Mini-Map for M.EE.8.F.4

Subject: Mathematics
Functions (F)
Grade: 8

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.8.F.4 Determine the values or rule of a function using a graph or a table.	**M.8.F.4** Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (*x, y*) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.

Linkage Level Descriptions

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
Form a pair of objects by arranging two objects in a specific order (e.g., form a pair by first placing a pencil and then placing a ruler).	Generate ordered pairs by recognizing the pattern rules for each coordinate and applying these rules to the *x*- and *y*-values [e.g., given (1, 3), (2, 5), (3, 7)..., the next ordered pair would be (4, 9)]. Communicate the next term in a growing or shrinking pattern, consisting of numerals or letters, by recognizing the core unit or the pattern rule and applying it to the	Recognize covariation as the pattern in which two variables or quantities change together. Recognize the direction in which two variables change together (e.g., describe that as *x* increases, *y* decreases).	Communicate understanding of a function rule from the list of ordered pairs or a graph by determining how *x*- and *y*-values change and relate to each other (e.g., the slope is 1/1 and each *y*-value is equal to *x*-value + 2, or $y = x + 2$).	Communicate understanding of a function as a set of ordered pairs or a line on a graph where there exists a relationship between *x*- and *y*-coordinates, and there are no two ordered pairs with the same input (*x*-value) and different outputs (*y*-value).

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
	pattern (e.g., the pattern rule in the pattern: 3, 6, 9, 12 is "add 3," so the next term in the pattern is 12 + 3 equals 15).			

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

How is the Initial Precursor related to the Target?

In order to understand and work with function tables, 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 student 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 work on identifying pattern rules, educators can also begin to demonstrate how rules can be used with ordered pairs (e.g., see example below). Provide students lots of opportunities to apply rules to create their own examples of ordered pairs.

Input	Rule	Output
5	+1	6
4	+1	5
7	+1	8
1	+1	

Input	Rule	Output
5	-2	3
4	-2	2
7	-2	
9	-2	7

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.

[Link to Text-Only Map]

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