



Dynamic Learning Maps Mathematics

Initial and Distal Precursors

7th Grade

This English Language Arts resource provides teachers with enhanced descriptions of the Initial and Distal precursors for the most frequently used Essential Elements.

By providing a clear connection between the IP or DP linkage level and the Target linkage level, teachers can better tailor classroom instruction for each student. Additionally, links to instructional information for each Essential Element and familiar texts in ELA, make these handy classroom resources.

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M.EE.7.NS.1

M.EE.7.NS.1 Add fractions with like denominators (halves, thirds, fourths, and tenths) with sums less than or equal to one.

Link to Minimap:

http://www.dynamiclearningmaps.org/sites/default/files/documents/Math_EEs/M.EE.7.NS.1.pdf

Target | Add fractions with common denominators.

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| <p>Proximal Precursor Explain the concept of addition and subtraction of fractions. Decompose a fraction into a sum of unit fractions with the same denominator.</p> | <p>Distal Precursor: Recognize parts of a given whole or a unit.</p> | <p>Initial Precursor: Recognize separateness. Recognize subset.</p> |
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How is the Initial Precursor related to the target?

Initial Precursor: Adding fractions requires a student to be able to recognize that two or more sets or groups of items exist. Work on this skill using a variety of sets. Help students recognize when items are grouped together into a set or separated out. As educators present a set, label it (e.g., two balls, one marker, three CDs), count the items, label it again, and encourage students to use numerals to label and count the separate sets. Use tools like the ten-frame to point out whole and parts (e.g., a row of 5 dots and a row of 4 dots are parts or subsets of 9).

How is the Distal Precursor related to the target?

Distal Precursor: As students begin to understand labeling, counting small sets, and recognizing wholes and parts of objects and sets, use a variety of tools (e.g., ten-frames, egg cartons, a collection of items in a category [clothes: shoes, socks, pants], your hands) to label and count the sets, and label and count the subsets.

M.EE.7.NS.2.a

M.EE.7.NS.2.a Solve multiplication problems with products to 100.

Link to Minimap:

http://dynamiclearningmaps.org/sites/default/files/documents/Math_EEs/M.EE.7.NS.2.a.pdf

Target | Multiply by 1, 2, 3, 4, 5, 6, 7, 8, 9, and/or 10.

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| Proximal Precursor Demonstrate the concept of multiplication. | Distal Precursor: Solve repeated addition problems. Represent repeated addition with an equation. Explain repeated addition. | Initial Precursor: Recognize separateness. Recognize set. |
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How is the Initial Precursor related to the target?

Initial Precursor: Solving multiplication problems requires a student to be able to recognize that two or more sets or groups of items exist. Work on this skill using a variety of sets. Help students recognize when items are grouped together into a set or separated out. As educators present a set, they label it (e.g., two balls, one marker, three CDs), count the items, label it again, and encourage students to use numerals to label and count the separate sets. Use tools like the ten-frame to point out whole and parts (e.g., a row of 5 dots and a row of 4 dots are parts or subsets of 9).

How is the Distal Precursor related to the target?

Distal Precursor: As students' understanding of labeling and counting sets develops, they will begin working on adding items to a set and combining sets to create a new set. Additionally, students will work on developing an understanding of equal shares by actively participating in one-to-one distribution of objects to person, objects to objects, and objects to available space (e.g., giving each person in the group two pencils; given four counters, they would line up four more counters in front of or on top of the first set; given three chairs at a table, the student would place a cup on the table for each available chair). As students learn to work with sets and connect their understanding of equal shares to sets, educators will provide students experience with combining multiple sets (e.g., 3 sets with 4 counters each) and represent the problem (e.g., $4 + 4 + 4 = ?$). Students will also learn to represent the problem using a pencil or their communication system (e.g., the student is shown 4 equal sets each with 2 counters. The student counts the first set and writes a 2 or indicates 2, then writes or indicates the plus sign. The student repeats for all 4 sets and then indicates the equal sign and solves the problem.).

M.EE.7.NS.2.b

M.EE.7.NS.2.b Solve division problems with divisors up to five and also with a divisor of 10 without remainders.

Link to Minimap:

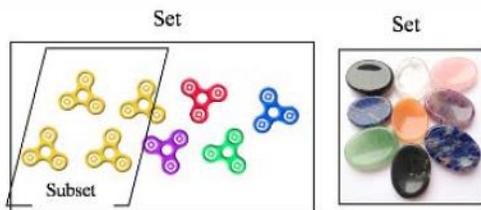
http://dynamiclearningmaps.org/sites/default/files/documents/Math_EEs/M.EE.7.NS.2.b.pdf

Target | Divide by 1, 2, 3, 4, 5, and/or 10.

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| Proximal Precursor Demonstrate the concept of division. | Distal Precursor: Solve repeated subtraction problems. Represent repeated subtraction with an equation. Explain repeated subtraction. | Initial Precursor: Recognize subset. Recognize set. Recognize separateness. |
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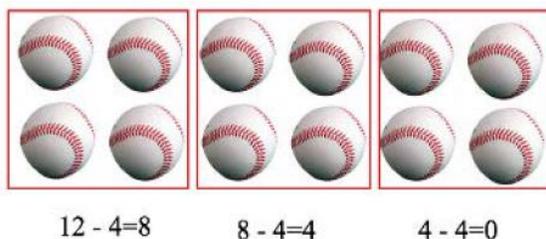
How is the Initial Precursor related to the target?

Initial Precursor: In order to understand division, students must learn to organize items into groups/sets based on a common characteristic such as size, color, shape, or texture. Students learn how to sort items by separating a group of items into two groups (e.g., music I like/music I don't like; red fidgets/black fidgets). As students gain comfort sorting items into sets, they are encouraged to use their language to convey their thought process by identifying and naming the characteristic that determines the set (e.g., color, length). Activities that require students to engage actively with the items will foster understanding of set, subsets, and separateness.



How is the Distal Precursor related to the target?

Distal Precursor: As students' understanding of labeling and counting sets develops, they will begin working on adding and taking away items from a set. Educators provide opportunities for students to work on developing an understanding of equal shares by actively participating in one-to-one distribution of objects to person, objects to objects, and objects to available space (e.g., giving each person in the group two pencils; given four counters they would line up, then four more counters in front of or on top of the first set; given three chairs at a table, the student would place a cup on the table for each available chair) and taking equal shares away (subtracting) from each person, object, or space. Educators will provide opportunities for students to connect their understanding of subtraction (starting with the whole and taking away a part) to repeated subtraction. For example, if the educator has 12 balls, and each team gets 4 balls, how many teams will there be? By subtracting 4 from the whole, we made 3 equal sets so there are 3 teams.



M.EE.7.NS.2.c-d

M.EE.7.NS.2.c-d Express a fraction with a denominator of 10 as a decimal.

Link to Minimap:

http://dynamiclearningmaps.org/sites/default/files/documents/Math_EEs/M.EE.7.NS.2.c-d.pdf

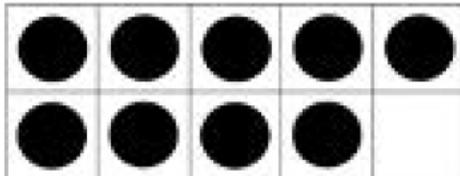
Target | Explain the decimal point.

Represent a fraction with a denominator of 10 as a decimal.

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| Proximal Precursor Recognize tenths in a set model. Recognize one tenth in a set model. | Distal Precursor: Recognize whole on a set model. | Initial Precursor: Recognize separateness. Recognize set. |
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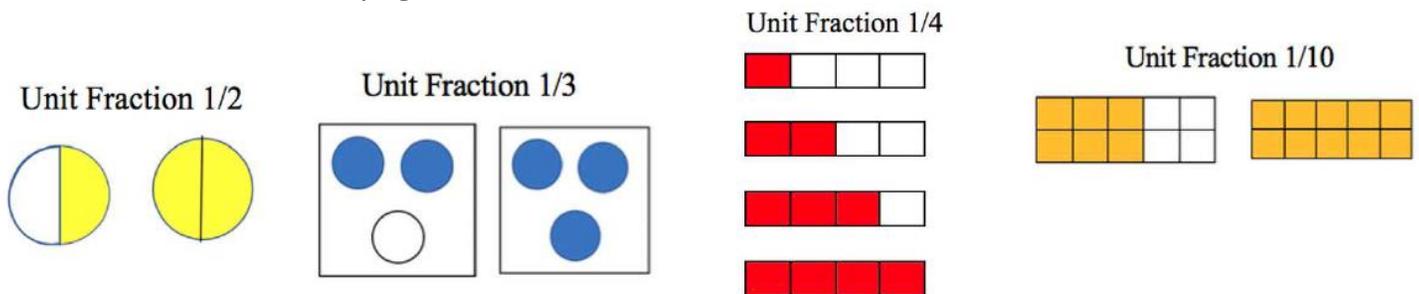
How is the Initial Precursor related to the target?

Initial Precursor: Expressing a fraction as decimal requires a student to be able to recognize that two or more sets or groups of items exist. Work on this skill using a variety of sets. Help students recognize when items are grouped together into a set or separated out. As educators present a set, they label it (e.g., two balls, one marker, three CDs), count the items, label it again, and encourage students to use numerals to label and count the separate sets. Use tools like the ten-frame to point out whole and parts (e.g., a set of 9 is part of 10).



How is the Distal Precursor related to the target?

Distal Precursor: As students work toward greater understanding of sets, educators will provide students with many set models (see below) of fractions using the same unit fraction, either halves, thirds, fourths, or tenths. Students will work on identifying the whole.



M.EE.7.NS.3

M.EE.7.NS.3 Compare quantities represented as decimals in real world examples to tenths.

Link to Minimap:

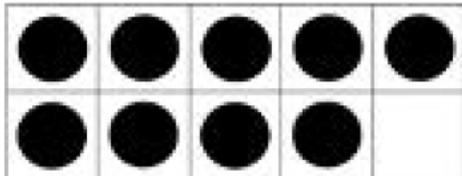
http://www.dynamiclearningmaps.org/sites/default/files/documents/Math_EEs/M.EE.7.NS.3.pdf

Target | Compare two decimals to tenths using symbols.

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| Proximal Precursor Represent a decimal to tenths as a fraction. | Distal Precursor: Recognize one tenth in a set model. Recognize tenths in a set model. | Initial Precursor: Recognize separateness. Recognize set. Recognize subset. |
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How is the Initial Precursor related to the target?

Initial Precursor: Adding fractions requires a student to be able to recognize that two or more sets or groups of items exist. Work on this skill using a variety of sets. Help students recognize when items are grouped together into a set or separated out. Educators present a set, label it (e.g., two balls, one marker, three CDs), count the items, label it again, and encourage students to use numerals to label and count the separate sets. Use tools like the ten-frame to point out whole and parts (e.g., a row of 5 dots and a row of 4 dots are parts or subsets of 9).



How is the Distal Precursor related to the target?

Distal Precursor: As students begin to understand labeling, counting small sets, and recognizing wholes and parts of objects and sets, use set models to provide a wide variety of sets of 10 to model tenths (e.g., individual shapes to match the fraction: “I have 10 cubes in my bag, 1/10 of them are blue”).

M.EE.7.G.1

M.EE.7.G.1 Match two similar geometric shapes that are proportional in size and in the same orientation.

Link to Minimap:

http://www.dynamiclearningmaps.org/sites/default/files/documents/Math_EEs/M.EE.7.G.1.pdf

Target | Match the same two-dimensional shape with different sizes and same orientation.
Match the same three-dimensional shapes with different size and same orientation.

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| <p>Proximal Precursor Match the same two-dimensional shape with same size and same orientation. Match the same three-dimensional shapes with same size and same orientation.</p> | <p>Distal Precursor: Recognize same. Recognize different.</p> | <p>Initial Precursor: Attend. Notice what is new.</p> |
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How is the Initial Precursor related to the target?

Initial Precursor: In order to match two- and three-dimensional shapes, students must first begin by learning to attend to people and objects when they are present. In the context of this EE, educators should work on attending while interacting with shapes. As students' attention to people, objects, and shapes increases, the educator draws the students' attention to new objects or stimuli, labels them (e.g., "these are two red cubes and two blue cubes", or "you have two fidgets; one is big and one is small but they are both fidgets"), and the student observes, feels, or otherwise interacts with it. Educators encourage students to begin placing like objects together, drawing attention to the characteristics that make an item the same or different.

How is the Distal Precursor related to the target?

Distal Precursor: At this level, educators will encourage students to begin placing like objects together, drawing attention to the characteristics that make an item the same or different and using the core vocabulary to demonstrate the words same and different.

M.EE.7.G.2

M.EE.7.G.2 Recognize geometric shapes with given conditions.

Link to Minimap:

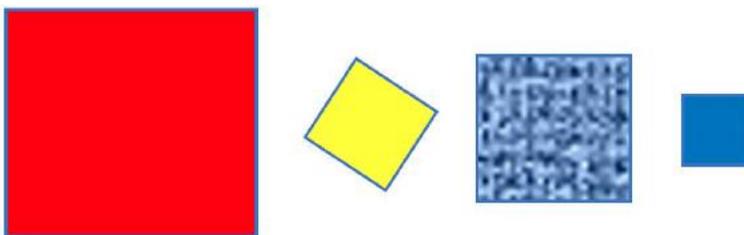
http://dynamiclearningmaps.org/sites/default/files/documents/Math_EEs/M.EE.7.G.2.pdf

Target | Recognize shapes with specified attributes.

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| <p>Proximal Precursor Describe attributes of shapes.</p> | <p>Distal Precursor: Recognize squares. Recognize circles. Recognize triangles. Recognize rectangles. Recognize cubes. Recognize cones. Recognize cylinders. Recognize spheres.</p> | <p>Initial Precursor: Recognize same. Recognize different.</p> |
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How is the Initial Precursor related to the target?

Initial Precursor: Being able to recognize shapes given certain conditions requires a student to recognize when basic objects and shapes are the same or different. Work on this understanding by providing students with a shape and naming it (e.g., “this is a square”). Then provide multiple examples of the same shape so students can make comparisons (e.g., focusing student attention on the characteristics that make this a particular shape [e.g., a square has 4 sides that are the same size]). As students explore shapes, label them and describe them as same or different.



NOTE: When presenting the same shape for comparison, do use shapes with different colors, textures, sizes, and orientation so that students understand the attribute that makes it that shape (e.g., 4 sides that are the same size).

How is the Distal Precursor related to the target?

Distal Precursor: Now that students have experience identifying shapes as “same” and “different”, provide instruction that focuses on the attribute of a given shape and making comparisons with other shapes. Educators should take care to use the names of the shapes while defining and describing the attributes. While students do not need to say the shape names, they do need to learn what makes a shape a shape (e.g., a square has four equal straight sides, a triangle has three straight sides, and a cone is an object that narrows from a circular base to a point).

M.EE.7.G.4

M.EE.7.G.4 Determine the perimeter of a rectangle by adding the measures of the sides.

Link to Minimap:

http://www.dynamiclearningmaps.org/sites/default/files/documents/Math_EEs/M.EE.7.G.4.pdf

Target | Calculate the perimeter of a rectangle by counting unit lengths on a grid.
Calculate perimeter by adding all the side lengths.

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| Proximal Precursor Explain length. Explain perimeter. | Distal Precursor: Describe measurable attributes. Recognize measurable attributes. | Initial Precursor: Recognize attribute values. |
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How is the Initial Precursor related to the target?

Initial Precursor: In order to calculate perimeter, students begin by learning to notice what is new. The educator draws the students' attention to new objects or stimuli, labels them (e.g., "these are two long cubes and short cubes", or "you have two fidgets; one is big and one is small but they are both fidgets"), and the student observes, feels, or otherwise interacts with it. Educators encourage students to begin placing like objects together, drawing attention to the characteristics that make an item the same or different.

How is the Distal Precursor related to the target?

Distal Precursor: As students develop their attention to objects and notice the difference between objects, they will begin working on recognizing and describing measurable attributes. Students need lots of experience making direct comparisons between objects. Educators should use the comparison words (e.g., big/small, tall/short, longer/shorter). While students do not need to say them, they do need to learn their meaning.

M.EE.7.G.5

M.EE.7.G.5 Recognize angles that are acute, obtuse, and right.

Link to Minimap:

http://dynamiclearningmaps.org/sites/default/files/documents/Math_EEs/M.EE.7.G.5.pdf

Target | Recognize obtuse angles.
Recognize acute angles.
Recognize right angles.

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| Proximal Precursor Recognize angle. | Distal Precursor: Recognize line. Recognize point. Recognize ray. | Initial Precursor: Recognize attribute values. |
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How is the Initial Precursor related to the target?

Initial Precursor: In order to recognize angles, 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 is a circle, and it does not have any sides", "this is a rectangle, and it has four sides") and the student observes, feels, or otherwise interacts with the shapes. Educators encourage students to begin placing like objects together, drawing attention to the characteristics that make an item the same or different.

How is the Distal Precursor related to the target?

Distal Precursor: At this level, educators provide students with specific vocabulary (line, point, and ray). These are all denoted by certain characteristics (a line has arrows on both ends; a point is a dot on a graph, a line, a line segment, or a number line; a ray is a line that has a well-defined starting point). Educators should take care to use the names "line", "point", and "ray" while defining and describing the attributes. While students do not need to say the names, they do need to learn their meaning. Educators should teach these attributes within the context of working with shapes, graphs, parallel lines, perpendicular lines, etc.

M.EE.7.SP.3

M.EE.7.SP.3 Compare two sets of data within a single data display such as picture graph, line plot, or bar graph.

Link to Minimap:

http://www.dynamiclearningmaps.org/sites/default/files/documents/Math_EEs/M.EE.7.SP.3.pdf

Target | Use visual overlap of two sets of data to compare variability of two populations.
Compare differences in shape of 2 or more sets of data.

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| <p>Proximal Precursor</p> <p>Recognize peaks in data distribution.</p> <p>Recognize symmetric distribution.</p> <p>Recognize outliers.</p> <p>Recognize variability in a data set.</p> | <p>Distal Precursor:</p> <p>Recognize the structure of a bar graph.</p> <p>Recognize the structure of a line plot (dot plot).</p> <p>Recognize the structure of a picture graph.</p> | <p>Initial Precursor:</p> <p>Classify.</p> <p>Order objects.</p> |
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How is the Initial Precursor related to the target?

Initial Precursor: In order to compare data, students begin by learning to recognize what is the same and different between familiar items; color, shape, quantity (1-4), size, texture, and pattern. Educators should take care to use attribute words while defining and demonstrating their meaning. While students do not need to say these words, they do need to learn the meanings. Students will also begin to group two or more items in the same set based on an attribute (e.g., two tigers, bumpy balls and bumpy gravel, red spoons). As the students group two or more items, the educator will demonstrate the representation in a bar graph or line plot and encourage students to actively participate in its creation.

How is the Distal Precursor related to the target?

Distal Precursor: Students actively participate in the creation of graphs and line plots by placing representations, x's, or dots for each response to the research question.

M.EE.7.SP.5-7

M.EE.7.SP.5-7 Describe the probability of events occurring as possible or impossible.

Link to Minimap:

http://dynamiclearningmaps.org/sites/default/files/documents/Math_EEs/M.EE.7.SP.5-7.pdf

Target | Classify events as possible or impossible.

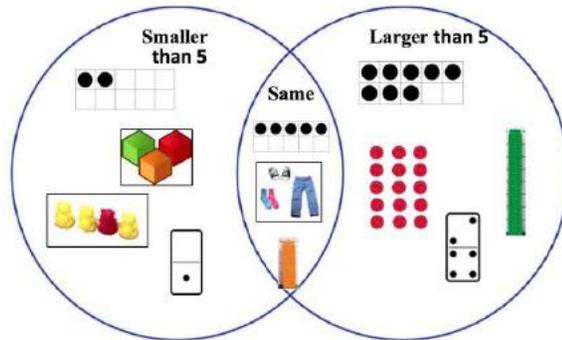
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| Proximal Precursor Recognize outcomes of an event. | Distal Precursor: Classify. | Initial Precursor: Recognize attribute values. |
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How is the Initial Precursor related to the target?

Initial Precursor: In order to describe the probability of an event, students begin by learning about attributes, numbers, and measurement. Educators draw student attention to new objects or stimuli, label and describe them (e.g., “this is a circle; it won't have sides”, “this egg carton has 12 spaces; it is likely that 12 eggs will fit into those spaces”, “this book is a small book, and it's impossible for it to get bigger”) and students observe, feel, or otherwise interact with the objects.

How is the Distal Precursor related to the target?

Distal Precursor: Proportional understanding is key when working toward describing probabilities. Educators provide many opportunities for students to classify (group) items based on their size (e.g., compare two or more items and determine which is larger or smaller), amount (e.g., numbers larger or smaller than a given number), and distance between numbers (e.g., skip counting by 2, 5, or 10).



Use a number line or counters to model how you got your answer.

2, 4, 6, ?

M.EE.7.EE.1

M.EE.7.EE.1

Use the properties of operations as strategies to demonstrate that expressions are equivalent.

Link to Minimap:

http://www.dynamiclearningmaps.org/sites/default/files/documents/Math_EEs/M.EE.7.EE.1.pdf

Target | Use properties of operations to generate equivalent expressions involving subtraction.
Use properties of operations to generate equivalent expressions involving addition.

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| <p>Proximal Precursor</p> <p>Apply the associative property of multiplication.</p> <p>Apply commutative property of addition.</p> <p>Apply associative property of addition.</p> <p>Apply the commutative property of multiplication.</p> | <p>Distal Precursor:</p> <p>Model associativity of multiplication.</p> <p>Model additive commutativity.</p> <p>Model associativity of addition.</p> <p>Model multiplicative commutativity.</p> | <p>Initial Precursor:</p> <p>Partition sets.</p> <p>Combine sets.</p> |
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How is the Initial Precursor related to the target?

Initial Precursor: In order to use properties of operations, students begin by counting small units, recognizing that two or more sets or groups of items exist. Work on this skill using a variety of sets. Help students recognize when items are grouped together into a set or separated out. As educators present a set, they label it (e.g., two balls, one marker, three CDs), count the items, label it again, and encourage students to use numerals to label and count the separate sets. The general goal is to explore how the set changes when items are separated out (partitioned) or combined.

How is the Distal Precursor related to the target?

Distal Precursor: As students continue developing their understanding of how sets change, educators can use manipulatives to create sets that model the associative and associative properties of addition and multiplication.

M.EE.7.EE.2

M.EE.7.EE.2 Identify an arithmetic sequence of whole numbers with a whole number common difference.

Link to Minimap:

http://dynamiclearningmaps.org/sites/default/files/documents/Math_EEs/M.EE.7.EE.2.pdf

Target | Recognize arithmetic sequences.

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| Proximal Precursor Recognize growing patterns. Recognize shrinking patterns. | Distal Precursor: Recognize symbolic patterns. Recognize sequence. | Initial Precursor: Classify. Contrast objects. Order objects. |
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How is the Initial Precursor related to the target?

Initial Precursor: In order to identify arithmetic sequences, students begin by learning to recognize what is the same and different between familiar items, such as color, shape, quantity, size, texture, and pattern. Educators should take care to use attribute words (e.g., circle/square, more/less/same, rough/smooth, red, green, red, green) while defining and demonstrating their meaning. While students do not need to say these words, they do need to learn the meanings. Educators will also provide activities in which students work on grouping two or more items in the same set based on an attribute and ordering the items by size or shape.

How is the Distal Precursor related to the target?

Distal Precursor: As students develop their understanding of attributes and work toward arithmetic sequences, educators provide interactive lessons around patterns using attributes like shape, size, and color. At this level, students are also expected to recognize symbolic (letter and number) patterns. This also requires that students recognize numerals in order. (i.e., 1, 2, 3...). Educators should take care to use number names while defining and demonstrating symbolic sequences. While students do not need to say these words, they do need to learn the meanings and the sequence.