value Functions
 - Activity 3: Instruction: Cubic Functions
 - Activity 4: Practice: Cubic Functions
 - Activity 5: Instruction: Square Root Functions
 - Activity 6: Practice: Square Root Functions
 - Activity 7: Instruction: Cube Root Functions
 - Activity 8: Practice: Cube Root Functions
 - Activity 9: Notes/Work Upload: Using Functions
 - Activity 10: Review: Using Functions
 - Activity 11: Exam: Using Functions

Unit 4: Transformations of Functions

- **Lesson 16: A Few More Functions**
 - Activity 1: Instruction: Piecewise Functions
 - Activity 2: Practice: Piecewise Functions

- Activity 3: Instruction: Step Functions
- Activity 4: Practice: Step Functions
- Activity 5: Instruction: Even and Odd Functions
- Activity 6: Practice: Even and Odd Functions
- Activity 7: Instruction: Classify Types of Functions
- Activity 8: Practice: Classify Types of Functions
- Activity 9: Checkpoint: A Few More Functions
- **Lesson 17: Performing Operations on Functions**
 - Activity 1: Instruction: Adding and Subtracting Functions
 - Activity 2: Practice: Adding and Subtracting Functions
 - Activity 3: Instruction: Multiplying Functions
 - Activity 4: Practice: Multiplying Functions
 - Activity 5: Instruction: Combining Functions from Context
 - Activity 6: Practice: Combining Functions from Context
 - Activity 7: Discussion: Graphs of Combined Functions
 - Activity 8: Checkpoint: Performing Operations on Functions
- **Lesson 18: Translating Functions**
 - Activity 1: Instruction: Types of Transformations
 - Activity 2: Practice: Types of Transformations
 - Activity 3: Instruction: Vertical Translations
 - Activity 4: Practice: Vertical Translations
 - Activity 5: Instruction: Horizontal Translations
 - Activity 6: Practice: Horizontal Translations
 - Activity 7: Checkpoint: Translating Functions
 - Activity 8: Project: Exploring Measurement, Part 3
- **Lesson 19: Dilating and Reflecting Functions**
 - Activity 1: Instruction: Vertical Dilations
 - Activity 2: Practice: Vertical Dilations
 - Activity 3: Instruction: Horizontal Dilations
 - Activity 4: Practice: Horizontal Dilations
 - Activity 5: Instruction: Reflections
 - Activity 6: Practice: Reflections
 - Activity 7: Checkpoint: Dilating and Reflecting Functions
- **Lesson 20: Inverses of Functions**
 - Activity 1: Instruction: Inverse Relations
 - Activity 2: Practice: Inverse Relations
 - Activity 3: Instruction: Graph Inverse Relations
 - Activity 4: Practice: Graph Inverse Relations
 - Activity 5: Instruction: Is the Inverse Relation a Function?
 - Activity 6: Practice: Is the Inverse Relation a Function?
 - Activity 7: Notes/Work Upload: Transformations of Functions
 - Activity 8: Review: Transformations of Functions
 - Activity 9: Exam: Transformations of Functions

Unit 5: Data and Statistics, Part 1

- **Lesson 21: Probability and Independent Events**
 - Activity 1: Instruction: Events, Sets, and Subsets

© 2023 StrongMind. All Rights Reserved.

This StrongMind course is Quality Matters certified.

- Activity 2: Practice: Events, Sets, and Subsets
- Activity 3: Instruction: Probability
- Activity 4: Practice: Probability
- Activity 5: Instruction: Independent Events
- Activity 6: Practice: Independent Events
- Activity 7: Checkpoint: Probability and Independent Events
- **Lesson 22: The Shape of Data**
 - Activity 1: Instruction: Data Displays
 - Activity 2: Practice: Data Displays
 - Activity 3: Instruction: Symmetry and Data Sets
 - Activity 4: Practice: Symmetry and Data Sets
 - Activity 5: Instruction: Skewed Data Sets
 - Activity 6: Practice: Skewed Data Sets
 - Activity 7: Checkpoint: The Shape of Data
- **Lesson 23: The Spread of Data**
 - Activity 1: Instruction: Spread and Outliers
 - Activity 2: Practice: Spread and Outliers
 - Activity 3: Instruction: Standard Deviation
 - Activity 4: Practice: Standard Deviation
 - Activity 5: Instruction: Outliers and Standard Deviations
 - Activity 6: Practice: Outliers and Standard Deviations
 - Activity 7: Checkpoint: The Spread of Data
 - Activity 8: Project: Exploring Measurement, Part 4
- **Lesson 24: Comparing Data Sets**
 - Activity 1: Instruction: Compare Data in Sets
 - Activity 2: Practice: Compare Data in Sets
 - Activity 3: Instruction: Compare Data in Displays
 - Activity 4: Practice: Compare Data in Displays
 - Activity 5: Instruction: Compare Data in Different Forms
 - Activity 6: Practice: Compare Data in Different Forms
 - Activity 7: Discussion: Compare Data
 - Activity 8: Checkpoint: Comparing Data Sets
- **Lesson 25: Two-Way Frequency Tables**
 - Activity 1: Instruction: Making Two-Way Frequency Tables
 - Activity 2: Practice: Making Two-Way Frequency Tables
 - Activity 3: Instruction: Relative Frequencies
 - Activity 4: Practice: Relative Frequencies
 - Activity 5: Instruction: Analyzing Results
 - Activity 6: Practice: Analyzing Results
 - Activity 7: Notes/Work Upload: Data and Statistics, Part 1
 - Activity 8: Review: Data and Statistics, Part 1
 - Activity 9: Exam: Data and Statistics, Part 1

Unit 6: Data and Statistics, Part 2

- **Lesson 26: Types of Correlations**
 - Activity 1: Instruction: Scatter Plots and Correlations
 - Activity 2: Practice: Scatter Plots and Correlations

- Activity 3: Instruction: Nonlinear Correlations
- Activity 4: Practice: Nonlinear Correlations
- Activity 5: Discussion: Correlation and Causation
- Activity 6: Checkpoint: Types of Correlations
- **Lesson 27: Fitting Functions to Data**
 - Activity 1: Instruction: Fitting a Linear Function to Data
 - Activity 2: Practice: Fitting a Linear Function to Data
 - Activity 3: Instruction: Fitting Nonlinear Functions to Data
 - Activity 4: Practice: Fitting Nonlinear Functions to Data
 - Activity 5: Checkpoint: Fitting Functions to Data
- **Lesson 28: Choosing a Good Model**
 - Activity 1: Instruction: The Correlation Coefficient
 - Activity 2: Practice: The Correlation Coefficient
 - Activity 3: Instruction: How Good Is the Model?
 - Activity 4: Practice: How Good Is the Model?
 - Activity 5: Checkpoint: Choosing a Good Model
- **Lesson 29: Making Predictions**
 - Activity 1: Instruction: Interpreting a Linear Model
 - Activity 2: Practice: Interpreting a Linear Model
 - Activity 3: Instruction: Predictions and Their Accuracy
 - Activity 4: Practice: Predictions and Their Accuracy
 - Activity 5: Notes/Work Upload: Data and Statistics, Part 2
 - Activity 6: Discussion: Analyze Data and Predictions
 - Activity 7: Review: Data and Statistics, Part 2
 - Activity 8: Exam: Data and Statistics, Part 2
- **Lesson 30: Final Exam**
 - Activity 1: Final Exam
 - Activity 2: Course Summary