Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.HS.F.IF.1-3 Use the concept of function to solve problems.	**M.F.IF.1** Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. The graph of f is the graph of the equation $y = f(x)$. **M.F.IF.2** Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. **M.F.IF.3** 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 $n \geq 1$.

Linkage Level Descriptions

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
Arrange objects in a specific order (e.g., smallest to largest). Form a pair by putting together two objects (e.g., putting together a pencil and a ruler).	Communicate understanding that a coordinate pair (ordered pair) is a set of numbers used to show a position on a graph. The first number, "x," or the x-coordinate in the coordinate pair (x, y), represents x units left	Describe the rate of change in a function graph and a function table by quantifying the covariation between two variables (e.g., describes that as x increases by 2 units, y decreases by 3 units).	Find solutions to real-world problems by interpreting linear function graphs and tables.	Extend, predict, or infer information presented in linear function graphs and function tables.

© 2021 Accessible Teaching, Learning, and Assessment Systems (ATLAS)

| Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
	or right on the *x*-axis. The second number, "*y*," or the *y*-coordinate, represents y units up or down on the *y*-axis [e.g., (4, 8) represents 4 units right on the *x*-axis and 8 units up on the *y*-axis].			

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

How is the Initial Precursor related to the Target?

In order to use functions to solve problems, students begin by learning to notice what is new. The educator draws the students' attention to new objects or stimuli, labels them (e.g., "this set has all red objects; this set has all blue", "these fidgets are big; these fidgets are small"), and the student observes, feels, or otherwise interacts with them. Educators encourage students to begin placing like objects together, drawing attention to the characteristics that make an item the same or different. Educators provide sorting activities that allow learners to isolate specific attributes while recognizing likenesses and differences among objects. Educators also provide activities that reinforce the skill of ordering (e.g., arrangement of objects from largest to smallest, sequencing daily events, and counting).

How is the Distal Precursor related to the Target?

As students' attention to objects and details develops, educators can extend their attention by providing experience with finding and creating simple patterns using objects and moving to symbols (e.g., numerals). Educators should take care to start with simple patterns (e.g., 1-2-1-2) and take advantage of the symbols that are already being used in the classroom. Educators should demonstrate how students can create and identify the pattern/rule (e.g., using colored cubes, the student creates a line of 5 cubes; the educator then creates a matching set and explains what to do to follow the student's pattern. Then, the student generates a third matching set. If the order is not followed, it is a good teaching opportunity to talk about why it doesn't fit the pattern). Learning to identify the rule of patterns will help students extend their thinking across patterns. As students are working on identifying pattern rules, educators can also begin to demonstrate how rules can be used with ordered pairs. Provide students lots of opportunities to apply rules to create their own examples of ordered pairs. Educators should demonstrate how students can use their counting skills to figure out where to mark the point by counting how far along and how far up the x- and y-axes.
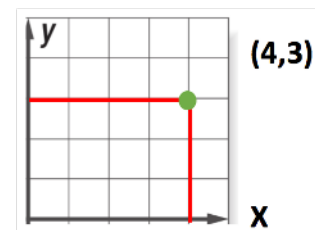
Instructional Resources

Released Testlets
See the Guide to Practice Activities and Released Testlets.

Using Untested (UN) Nodes
See the document Using Mini-Maps to Plan Instruction.

M.EE.HS.F.IF.1-3 Use the concept of function to solve problems.

Map Key

IP	Initial Precursor
DP	Distal Precursor
PP	Proximal Precursor
T	Target
S	Successor
UN	Untested

Boxes indicate tested nodes