Mini-Map for M.EE.7.NS.2.c-d

Subject: Mathematics
The Number System (NS)
Grade: 7

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.7.NS.2.c-d Express a fraction with a denominator of 10 as a decimal.	**M.7.NS.2.c** Apply properties of operations as strategies to multiply and divide rational numbers. **M.7.NS.2.d** Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.

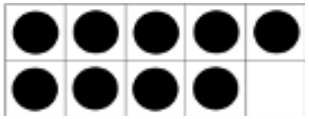
Linkage Level Descriptions

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
Communicate understanding of "separateness" by recognizing objects that are not joined together. Communicate understanding of a set by recognizing a group of objects sharing an attribute.	Recognize a set model that represents a whole.	Recognize one-tenth in a set model. Recognize multiple tenths, such as two-tenths, five-tenths, or eight-tenths in a set model.	Communicate understanding that a decimal point is a dot that separates the whole number from the fractional part of a number. Represent a fraction with a denominator of 10 as a decimal.	Communicate understanding that the value of the digit in the tenths place is worth that many tenths. Compare two decimals to the tenths place using symbols (i.e., =, <, >) to show that one is greater than, less than, or equal to the other.

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

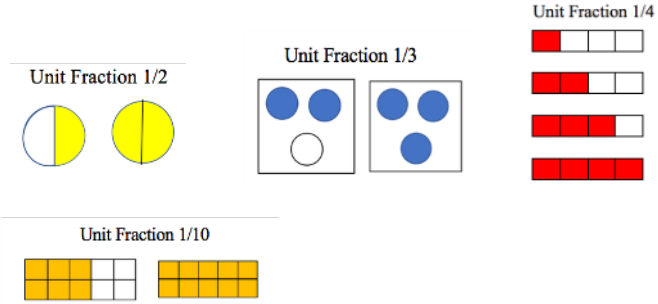
How is the Initial Precursor related to the Target?

Expressing a fraction as a 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?

As students work toward a 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.



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.

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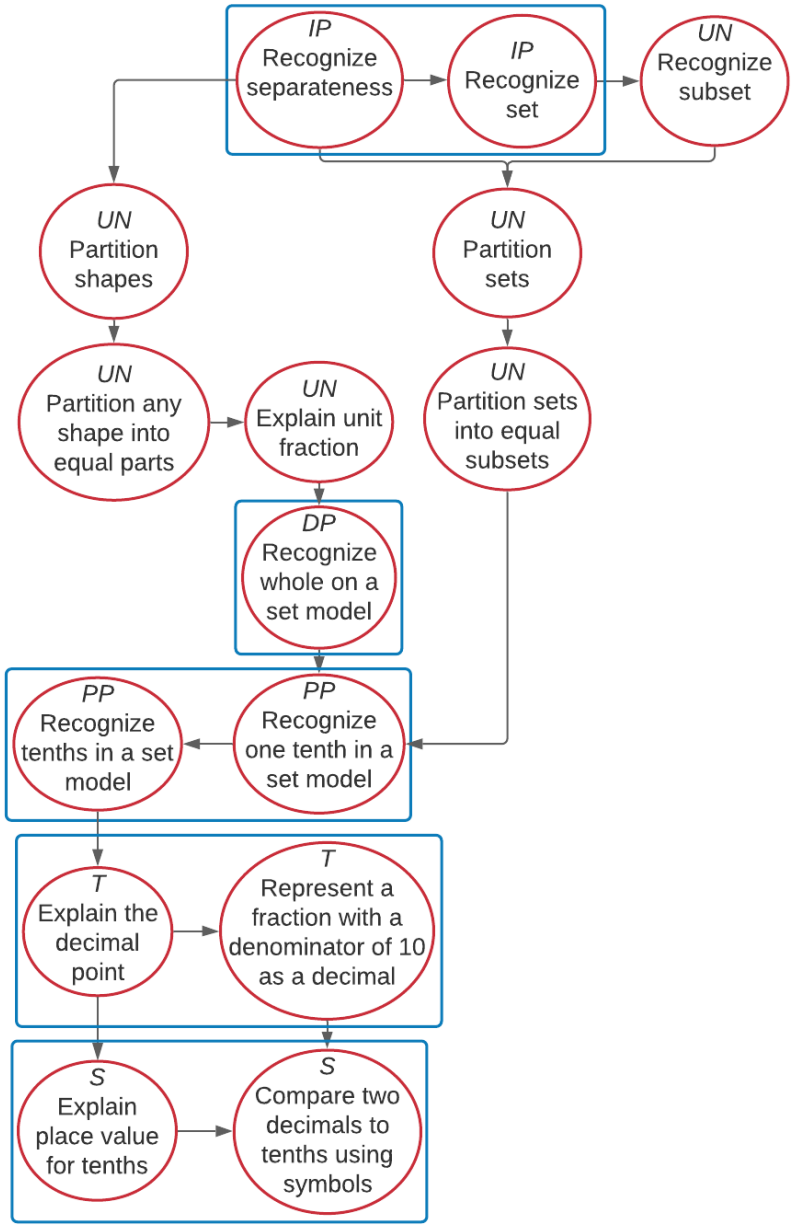
M.EE.7.NS.2.c-d Express a fraction with a denominator of 10 as a decimal.



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

Boxes indicate tested nodes

Mini-Map for M.EE.7.RP.1-3

Subject: Mathematics
Ratios and Proportional Relationships (RP)
Grade: 7

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.7.RP.1-3 Use a ratio to model or describe a relationship.	**M.7.RP.1** Compute unit rates associated with ratios of fractions, including ratios of lengths, areas, and other quantities measured in like or different units. **M.7.RP.2** Recognize and represent proportional relationships between quantities. **M.7.RP.3** Use proportional relationships to solve multistep ratio and percent problems.

Linkage Level Descriptions

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
Communicate understanding of "separateness" by recognizing objects that are not joined together. Communicate understanding of set by recognizing a group of objects sharing an attribute. Communicate understanding of a subset by recognizing a subset as a set or group of objects within a larger set that share an attribute.	Divide familiar shapes, such as circles, squares, and/or rectangles, into two or more equal parts. Demonstrate understanding of a unit fraction (e.g., 1/4) as the quantity formed by one part when a whole is partitioned into *n* (e.g., 4) equal parts. Recognize a fraction as a number expressed as a quotient of two integers in the form	Communicate understanding that a ratio (e.g., 5:1) represents the relationship between two quantities (i.e., 5 of object *a* for every 1 object *b*). When shown two groups of objects, one group with one object and another group with multiple objects (e.g., 4), recognize that there are four times as many objects in the second	When shown two groups of multiple objects (e.g., one group with two objects and another group with three objects), recognize that for every two objects in the first group there are three objects in the second group. When shown two groups of multiple objects, represent a many-to-many ratio of the parts as 2:3.	Communicate understanding that rates (i.e., *a*/*b*) can be expressed as ratios (i.e., *a*:*b*). For example, instructions for a craft that uses 2/3 piece of paper for each drawing can be expressed in the ratio of pieces of paper to number of drawings as 2:3.

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
	a/b, with b not equal to zero.	group as in the first group.		

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

How is the Initial Precursor related to the Target?

In order to understand ratios, students need to gain experience with creating sets. Educators can provide students with opportunities to take a set of objects (e.g., tiles, linking cubes, buttons) and separate them based on a given characteristic (e.g., shape, color, size) into two distinct sets. Then, separate the objects again based on another characteristic.

How is the Distal Precursor related to the Target?

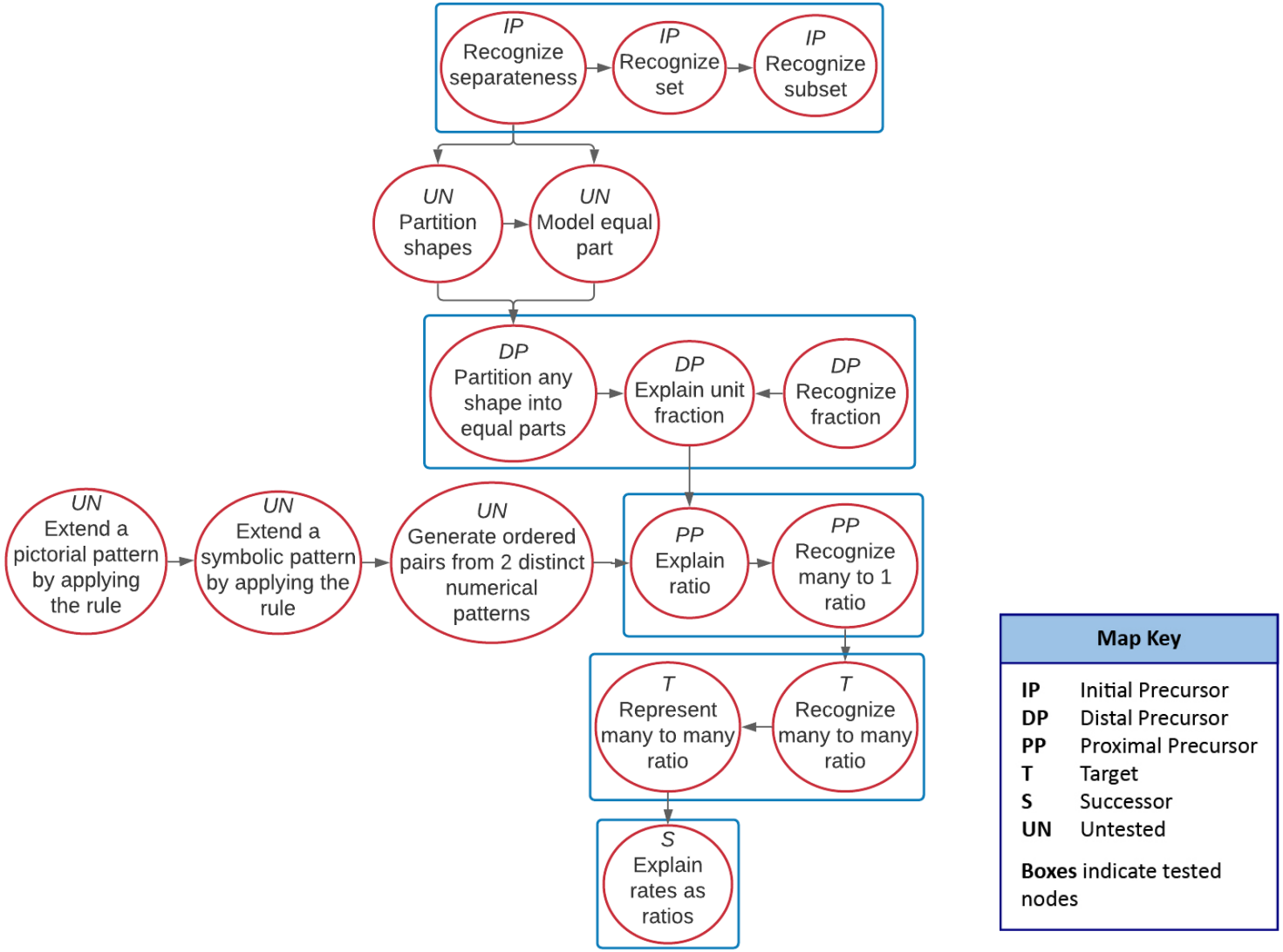
As students become more adept at tracking discrete objects, they will begin working on one-to-one distribution of objects to person, objects to objects, and objects to available space (e.g., giving each person in the group a pencil; given four counters, they would line up four more counters in front 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 understanding of one-to-one distribution develops, provide students many opportunities to recognize equivalence in sets with same items and then sets with differing items. As students work on all these skills and concepts, continue to draw their attention to parts and wholes.

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]

M.EE.7.RP.1-3 Use a ratio to model or describe a relationship.



Mini-Map for M.EE.7.NS.3

Subject: Mathematics
The Number System (NS)
Grade: 7

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.7.NS.3 Compare quantities represented as decimals in real-world examples to tenths.	**M.7.NS.3** Solve real-world and mathematical problems involving the four operations with rational numbers.

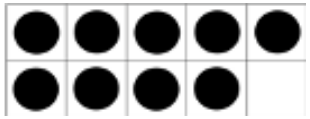
Linkage Level Descriptions

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
Communicate understanding of "separateness" by recognizing objects that are not joined together. Communicate understanding of set by recognizing a group of objects sharing an attribute. Communicate understanding of a subset by recognizing a subset as a set or group of objects within a larger set that share an attribute.	Recognize the set model that represents one-tenth. Recognize the set model that is divided into tenths.	Represent a decimal to tenths (e.g., 5.6) as a fraction (i.e., 56/10).	Compare two decimals to the tenths place using symbols (i.e., =, <, >) to show that one is greater than, less than, or equal to the other.	Compare two decimals to the hundredths place using symbols (i.e., =, <, >) to show that one is greater than, less than, or equal to the other.

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

How is the Initial Precursor related to the Target?

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?

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”).

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.

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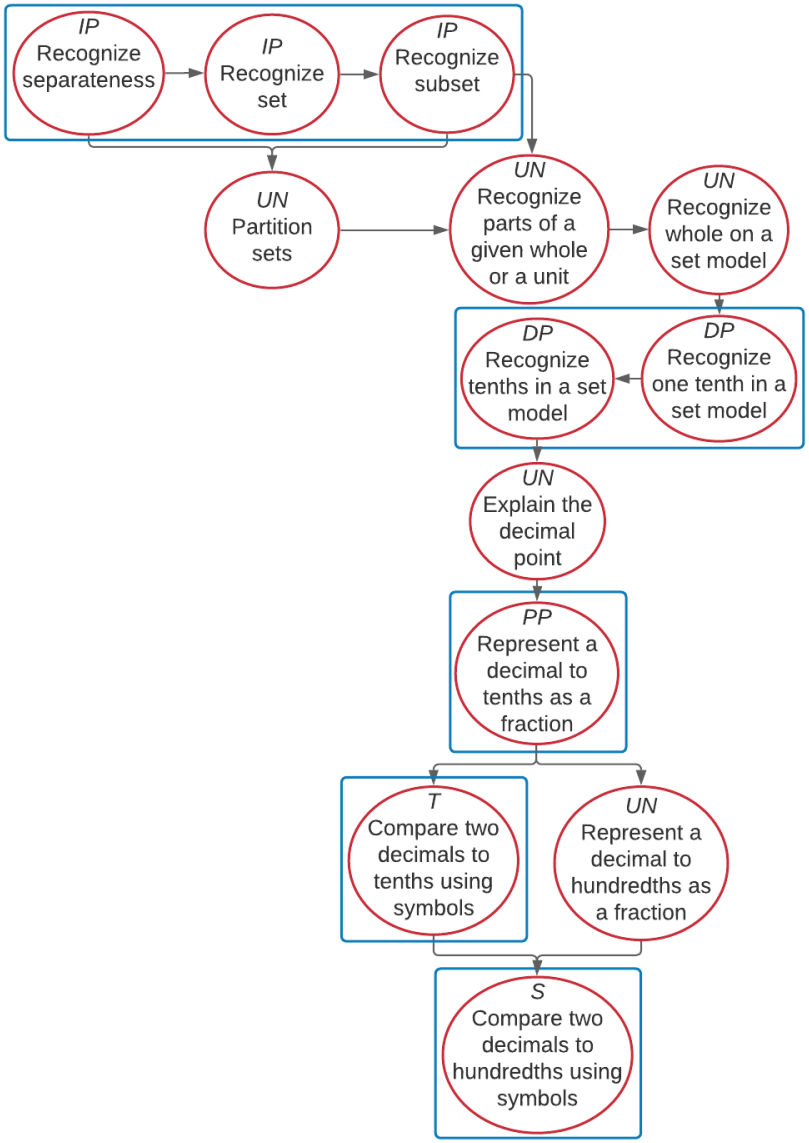
M.EE.7.NS.3 Compare quantities represented as decimals in real-world examples to tenths.



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

Boxes indicate tested nodes

Mini-Map for M.EE.7.NS.1

Subject: Mathematics
The Number System (NS)
Grade: 7

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.7.NS.1 Add fractions with like denominators (halves, thirds, fourths, and tenths) with sums less than or equal to one.	**M.7.NS.1** Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.

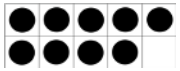
Linkage Level Descriptions

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
Communicate understanding of "separateness" by recognizing objects that are not joined together. Communicate understanding of a subset by recognizing a subset as a set or group of objects within a larger set that share an attribute.	Recognize each object as the part of a whole or unit when shown a whole or unit containing a group of objects.	Communicate understanding that when fractional parts are added, it produces a larger portion of the whole, and when fractional parts are separated, it results in a smaller portion of the whole. Decompose fractions into sums of unit fractions with the same denominator (e.g., 3/7 = 1/7 + 1/7 + 1/7).	Add two fractions with common denominators (e.g., 2/5 + 1/5 = 3/5).	Add or subtract two fractions where one fraction has a denominator of 10 and one has a denominator of 100 (e.g., 5/10 + 1/100 = 50/100 + 1/100 = 51/100).

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

How is the Initial Precursor related to the Target?

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?

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.

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.

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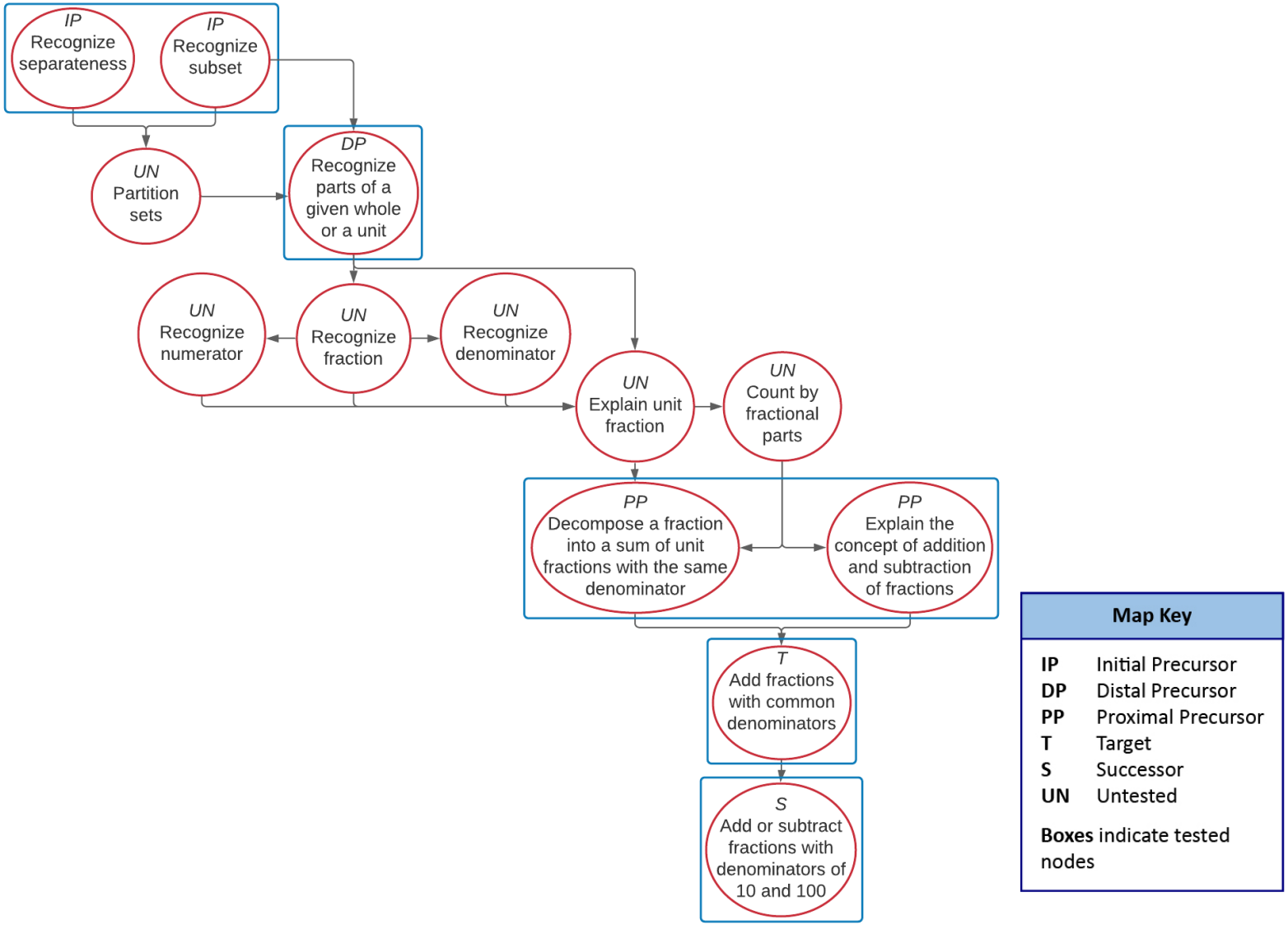
M.EE.7.NS.1 Add fractions with like denominators (halves, thirds, fourths, and tenths) with sums less than or equal to one.



Mini-Map for M.EE.7.NS.2.a

Subject: Mathematics
The Number System (NS)
Grade: 7

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.7.NS.2.a Solve multiplication problems with products to 100.	**M.7.NS.2.a** Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (–1)(–1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.

Linkage Level Descriptions

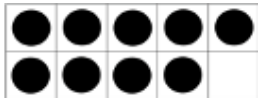
Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
Communicate understanding of "separateness" by recognizing objects that are not joined together. Communicate understanding of a set by recognizing a group of objects sharing an attribute.	Communicate understanding that in repeated addition problems, a single numerical value is added repeatedly (e.g., 6 + 6 + 6) and that one way to add a number a given number of times is by using skip-counting as a strategy (e.g., 6 + 6 + 6 can be added as 6, 12, 18). Represent repeated addition problems using an equation showing the addition of the same	Demonstrate multiplication by combining multiple sets containing the same number of objects. Communicate understanding that the number of sets times the number of objects in each set equals the total number of objects.	Multiply a number up to 20 by a number 1 to 10 to determine the product, using manipulatives as needed.	Divide a number by a divisor from 1 to 10 to determine the quotient, using manipulatives if needed. Quotients will not exceed 12. Communicate understanding of multiplication as the number of groups times the number of objects in each group (with the understanding that each group contains an equal number of objects) and that the total number of objects

	numeral the required number of times, and find the correct sum using an addition strategy (e.g., 5 + 5 + 5 = 15).			(i.e., the product) can then be divided by the number of groups to equal the number of objects in each group, and vice versa.

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

How is the Initial Precursor related to the Target?

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?

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.).

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.

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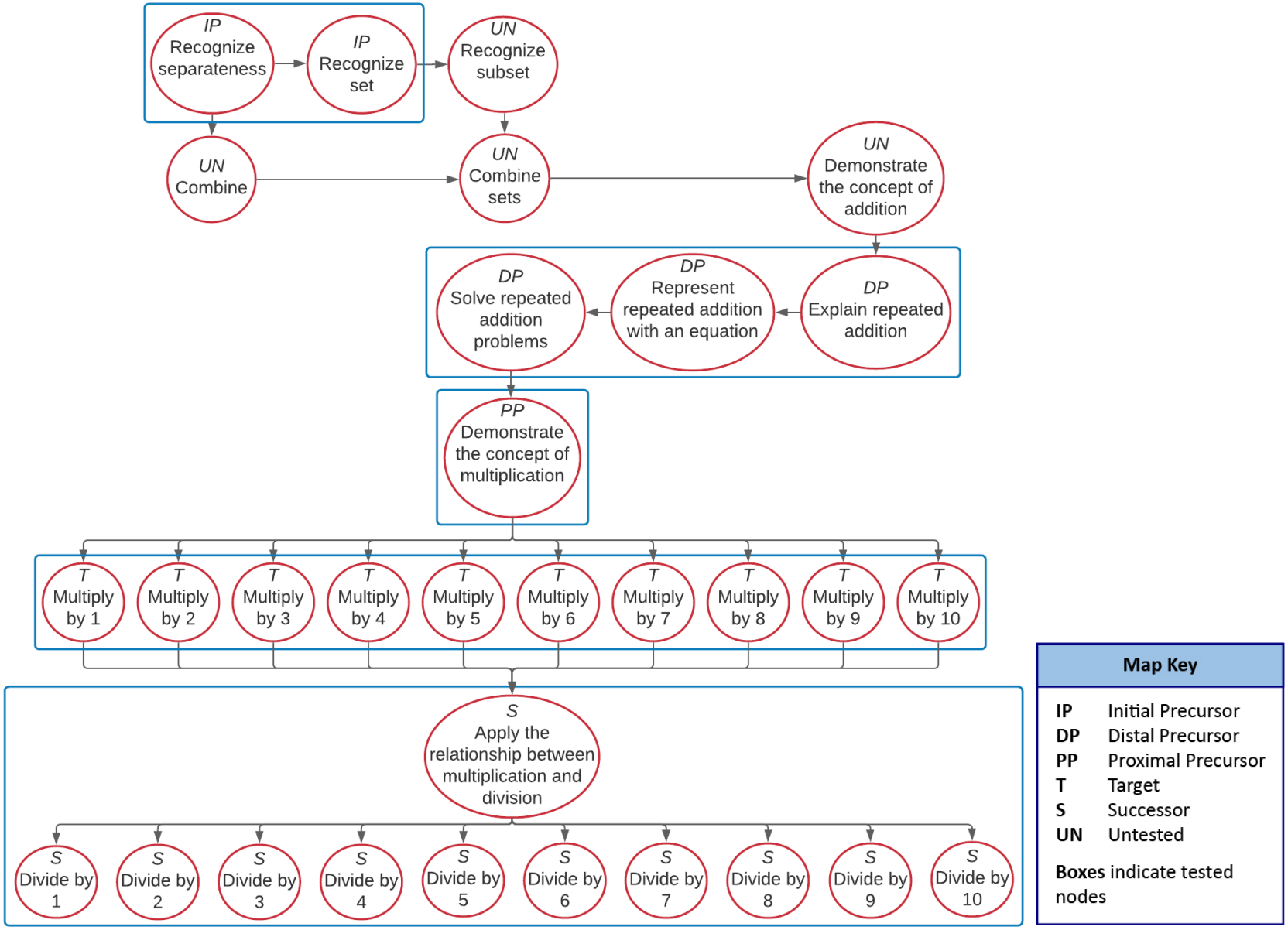
M.EE.7.NS.2.a Solve multiplication problems with products to 100.



Mini-Map for M.EE.7.NS.2.b

Subject: Mathematics
The Number System (NS)
Grade: 7

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.7.NS.2.b Solve division problems with divisors up to five and also with a divisor of 10 without remainders.	**M.7.NS.2.b** Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts.

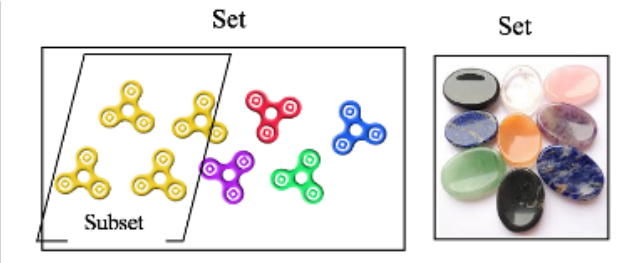
Linkage Level Descriptions

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
Communicate understanding of "separateness" by recognizing objects that are not joined together. Communicate understanding of set by recognizing a group of objects sharing an attribute. Communicate understanding of a subset by recognizing a subset as a set or group of objects within a larger set that share an attribute.	Communicate understanding that repeated subtraction is a subtraction of equal groups from a number (e.g., 15 - 5 - 5 - 5). Represent repeated subtraction using equations (e.g., 15 - 5 - 5 - 5 = 0). Solve repeated subtraction problems by identifying the number of times a number is subtracted repeatedly from another number to reach zero.	Show understanding of division by arranging the total number of objects into two or more equal groups and communicate that the total number of objects (i.e., dividend) divided by the number of groups (i.e., divisor) is equal to the number of objects in each group (i.e., quotient).	Divide numbers within 100 by 1, 2, 3, 4, 5, and 10 and determine the quotient, using manipulatives.	Recognize the inverse relationship between multiplication and division, and communicate understanding that the number of groups multiplied by the number of objects in each group equals the total number of objects and that the total number of objects divided by the number of groups equals the number of objects in each group.

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

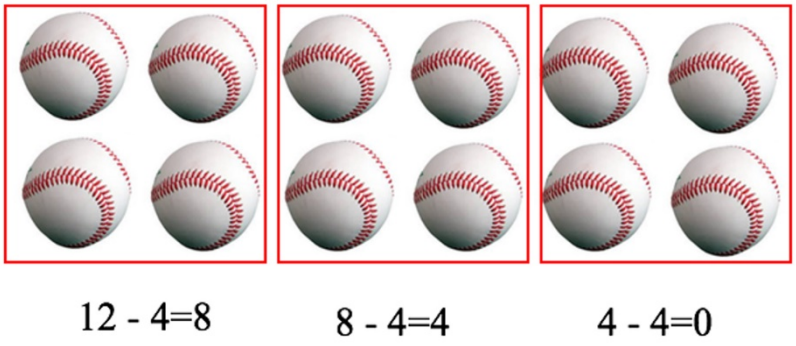
How is the Initial Precursor related to the Target?

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?

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.

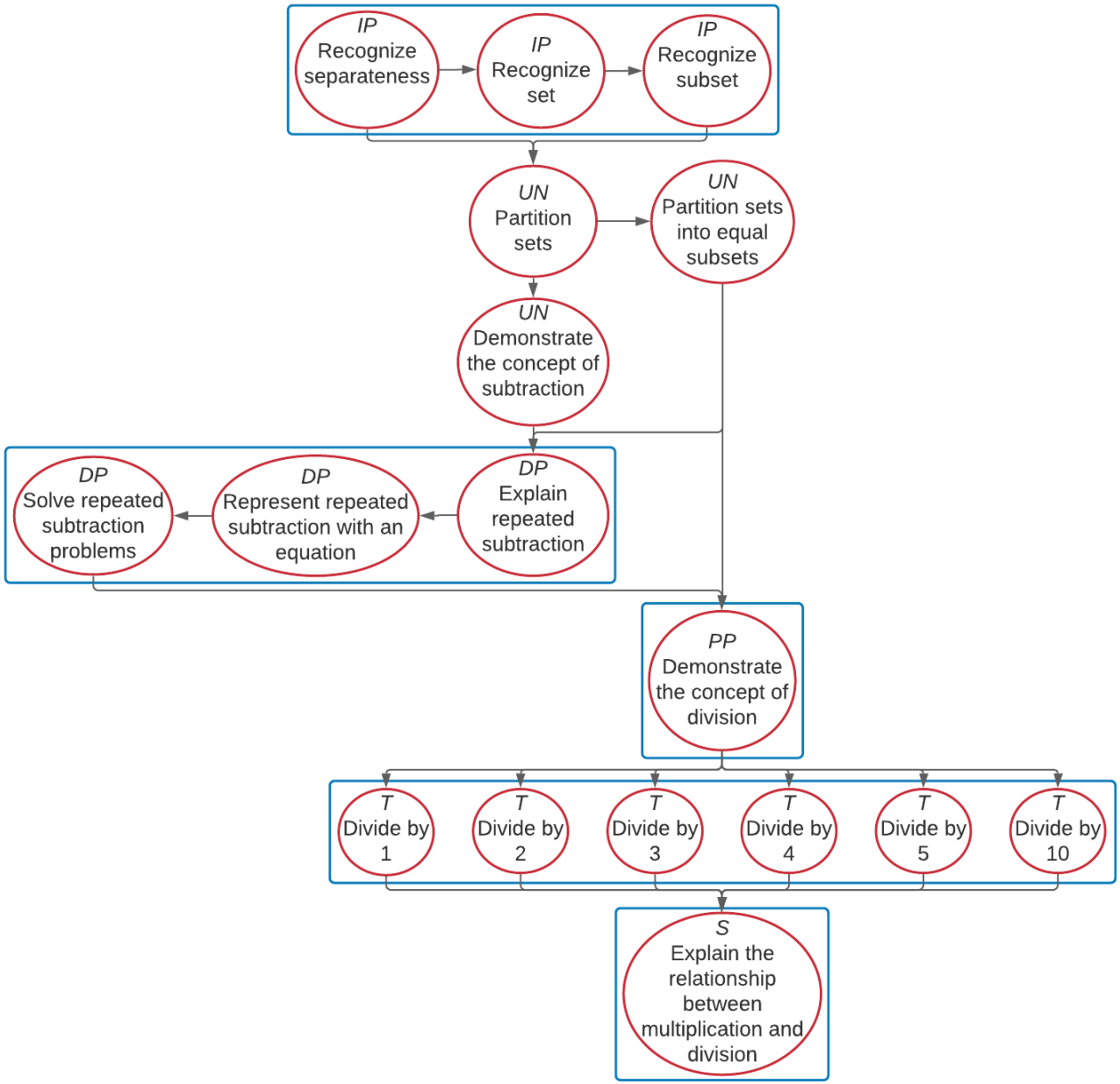


Instructional Resources

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]

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



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

Boxes indicate tested nodes

Mini-Map for M.EE.7.G.1

Subject: Mathematics
Geometry (G)
Grade: 7

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.7.G.1 Match two similar geometric shapes that are proportional in size and have the same orientation.	**M.7.G.1** Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.

Linkage Level Descriptions

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
Show interest in and focused attention to a task, object, or any environment stimulus. Notice or pay attention to a new stimuli (e.g., object, task, sound) introduced in the environment. (Students may use the methods of eye gaze, pointing, etc. to show they have noticed the new stimuli.)	Recognize "same" as the object that shares all of the same attributes as other objects in a group. Recognize "different" as the object that shares some or none of the attributes as other objects in a group.	Match two 2-dimensional or 3-dimenisional shapes (e.g., squares, rectangles, circles, spheres, rectangular prisms, cubes, pyramids) that are the same size and same orientation.	Match two 2-dimensional or 3-dimensional shapes (e.g., squares, rectangles, circles, spheres, rectangular prisms, cubes, pyramids) that are different sizes and the same orientation.	Match two 2-dimensional or 3-dimensional shapes (e.g., squares, rectangles, circles, spheres, rectangular prisms, cubes, pyramids) that are different sizes and different orientations.

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

How is the Initial Precursor related to the Target?

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?

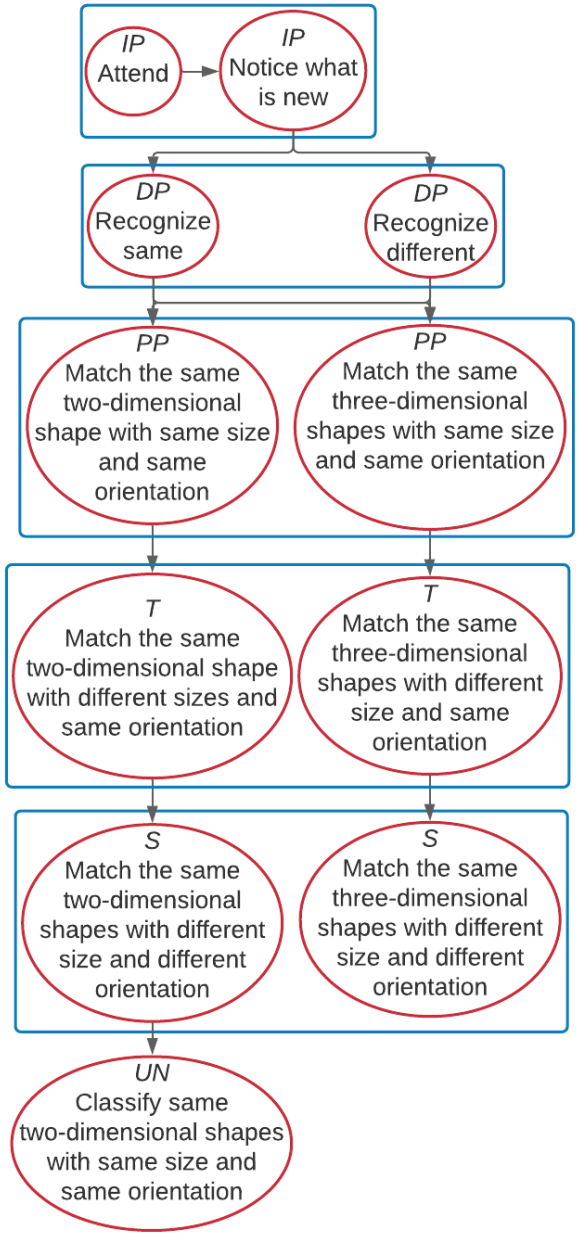
At this level, educators will encourage students to begin placing like objects together, drawing attention to the characteristics that make an item the same or different and using the core vocabulary to demonstrate the words same and different.

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]

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



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

Boxes indicate tested nodes

Mini-Map for M.EE.7.G.2

Subject: Mathematics
Geometry (G)
Grade: 7

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.7.G.2 Recognize geometric shapes with given conditions.	**M.7.G.2** Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.

Linkage Level Descriptions

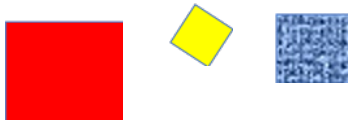
Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
Recognize "same" as the object that shares all of the same attributes as other objects in a group. Recognize "different" as the object that shares some or none of the attributes as other objects in a group.	Recognize two-dimensional shapes such as square, circle, triangle, or rectangle or three-dimensional shapes such as cube, cone, cylinder, or sphere.	Communicate attribute values of a shape, such as number of sides or number of corners (e.g., a square has four sides).	Recognize shapes with specified attributes (e.g., number of sides, number of vertices).	Group together shapes with specified attributes (e.g., number of sides, number of vertices).

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

How is the Initial Precursor related to the Target?

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?

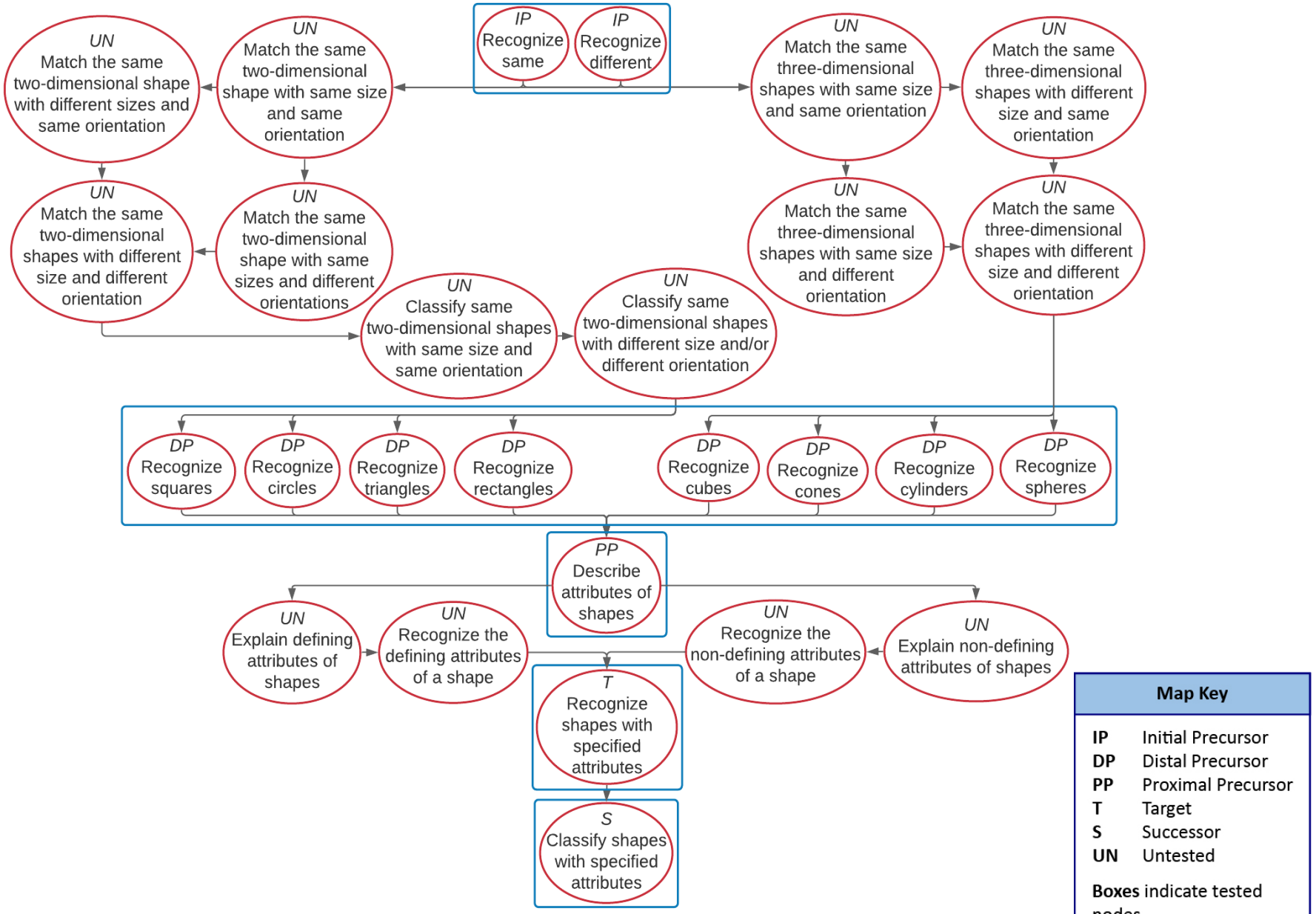
Now that students have experience identifying shapes as "same" and "different", provide instruction that focuses on the attribute of a given shape and making comparisons with other shapes. Educators should take care to use the names of the shapes while defining and describing the attributes. While students 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).

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]

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



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

Boxes indicate tested nodes

Mini-Map for M.EE.7.G.5

Subject: Mathematics
Geometry (G)
Grade: 7

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.7.G.5 Recognize angles that are acute, obtuse, and right.	**M.7.G.5** Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.

Linkage Level Descriptions

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
Recognize attributes or characteristics of an object, such as color, orientation, length, width, and weight.	Recognize a point as a precise location on a plane or in space, usually represented by a dot. Recognize a ray as a part of a line that begins at one point and extends infinitely in one direction. Recognize a line as a straight line that extends infinitely in two directions.	Recognize an angle as a figure formed by two rays sharing one endpoint.	Recognize an acute, obtuse, or right angle.	Compare the measure of an angle to the measure of a right angle, and communicate whether the measure of the angle is greater than, less than, or congruent to the measure of the right angle.

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

How is the Initial Precursor related to the Target?

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?

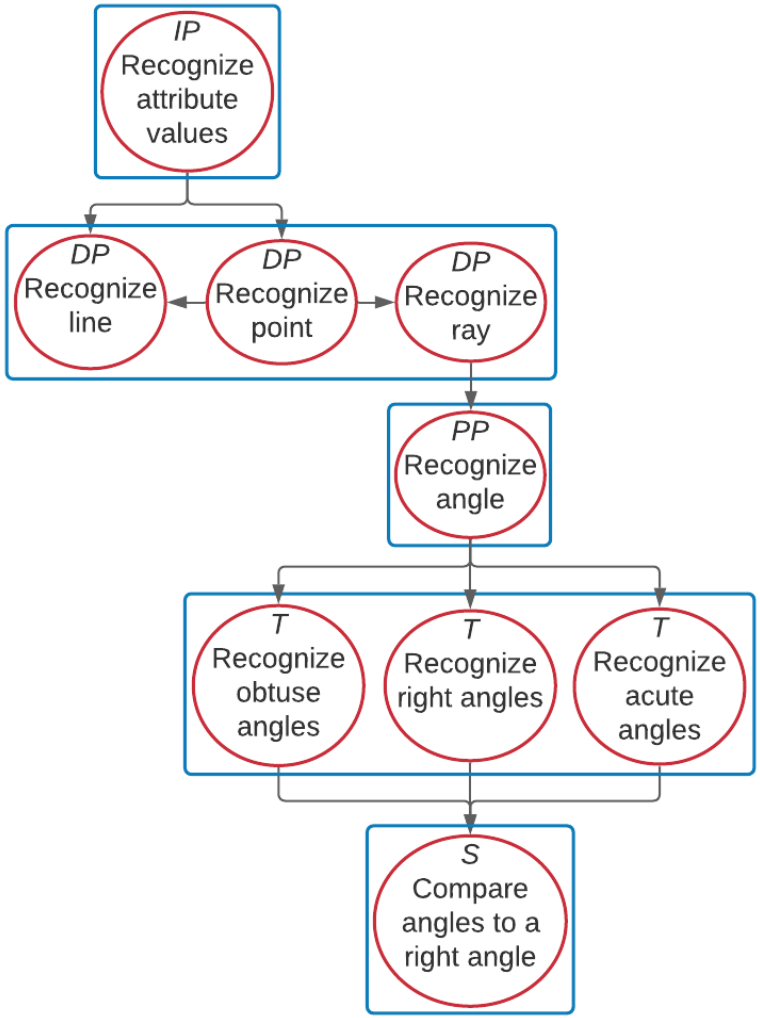
At this level, educators provide students with specific vocabulary (line, point, and ray). These are all denoted by certain characteristics (a line has arrows on both ends; a point is a dot on a graph, a line, a line segment, or a number line; a ray is a line that has a well-defined starting point). 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.

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

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



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

Boxes indicate tested nodes

Mini-Map for M.EE.7.G.4

Subject: Mathematics
Geometry (G)
Grade: 7

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.7.G.4 Determine the perimeter of a rectangle by adding the measures of the sides.	**M.7.G.4** Know the formulas for the area and circumference of a circle, and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.

Linkage Level Descriptions

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
Recognize attributes or characteristics of an object, such as color, orientation, length, width, and weight.	Recognize and explain measurable (e.g., height, depth, diameter, weight) and non-measurable (e.g., color or orientation) attribute values.	Communicate understanding that length is the measure along a side of a shape or object and perimeter is the measure around a shape or object, beginning and ending at the same point, and without any overlap.	Calculate the perimeter of a shape by adding the measures of all the sides. Calculate the perimeter of a rectangle drawn on a grid paper by counting the unit squares contained within the boundary of the shape.	Determine the perimeter of a square or rectangle drawn on a graph paper using the *x*- and *y*-coordinates of the vertices.

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

How is the Initial Precursor related to the Target?

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?

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.

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.

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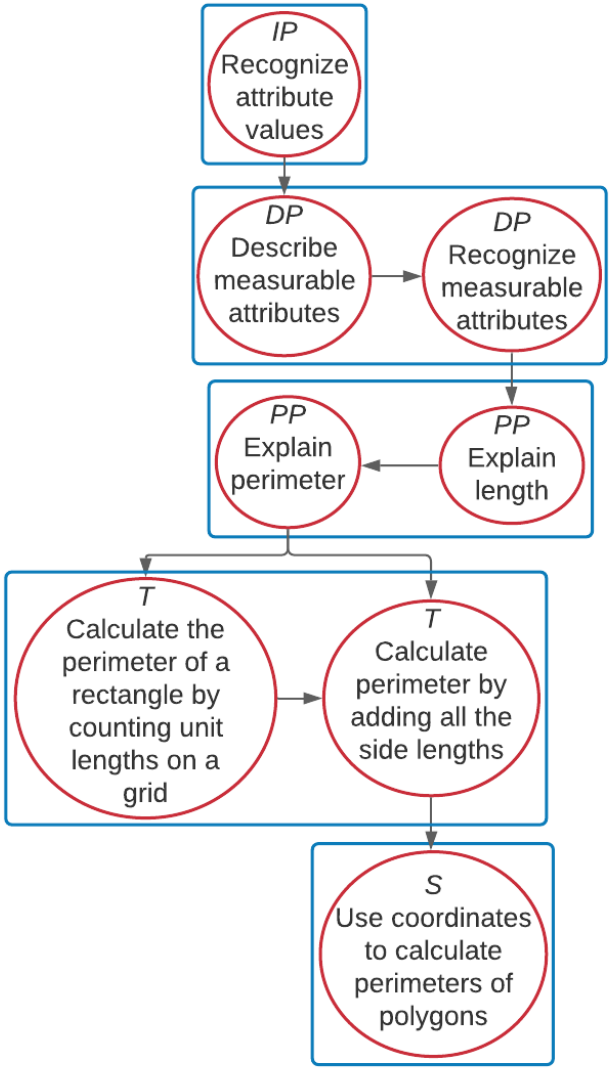
M.EE.7.G.4 Determine the perimeter of a rectangle by adding the measures of the sides.



Map Key	
IP	Initial Precursor
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Boxes indicate tested nodes

Mini-Map for M.EE.7.SP.3

Subject: Mathematics
Statistics and Probability (SP)
Grade: 7

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.7.SP.3 Compare two sets of data within a single data display such as a picture graph, line plot, or bar graph.	**M.7.SP.3** Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability.

Linkage Level Descriptions

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
Arrange objects in a specific order or by following a specific rule (e.g., arranging three pencils by increasing length). Group like items by attributes and distinguish between like items based on simple characteristics, such as shape, size, texture, and numerical pattern.	Recognize the structure of bar graphs, picture graphs, and line plots such as the title and labels for the *x*- and *y*-axes. Understand that bars are used to display data on bar graphs, where the height of the bar represents the data values. Understand that pictures or symbols are used to display data on picture graphs, where the number of pictures or symbols represents the data values. Understand that on a line plot, "x" is used to	Recognize symmetric distribution, outliers, and peaks in a data distribution shown graphically. Recognize data values substantially larger or smaller than the other values as outliers. Recognize peaks as data values that most frequently occur. Recognize symmetric distribution as distributions where the left- and right-hand sides of the distributions are roughly equal.	Compare variability of two data sets (i.e., spread out or grouped together) by overlapping the shapes of two data distributions. Compare differences in shapes of two or more sets of data (i.e., peaks, outliers, or symmetric distribution).	Draw inferences by comparing the shape and spread of two data sets (e.g., compare the peaks of two sets of data, height of soccer players and height of basketball players, to communicate that basketball players are, in general, taller than soccer players).

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
	represent the data values.	Recognize whether a set of scores is spread-out or grouped together (variability).		

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

How is the Initial Precursor related to the Target?

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?

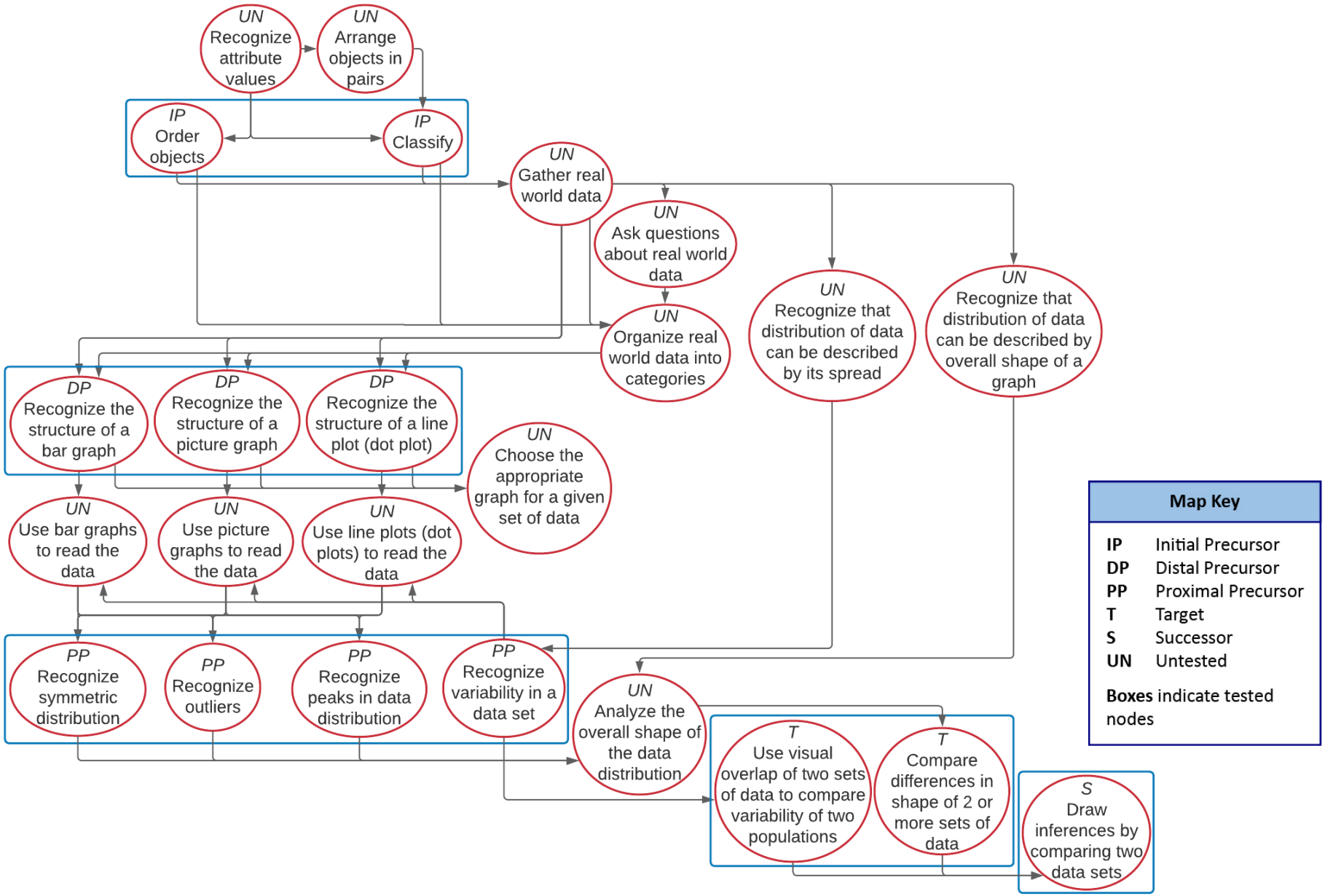
Students actively participate in the creation of graphs and line plots by placing representations, x's, or dots for each response to the research question.

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]

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



Mini-Map for M.EE.7.SP.5-7

Subject: Mathematics
Statistics and Probability (SP)
Grade: 7

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.7.SP.5-7 Describe the probability of events occurring as possible or impossible.	**M.7.SP.5** Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event. **M.7.SP.6** Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. **M.7.SP.7** Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.

Linkage Level Descriptions

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
Recognize attributes or characteristics of an object, such as color, orientation, length, width, and weight.	Group together objects by attribute values such as shape or size (e.g., group together a square, a rectangle, and a rhombus, as they all have four sides).	Recognize possible outcomes of an event (e.g., drawing a red marble from a bag containing red and green marbles).	Categorize events as possible or impossible (e.g., drawing a red marble from a bag containing red and yellow marbles as possible and drawing a blue marble from a group of red and yellow marbles as an impossible event).	Communicate understanding that probability of an event is the likelihood of an event occurring (e.g., given the likelihood of drawing a blue crayon out of a box containing 5 blue crayons and 6 yellow crayons is 5/11, the student describes 5/11 as the probability).

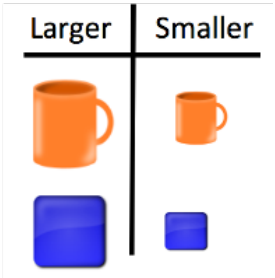
Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

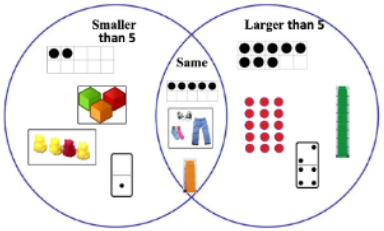
How is the Initial Precursor related to the Target?

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?

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.

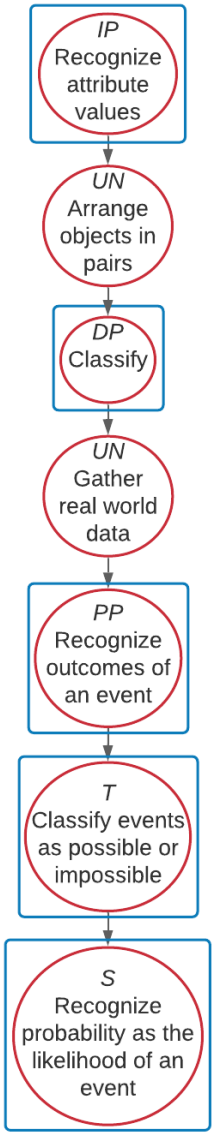
2, 4, 6, ?

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]

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



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Mini-Map for M.EE.7.EE.1

Subject: Mathematics
Expressions and Equations (EE)
Grade: 7

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.7.EE.1 Use the properties of operations as strategies to demonstrate that expressions are equivalent.	**M.7.EE.1** Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.

Linkage Level Descriptions

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
Combine two or more sets of objects or numbers to form a new set. Divide a set of 10 or fewer objects into two or more distinct subsets (e.g., dividing a set containing 10 objects into two subsets containing 4 and 6 objects).	Demonstrate understanding that the sum or product of two numbers remains the same regardless of the order in which numerals are written (e.g., 3 + 4 = 4 + 3, 2 x 3 = 3 x 2) and that the sum or product of three or more numbers remains the same regardless of the grouping of the numbers [e.g., (2 + 3) + 5 = 2 + (3 + 5), 2 x (3 x 5) = (2 x 3) x 5].	Apply commutative (e.g., 3 + 4 = 4 + 3) and associative [e.g., (2 + 3) + 5 = 2 + (3 + 5)] properties of addition to add two or more numbers. Apply commutative (e.g., 3 × 4 = 4 × 3) and associative [e.g., (10 × 4) × 2 = 10 × (4 × 2)] properties of multiplication as strategies to multiply two or more numbers.	Recognize an expression equivalent to a given expression involving addition and subtraction operations by using commutative and associative properties of addition and multiplication {e.g., recognize [(3 + 4) - (5 x 6)] as an expression equivalent to [(4 + 3) - (6 x 5)]}.	Write two equivalent expressions that represent a given real-world problem. For example, "Joe has 5 books, John has 7 books, and Kayla has 8 books. How many books do they have altogether?" Two equivalent expressions that represent this word problem are (5 + 7) + 8 and (7 + 8) + 5.

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

How is the Initial Precursor related to the Target?

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?

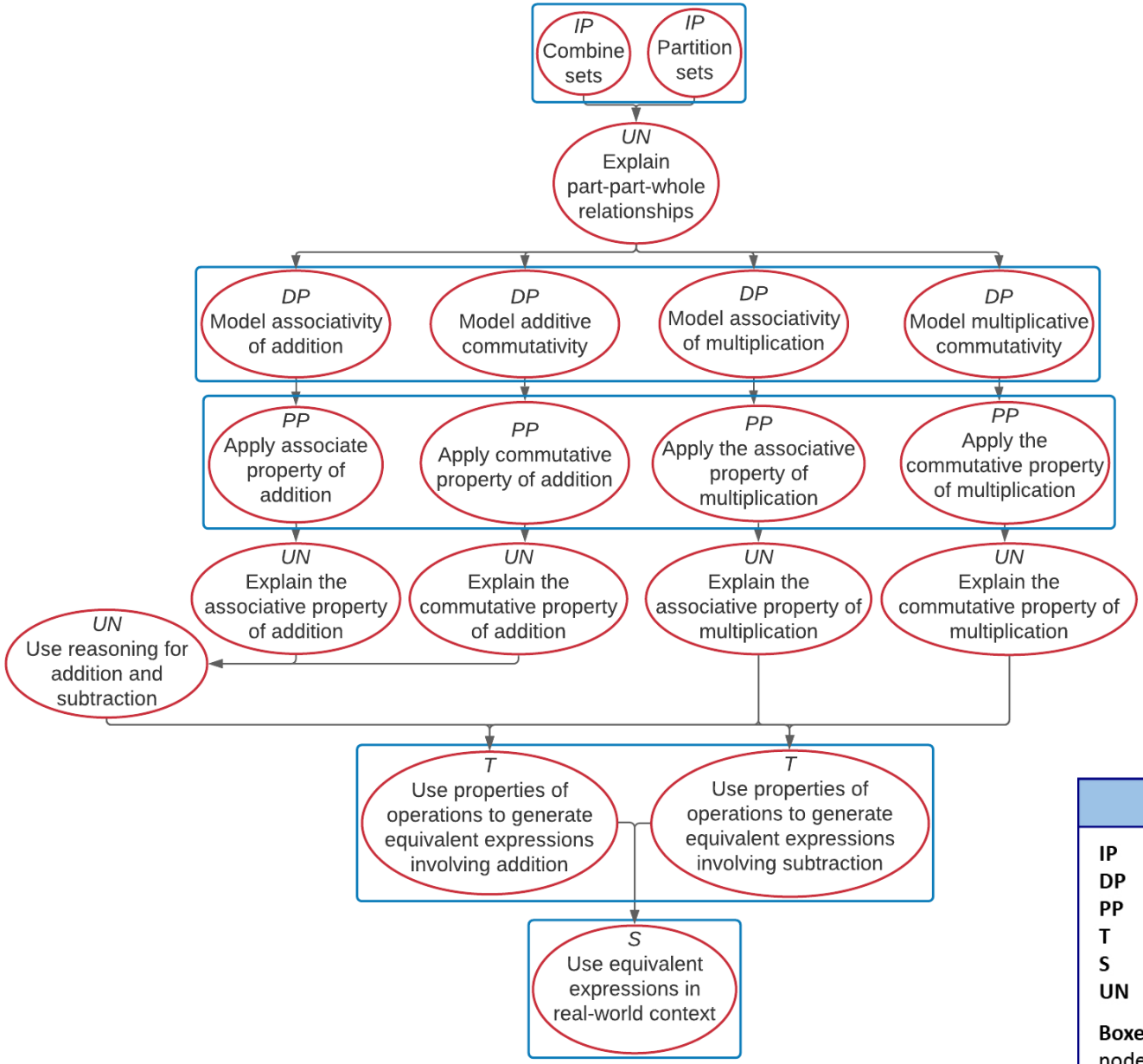
As students continue developing their understanding of how sets change, educators can use manipulatives to create sets that model the commutative and associative properties of addition and multiplication.

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]

M.EE.7.EE.1 Use the properties of operations as strategies to demonstrate that expressions are equivalent.



Map Key	
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Boxes indicate tested nodes

Mini-Map for M.EE.7.EE.2

Subject: Mathematics
Expressions and Equations (EE)
Grade: 7

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.7.EE.2 Identify an arithmetic sequence of whole numbers with a whole number common difference.	**M.7.EE.2** Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.

Linkage Level Descriptions

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
Arrange objects in a specific order by following a specific rule (e.g., arrange objects from the largest to the smallest size). Group like items by attributes such as size, shape, and color. Contrast or distinguish objects based on attributes such as shape, size, texture, and numerical pattern.	Recognize patterns (i.e., repeating, growing, shrinking) involving numbers or letters (e.g., a, b, b, a, b, b...; 2, 5, 8, 11...). Identify a sequence as an ordered list of numbers that adheres to a common rule between corresponding numbers (e.g., 2, 4, 6, 8...).	Recognize a growing pattern as a pattern that increases (e.g., 3, 6, 9, 12...), and a shrinking pattern as a pattern that decreases (e.g., 12, 10, 8...).	Recognize arithmetic sequences as sequences where the difference between two consecutive terms is constant (e.g., 1, 4, 7, 10...).	Recognize the recursive rule in arithmetic sequences by determining how each term in the sequence differs from the preceding term (e.g., the recursive rule in the sequence 2, 4, 6, 8... is "add 2").

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

How is the Initial Precursor related to the Target?

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?

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.

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]

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