

## PROGRAM OVERVIEW

# Table of Contents for Instructional Units

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### Unit 1: Building Mathematical Community with Parent Functions and Key Features

#### Unit 1 Resources

Lesson 1.1: Reading and Identifying Key Features of Real-World Situation Graphs (NC.M3.F–IF.4★)

Lesson 1.2: Transformations of Parent Graphs (NC.M3.F–BF.3)

Lesson 1.3: Recognizing Odd and Even Functions (NC.M3.F–BF.3)

#### Conceptual Tasks

Temperature Transformations, Parts 1 and 2 (NC.M3.F–BF.3)

Fitted Functions for Fuel Consumption, Parts 1 and 2 (NC.M3.F–IF.4★)

#### Mid-Unit Assessment

#### End-of-Unit Assessment

### Unit 2: Piecewise Functions, Composition of Functions, and Regression

#### Unit 2 Resources

Lesson 2.1: Piecewise, Step, and Absolute Value Functions (NC.M4.AF.4.1, NC.M4.AF.4.2)

Lesson 2.2: Composition of Functions (NC.M4.AF.1.1)

Lesson 2.3: Evaluating Composite Functions in Various Forms (NC.M4.AF.1.2)

Lesson 2.4: Linear, Exponential, and Quadratic Regression (NC.M4.AF.5.1)

Lesson 2.5: Analyzing Residual Plots (NC.M4.AF.5.2)

#### Conceptual Tasks

Composition Notation, Parts 1 and 2 (NC.M4.AF.4.1, NC.M4.AF.4.2)

Modeling with Data, Parts 1 and 2 (NC.M3.F–IF.4★)

#### Mid-Unit Assessment

#### End-of-Unit Assessment

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## PROGRAM OVERVIEW

### Table of Contents for Instructional Units

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#### **Unit 3: Logarithmic Functions**

##### **Unit 3 Resources**

Lesson 3.1: Inverses of Exponential and Logarithmic Functions (NC.M4.AF.3.1)

Lesson 3.2: Common Logarithms (NC.M4.AF.3.1, NC.M4.AF.3.2)

Lesson 3.3: Natural Logarithms (NC.M4.AF.3.1, NC.M4.AF.3.2)

Lesson 3.4: Interpreting Logarithmic Models (NC.M4.AF.3.1, NC.M4.AF.3.2, NC.M4.AF.3.3)

Lesson 3.5: Logarithmic Regression (NC.M4.AF.5.1)

##### **Conceptual Task**

Logs from Trees, Parts 1 and 2 (NC.M4.AF.3.1, NC.M4.AF.3.2, NC.M4.AF.3.3)

##### **Mid-Unit Assessment**

##### **End-of-Unit Assessment**

#### **Unit 4: Trigonometry**

##### **Unit 4 Resources**

Lesson 4.1: Proving the Fundamental Pythagorean Identity (NC.M4.AF.2.1)

Lesson 4.2: Proving the Law of Sines (NC.M4.AF.2.2)

Lesson 4.3: Proving the Law of Cosines (NC.M4.AF.2.2)

Lesson 4.4: Applying the Laws of Sines and Cosines (NC.M4.AF.2.2)

Lesson 4.5: Key Features of Trigonometric Functions (NC.M4.AF.2.3)

Lesson 4.6: Sinusoidal Regression (NC.M4.AF.5.1)

##### **Conceptual Task**

Tricky Triangles, Parts 1 and 2 (NC.M4.AF.2.2)

##### **Mid-Unit Assessment**

##### **End-of-Unit Assessment**

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## PROGRAM OVERVIEW

### Table of Contents for Instructional Units

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#### Unit 5: Exploratory Data Analysis

##### Unit 5 Resources

Lesson 5.1: Simple Random Sampling (NC.M4.SP.1.1, NC.M4.SP.1.2)

Lesson 5.2: Sampling Methods and Sources of Bias

(NC.M4.SP.1.1, NC.M4.SP.1.2, NC.M4.SP.1.3, NC.M4.SP.1.4)

Lesson 5.3: Observational Studies, Surveys, and Experiments

(NC.M4.SP.1.1, NC.M4.SP.1.3, NC.M4.SP.1.4)

Lesson 5.4: Experimental Design (NC.M4.SP.1.1, NC.M4.SP.1.2, NC.M4.SP.1.3, NC.M4.SP.1.4)

Lesson 5.5: Analyzing Data Visualizations (NC.M4.SP.1.4)

##### Conceptual Task

Sampling Fish, Parts 1 and 2 (NC.M4.SP.1.1, NC.M4.SP.1.2)

##### Mid-Unit Assessment

##### End-of-Unit Assessment

#### Unit 6: Probability Distributions

##### Unit 6 Resources

Lesson 6.1: Creating Graphs of Probability Distributions (NC.M4.SP.3.1, NC.M4.SP.3.3)

Lesson 6.2: Expected Value (NC.M4.SP.3.1)

Lesson 6.3: Normal Distributions and the 68–95–99.7 Rule (NC.M4.SP.3.3, NC.M4.SP.3.4)

Lesson 6.4: Standard Normal Calculations (NC.M4.SP.3.3, NC.M4.SP.3.4)

Lesson 6.5: Assessing Normality (NC.M4.SP.3.3, NC.M4.SP.3.4)

Lesson 6.6: Developing Probability Distributions (NC.M4.SP.3.1, NC.M4.SP.3.3)

Lesson 6.7: Using Probability Distributions to Evaluate Outcomes (NC.M4.SP.3.1)

Lesson 6.8: The Binomial Distribution (NC.M4.SP.3.2)

##### Conceptual Tasks

Tons of Tuna, Parts 1 and 2 (NC.M4.SP.3.3, NC.M4.SP.3.4)

Possible Side Effects, Parts 1 and 2 (NC.M4.SP.3.1, NC.M4.SP.3.3)

##### Extension Activity

Playing Roulette (NC.M4.SP.3.1, NC.M4.SP.3.3, NC.M4.SP.3.4)

##### Mid-Unit Assessment

##### End-of-Unit Assessment

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## PROGRAM OVERVIEW

### Table of Contents for Instructional Units

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#### Unit 7: Statistical Inference

##### Unit 7 Resources

Lesson 7.1: Confidence in Sample Statistics (NC.M4.SP.2.2, NC.M4.SP.2.3)

Lesson 7.2: Estimating with Confidence (NC.M4.SP.2.2, NC.M4.SP.2.3)

Lesson 7.3: Using Simulations (NC.M4.SP.2.1)

##### Conceptual Task

Arcade Simulation, Parts 1 and 2 (NC.M4.SP.2.1)

##### Mid-Unit Assessment

##### End-of-Unit Assessment

#### Unit 8: ACT Prep: Complex Numbers, Matrices, and Vectors

##### Unit 8 Resources

Lesson 8.1: Defining Complex Numbers,  $i$ , and  $i^2$  (NC.M4.N.1.1)

Lesson 8.2: Adding and Subtracting Complex Numbers (NC.M4.N.1.1)

Lesson 8.3: Multiplying Complex Numbers (NC.M4.N.1.2)

Lesson 8.4: Finding the Complex Conjugate (NC.M4.N.1.2)

Lesson 8.5: Operations with Matrices (NC.M4.N.2.1)

Lesson 8.6: Using Operations on Matrices (NC.M4.N.2.1)

Lesson 8.7: Zero, Identity, Inverse, and Transformation Matrices (NC.M4.N.2.1)

Lesson 8.8: Representing and Modeling with Vector Quantities (NC.M4.N.2.2)

Lesson 8.9: Performing Operations on Vectors (NC.M4.N.2.2)

##### Conceptual Task

Systems Solving, Parts 1 and 2 (NC.M4.N.2.1)

##### Extension Activity

Computer Animation with Matrices (NC.M4.N.2.1)

##### Mid-Unit Assessment

##### End-of-Unit Assessment