# Pre-AP Algebra 2 Instructional Planning Guide with SpringBoard Algebra 2, National Edition

The goal of the instructional planning guide is to help you create a roadmap of the key instructional activities and assessments you will   
use to design your course in alignment with the Pre-AP course framework and instructional principles. This sample offers one approach   
of how your SpringBoard resources can be used across each Pre-AP unit to create a plan for the full year. We encourage you to adapt this   
approach to support your students’ needs.

**Using and Customizing the Instructional Planning Guide:**

* Consider using this tool to plan collaboratively with your peers.
* This document is flexible, allowing you to modify it as needed to best support your students’ needs.   
  Feel free to incorporate other SpringBoard resources to reinforce the model lessons and course goals as appropriate. These resources include:
  + Core lessons and activities
  + Embedded Assessments
  + Skills Workshops
  + SpringBoard digital assessments
  + Desmos activities
* Take time to capture your reflections as you move through the course.

## Unit 1: Modeling with Functions

| **Pacing in Min.** | **Actual Date(s)** | **Key Concepts** | **Materials/Resources/Tasks**  *Pre-AP Model Lessons, Additional Lessons, Textbooks,  Performance Tasks, Assessments* | **Learning Objectives** | **State Standards** | **Reflections on  Areas of Focus & Shared Principles** |
| --- | --- | --- | --- | --- | --- | --- |
| ~90 |  | 1.1: Choosing Appropriate Function Models | Pre-AP Model Lesson 1.1:  Recognizing Linear, Quadratic, and Exponential Relationships | 1.1.1 | A.SSE.1  F.IF.4 |  |
| ~60 |  | 1.1: Choosing Appropriate Function Models | Pre-AP Model Lesson 1.2:  Making Predictions with Linear Models | 1.1.3, 1.1.4 | A.SSE.1  A.SSE.2  F.IF.4  F.IF.5  F.IF.7  F.BF.1 |  |
| ~90 |  | 1.1: Choosing Appropriate Function Models | Pre-AP Model Lesson 1.3:  Evaluating the Appropriateness of a Linear Model | 1.1.2, 1.1.3 | A.SSE.1  A.SSE.2  F.IF.4  F.IF.7  F.BF.1 |  |
| ~90 |  | 1.1: Choosing Appropriate Function Models | Pre-AP Model Lesson 1.4:  Connecting Growth Factor to Percent Change | 1.1.3, 1.1.4 | A.SSE.1  A.SSE.2  F.IF.4  F.IF.5  F.IF.7  F.BF.1 |  |
| ~75 |  | 1.1: Choosing Appropriate Function Models | Pre-AP Model Lesson 1.5:  Modeling Nonlinear Data with Exponential Functions | 1.1.3, 1.1.4 | A.SSE.1  A.SSE.2  F.IF.4  F.IF.5  F.IF.7  F.BF.1 |  |
| ~45 |  | 1.1: Choosing Appropriate Function Models | Pre-AP Model Lesson 1.6:  Modeling Scenarios with Quadratic Functions | 1.1.1, 1.1.3 | A.SSE.1  A.SSE.2  F.IF.4  F.IF.7  F.BF.1 |  |
| ~60 |  | 1.1: Choosing Appropriate Function Models | Pre-AP Model Lesson 1.7:  Modeling Data with Quadratic Functions in Vertex Form | 1.1.1, 1.1.3 | A.SSE.1  A.SSE.2  F.IF.4  F.IF.7  F.BF.1 |  |
| ~135 |  | 1.1: Choosing Appropriate Function Models | Practice Performance Task:  Modeling Bee Colony Collapse | 1.1.1, 1.1.2, 1.1.3, 1.1.4 | A.SSE.1  A.SSE.2  F.IF.4  F.IF.5  F.IF.7  F.BF.1 |  |
| ~45 |  | 1.1 | **Learning Checkpoint 1**  *This learning checkpoint can assess any of the learning objectives from its associated key concepts.* |  |  |  |
| ~45 |  | 1.2: Rate of Change | Pre-AP Model Lesson 1.8:  Understanding Rate of Change | 1.2.1 | F.IF.4  F.IF.6 |  |
| ~60 |  | 1.2: Rate of Change | Pre-AP Model Lesson 1.9:  Average Rate of Change | 1.2.1, 1.2.2 | F.IF.4  F.IF.6 |  |
| ~45 |  | 1.2 | **Performance Task**  Counting Customers in the Grocery Store  *This performance task assesses learning objectives addressed in the unit.* | 1.2.1, 1.2.2 | F.IF.4  F.IF.6 |  |
| ~45 |  | 1.3: Piecewise-Defined Models | Pre-AP Model Lesson 1.10:  Modeling with Piecewise-Defined Functions | 1.3.1, 1.3.2 | A.CED.3  F.IF.4  F.IF.5  F.IF.7  F.IF.8  F.BF.1 |  |
| ~45 |  | 1.3: Piecewise-Defined Models | SpringBoard Lesson 4-2:  Step Functions and Absolute Value Functions | 1.3.3 | F.IF.4  F.IF.5  F.IF.7  F.BF.1 |  |
| ~45 |  | 1.2 and 1.3 | **Learning Checkpoint 2**  *This learning checkpoint can assess any of the learning objectives from its associated key concepts.* |  |  |  |

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### Reflections

What went well in this unit?

When were students most engaged during this unit?

How have students grown? What opportunities for growth stand out at this time?

What needs modification or differentiation next time?

## Unit 2: The Algebra of Functions

| **Pacing in Min.** | **Actual Date(s)** | **Key Concepts** | **Materials/Resources/Tasks**  *Pre-AP Model Lessons, Additional Lessons, Labs, Textbooks,  Performance Tasks, Assessments* | **Learning Objectives** | **State Standards** | **Reflections on  Areas of Focus & Shared Principles** |
| --- | --- | --- | --- | --- | --- | --- |
| ~110 |  | 2.1: Composing Functions | Pre-AP Model Lesson 2.1:  Introduction to Function Composition | 2.1.1, 2.1.2, 2.1.3 | A.CED.4  F.IF.4  F.IF.5  F.IF.8  F.BF.1 |  |
| ~45 |  | 2.1 and 1.3 | Pre-AP Model Lesson 2.2:  Function Composition with the Absolute Value Function | 1.3.3, 2.1.2 | A.CED.4  F.IF.4  F.IF.5  F.IF.8  F.BF.1 |  |
| ~225 |  | 2.2: Transforming Functions | SpringBoard Lesson 4-3:  Transforming the Absolute Value Parent Function  SpringBoard Activity 11:  Transformations of *y* = *x*2 – Parent Parabola  SpringBoard Lesson 21-4:  Transforming Exponential Functions | 2.2.1, 2.2.2, 2.2.3 | F.IF.8  F.BF.1  F.BF.3 |  |
| ~45 |  | 2.2: Transforming Functions | Practice Performance Task:  Using Transformations to Model a Lion's Location | 2.2.1, 2.2.2, 2.2.3 | F.BF.1  F.BF.3 |  |
| ~45 |  | 2.1 and 2.2 | **Learning Checkpoint 1**  *This learning checkpoint can assess any of the learning objectives from its associated key concepts.* |  |  |  |
| ~90 |  | 2.3: Inverting Functions | Pre-AP Model Lesson 2.3:  Inverting Operations | 2.3.1, 2.3.2 | F.IF.5  F.LE.4 |  |
| ~90 |  | 2.3: Inverting Functions | SpringBoard Activity 6:  Inverse Functions – Old from New | 2.3.3 | F.BF.4 |  |
| ~135 |  | 2.3: Inverting Functions | Pre-AP Model Lesson 2.4:  Introduction to Inverse Functions | 2.3.4, 2.3.5 | F.IF.4  F.BF.4 |  |
| ~45 |  | 2.3 | **Learning Checkpoint 2**  *This learning checkpoint can assess any of the learning objectives from its associated key concepts.* |  |  |  |
| ~45 |  | 2.1 and 2.3 | **Performance Task**  Composite Functions and Inverse Functions  *This performance task assesses learning objectives addressed in the unit.* | 2.1.2, 2.1.3, 2.3.4 | A.CED.4  F.IF.4  F.IF.5  F.IF.8  F.BF.1  F.BF.4 |  |

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### Reflections

What went well in this unit?

When were students most engaged during this unit?

How have students grown? What opportunities for growth stand out at this time?

What needs modification or differentiation next time?

## Unit 3: Function Families

| **Pacing in Min.** | **Actual Date(s)** | **Key Concepts** | **Materials/Resources/Tasks**  *Pre-AP Model Lessons, Additional Lessons, Labs, Textbooks,  Performance Tasks, Assessments* | **Learning Objectives** | **State Standards** | **Reflections on  Areas of Focus & Shared Principles** |
| --- | --- | --- | --- | --- | --- | --- |
| ~60 |  | 3.1: Exponential and Logarithmic Functions | Pre-AP Model Lesson 3.1:  Problem Set for Exponential Functions | 3.1.1, 3.1.2 | A.CED.3  A.CED.4  F.IF.7  F.IF.8  F.BF.1 |  |
| ~125 |  | 3.1: Exponential and Logarithmic Functions | Pre-AP Model Lesson 3.2:  Introduction to the Logarithm Function | 3.1.3, 3.1.4, 3.1.5 | A.CED.3  A.CED.4  F.IF.4  F.IF.5  F.IF.7  F.IF.8  F.BF.1  F.BF.4  F.LE.4 |  |
| ~150 |  | 3.1: Exponential and Logarithmic Functions | Pre-AP Model Lesson 3.3:  Connecting Properties of Logarithms with Transformations of the Graph of the Parent Logarithm Function | 3.1.3, 3.1.4 | A.CED.3  A.CED.4  F.IF.4  F.IF.5  F.IF.7  F.IF.8  F.BF.1  F.LE.4 |  |
| ~90 |  | 3.1: Exponential and Logarithmic Functions | Pre-AP Model Lesson 3.4:  Applications of Logarithmic Functions | 3.1.4, 3.1.6 | F.IF.7  F.IF.8  F.LE.4 |  |
| ~45 |  | 3.1 and 1.1 | Practice Performance Task:  Modeling the Relationship Between Pressure and Volume | 1.1.1, 1.1.3, 3.1.3, 3.1.4 | A.CED.1  A.CED.2  F.IF.4  F.IF.8  F.BF.1  F.LE.4 |  |
| ~45 |  | 3.1 | **Learning Checkpoint 1**  *This learning checkpoint can assess any of the learning objectives from its associated key concepts.* |  |  |  |
| ~45 |  | 3.2: Polynomial and Rational Functions | Pre-AP Model Lesson 3.5:  A Field Guide to Polynomial Functions | 3.2.1, 3.2.2, 3.2.3 | N.CN.7  N.CN.8  N.CN.9  A.SSE.1  A.SSE.2  A.APR.3  A.CED.2  A.CED.4  F.IF.4  F.IF.5  F.IF.7  F.IF.8  F.BF.1 |  |
| ~90 |  | 3.2: Polynomial and Rational Functions | SpringBoard Lesson 8-1:  The Imaginary Unit, *i*  SpringBoard Lesson 17-2:  The Fundamental Theorem of Algebra | 3.2.4 | N.CN.1  N.CN.4  N.CN.7  N.CN.8  N.CN.9 |  |
| ~180 |  | 3.2: Polynomial and Rational Functions | SpringBoard Activity 27:  Introduction to Rational Functions – Planning a Summer Camp  SpringBoard Lesson 28-2:  Transformations of the Parent Rational Function | 3.2.5, 3.2.6 | A.SSE.1  A.SSE.2  A.CED.2  F.IF.4  F.IF.5  F.IF.8  F.BF.1 |  |
| ~45 |  | 3.2 | **Performance Task**  Predicting the Number of Sections of a Circle  *This performance task assesses learning objectives addressed in the unit.* | 3.2.1 | A.SSE.1  A.CED.2  F.IF.4  F.IF.5  F.BF.1 |  |
| ~180 |  | 3.3: Square Root and Cube Root Functions | SpringBoard Activity 25:  Square Root and Cube Root Functions – Go, Boat, Go! | 3.3.1, 3.3.2, 3.3.3, 3.3.4 | A.SSE.1  A.CED.1  A.CED.2  A.CED.4  A.REI.2  A.REI.11  F.IF.4  F.IF.5  F.IF.7  F.IF.8  F.BF.1  F.BF.4 |  |
| ~45 |  | 3.2 and 3.3 | **Learning Checkpoint 2**  *This learning checkpoint can assess any of the learning objectives from its associated key concepts.* |  |  |  |

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### Reflections

What went well in this unit?

When were students most engaged during this unit?

How have students grown? What opportunities for growth stand out at this time?

What needs modification or differentiation next time?

## Unit 4T: Trigonometric Functions

| **Pacing in Min.** | **Actual Date(s)** | **Key Concepts** | **Materials/Resources/Tasks**  *Pre-AP Model Lessons, Additional Lessons, Labs, Textbooks,  Performance Tasks, Assessments* | **Learning Objectives** | **State Standards** | **Reflections on  Areas of Focus & Shared Principles** |
| --- | --- | --- | --- | --- | --- | --- |
| ~165 |  | 4T.1: Radian Measure and Sinusoidal Functions | Pre-AP Model Lesson 4T.1:  Measuring an Angle's Openness | 4T.1.1 | F.TF.1 |  |
| ~45 |  | 4T.1: Radian Measure and Sinusoidal Functions | Pre-AP Model Lesson 4T.2:  Determining Equivalent Angle Measures | 4T.1.1, 4T.1.2 | F.TF.1  F.TF.2 |  |
| ~45 |  | 4T.1: Radian Measure and Sinusoidal Functions | Pre-AP Model Lesson 4T.3:  Angles in the Coordinate Plane | 4T.1.2 | F.TF.2 |  |
| ~90 |  | 4T.1: Radian Measure and Sinusoidal Functions | Pre-AP Model Lesson 4.4:  A Model for Circular Motion | 4T.1.3 | A.CED.2  F.IF.5  F.IF.8  F.BF.1  F.TF.2 |  |
| ~60 |  | 4T.1: Radian Measure and Sinusoidal Functions | Pre-AP Model Lesson 4T.5:  The Coordinates of Points on a Circle | 4T.1.4 | F.TF.2 |  |
| ~75 |  | 4T.1: Radian Measure and Sinusoidal Functions | Pre-AP Model Lesson 4T.6:  Common Reference Triangles in a Unit Circle | 4T.1.4, 4T.1.7 | A.CED.1  F.TF.2  F.TF.8 |  |
| ~120 |  | 4T.1: Radian Measure and Sinusoidal Functions | Pre-AP Model Lesson 4T.7:  A Model for Periodic Phenomena | 4T.1.5, 4T.1.6 | A.CED.2  F.IF.4  F.IF.8  F.BF.1  F.BF.3  F.TF.5 |  |
| ~45 |  | 4T.1 | **Performance Task**  Modeling Hours of Sunlight with a Trigonometric Function  *This performance task assesses learning objectives addressed in the unit.* | 4T.1.3, 4T.1.5 | A.CED.2  F.IF.4  F.IF.5  F.IF.7  F.BF.1  F.BF.3  F.TF.2  F.TF.5 |  |
| ~45 |  | 4T.1 | **Learning Checkpoint 1**  *This learning checkpoint can assess any of the learning objectives from its associated key concepts.* |  |  |  |
| ~120 |  | 4T.2: The Tangent Function and Other Trigonometric Functions | Pre-AP Model Lesson 4T.8:  The Tangent Function | 4T.2.1, 4T.2.2 | A.CED.2  F.IF.7  F.BF.1  F.TF.2  F.TF.5 |  |
| ~45 |  | 4T.2: The Tangent Function and Other Trigonometric Functions | Practice Performance Task:  Connecting Circles, Triangles, and Line Segments | 4T.2.1, 4T.2.2 | A.CED.2  F.IF.7  F.BF.1  F.TF.2  F.TF.5 |  |
|  |  | 4T.3: Inverting Trigonometric Functions | *There are no SpringBoard Algebra 2 activities or lessons to address this learning objective.* | 4T.3.1 | F.BF.4 |  |
|  |  | 4T.3: Inverting Trigonometric Functions | *There are no SpringBoard Algebra 2 activities or lessons to address this learning objective.* | 4T.3.2 | A.CED.1  A.REI.11 |  |
| ~45 |  | 4T.2 and 4T.3 | **Learning Checkpoint 2**  *This learning checkpoint can assess any of the learning objectives from its associated key concepts.* |  |  |  |

[add or remove rows as needed]

### Reflections

What went well in this unit?

When were students most engaged during this unit?

How have students grown? What opportunities for growth stand out at this time?

What needs modification or differentiation next time?

## Unit 4M: Matrices and Their Applications

| **Planned Date(s)** | **Actual Date(s)** | **Key Concepts** | **Materials/Resources/Tasks**  *Pre-AP Model Lessons, Additional Lessons, Labs, Textbooks,  Performance Tasks, Assessments* | **Learning Objectives** | **State Standards** | **Reflections on  Areas of Focus & Shared Principles** |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | 4M.1: Geometric Transformations | Pre-AP Model Lesson 4M.1:  Introduction to Linear Transformations | 4M.1.1 | F.IF.8 |  |
|  |  | 4M.1: Geometric Transformations | Pre-AP Model Lesson 4M.2:  Expressing Linear Transformations with Matrix Multiplication | 4M.1.2, 4M.1.3 | A.CED.3  F.BF.1 |  |
|  |  | 4M.1: Geometric Transformations | Pre-AP Model Lesson 4M.3:  Determining Images of Multiple Points Simultaneously | 4M.1.3, 4M.1.4 | A.APR.1 |  |
|  |  | 4M.1: Geometric Transformations | Pre-AP Model Lesson 4M.4:  Area and the Determinant of a Matrix | 4M.1.5 |  |  |
|  |  | 4M.1: Geometric Transformations | Pre-AP Model Lesson 4M.5:  Sequences of Linear Transformations | 4M.1.6 | F.BF.3 |  |
|  |  | 4M.1: Geometric Transformations | Pre-AP Model Lesson 4M.6:  Undoing Transformations and Finding Preimages | 4M.1.7, 4M.1.8 | F.BF.4 |  |
|  |  | 4M.1: Geometric Transformations | **Learning Checkpoint 1**  *This learning checkpoint can assess any of the learning objectives from its associated key concepts.* |  |  |  |
|  |  | 4M.2: Solving Systems of Equations with Matrices | SpringBoard Lesson 3-3:  Matrix Operations | 4M.2.1 | A.CED.2  A.CED.3 |  |
|  |  | 4M.2: Solving Systems of Equations with Matrices | SpringBoard Lesson 3-4:  Solving Matrix Equations | 4M.2.2 | A.CED.3 |  |
|  |  | 4M.2: Solving Systems of Equations with Matrices | *There are no SpringBoard Algebra 2 activities or lessons to address this learning objective.* | 4M.2.3 |  |  |
|  |  | 4M.2: Solving Systems of Equations with Matrices | Practice Performance Task:  Using Matrices to Construct Polynomial Functions | 4M.2.1, 4M.2.2, 4M.2.3 | A.CED.2  A.CED.3 |  |
|  |  | 4M.3: Applications of Matrix Multiplication | Pre-AP Model Lesson 4M.7:  Introduction to Recursive Processes | 4M.3.1, 4M.3.2 | A.CED.2  F.IF.8 |  |
|  |  | 4M.3: Applications of Matrix Multiplication | Pre-AP Model Lesson 4M.8:  Stabilized Recursive Processes | 4M.3.2, 4M.3.3 | A.CED.2  F.IF.8 |  |
|  |  | 4M.3: Applications of Matrix Multiplication | *There are no SpringBoard Algebra 2 activities or lessons to address this learning objective.* | 4M.3.4 | A.CED.2  F.IF.8 |  |
|  |  | 4M.2 and 4M.3 | **Learning Checkpoint 2**  *This learning checkpoint can assess any of the learning objectives from its associated key concepts.* |  |  |  |
|  |  | 4M.3 | **Performance Task**  Migrating Populations  *This performance task assesses learning objectives addressed in the unit.* |  |  |  |

[add or remove rows as needed]

### Reflections

What went well in this unit?

When were students most engaged during this unit?

How have students grown? What opportunities for growth stand out at this time?

What needs modification or differentiation next time?