# 2016-2017 Curriculum Blueprint

## Module 4: Patterns and Sequences

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<td>The student is expected to identify and construct linear functions, including arithmetic sequences, represented by a graph, description, or two input-output pairs.</td>
<td>1. How are patterns and sequences used to solve real-world problems? 2. What is a sequence and how are sequences and functions related? 3. What is an arithmetic sequence? 4. How can you solve real-world problems using arithmetic sequences?</td>
<td>This unit provides an opportunity for students to reinforce their understanding of the various representations of a functional relationship – words, concrete elements, numbers, graphs, and algebraic expressions. Students review the distinction between independent and dependent variables in a functional relationship and connect those to the domain and range of a function.</td>
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### Vertical Progression

MAFS.8.F.2.4, F.2.5: In Grade 8, students constructed and described qualitatively a functional relationship between two quantities.

### Module Focus Standards

**Algebra 1 Test Item Specs**  (Reference Sheet at End)

**MAFS.912.F-BF.1.1a**: (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.
- Justify the translation between the recursive form and explicit formula for arithmetic and geometric sequences.

**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(n1) for n ≥ 1.
- Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.

**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.

### Module Topics

**High School Flipbook**

**Identifying and Graphing Sequences** (F-IF.1.3, F-LE.1.2)
- Core Resource: Lesson 4.1 (HMH Book)
- Formative Assessments:
  - Lesson Performance Task (HMH pg. 164)
  - **Recursive Sequences** - CPALMS
  - **Snake on a Plane** – Illustrative Mathematics

**Constructing Arithmetic Sequences** (F-LE.1.2, F-BF.1.1a, F-IF.1.3)
- Core Resource: Lesson 4.2 (HMH Book)
- Formative Assessments:
  - Lesson Performance Task (HMH pg. 174)
  - **Table Tiling** - MARS

**Modeling with Arithmetic Sequences** (F-BF.1.1a, F-LE.1.2, F-IF.1.3)
- Core Resource: Lesson 4.3 (HMH Book)

### Essential Vocabulary

- sequence
- term
- explicit rule
- recursive rule
- arithmetic sequence
- common difference

### Higher Order Question Stems

- How do the important quantities in your problem relate to each other?
- What patterns do you find in . . . ?

### Writing Connections

- Interpret the results of a mathematical situation.
- Write to explain the overall structure and pattern in the mathematics.

[Link to Webb’s DOK Guide]
• 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.

Mathematical Practices

Link to Mathematical Practice Standards Rubric
MAFS.K12.MP.4.1: Model with mathematics.
MAFS.K12.MP.7.1: Look for and make use of structure.

Formative Assessments:
• Lesson Performance Task (HMH pg. 186)
• Patchwork - MARS
• Furniture Purchase - CPALMS