Mini-Map for M.EE.6.RP.1

Subject: Mathematics
Ratios and Proportional Relationships (RP)
Grade: 6

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.6.RP.1 Demonstrate a simple ratio relationship.	**M.6.RP.1** Understand the concept of a ratio, and use ratio language to describe a ratio relationship between two quantities.

Linkage Level Descriptions

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
Communicate understanding of a unit by recognizing a group of countable objects. Communicate understanding of "wholeness" by recognizing an object that has all the parts joined together. Recognize parts of an object and the whole object.	Recognize two glasses with an equal amount of liquid.	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 *a*/*b*, with *b* not equal to zero.	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 group as in the first group. When shown two groups of objects, one group with one object and another group with multiple objects (e.g., 4), represent a many-to-one ratio of the parts as 1:4 or 1/4.	When shown two groups of multiple objects (e.g., one group with two objects and another group with three objects), recognize that for every *a* objects in the first group there are *b* objects in the second group (e.g., 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 (e.g., 2:3).

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

How is the Initial Precursor related to the Target?

Being able to understand ratios requires a student to recognize a unit and recognize when basic objects are in whole and part forms. Work on this understanding by giving students an opportunity to observe, feel, or otherwise interact with objects and shapes in their whole and part forms. The general goal is to explore the differences between whole units or objects and parts of units or objects. As students explore shapes, label them and describe them as whole or part.

NOTE: Educators can work on the Initial Precursor skills using everyday objects and/or using the shapes that students working at the Target level are representing as a ratio.

How is the Distal Precursor related to the Target?

As students begin to recognize whole objects or shapes and parts of objects or shapes, they can move toward building and taking apart shapes.

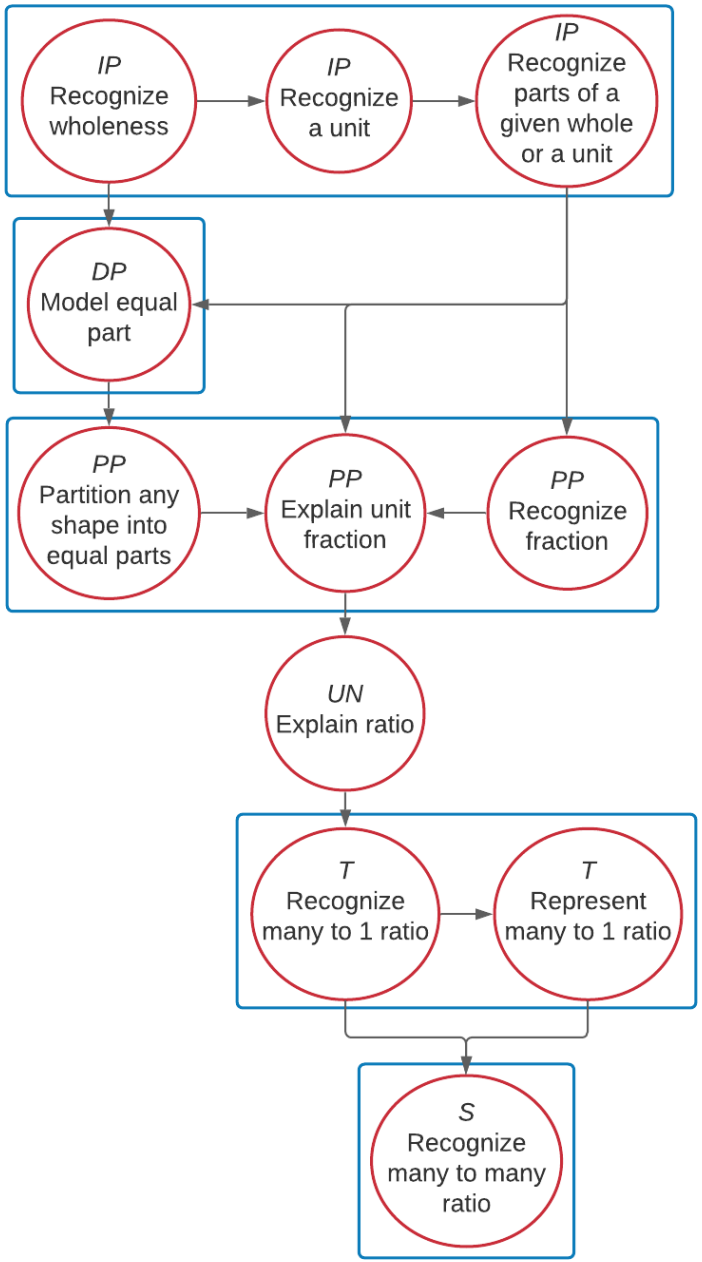
NOTE: Educators can work on the Distal Precursor skills using everyday objects and/or using the shapes that students working at the Target level are representing as a ratio.

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.6.RP.1 Demonstrate a simple ratio relationship.



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.6.NS.1

Subject: Mathematics
The Number System (NS)
Grade: 6

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.6.NS.1 Compare the relationships between two unit fractions.	**M.6.NS.1** Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions (e.g., by using visual fraction models and equations to represent the problem).

Linkage Level Descriptions

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
Communicate understanding of a unit by recognizing a group of countable objects. Communicate understanding of "wholeness" by recognizing an object that has all the parts joined together. Recognize parts of an object and the whole object.	Recognize two glasses with an equal amount of liquid. Divide familiar shapes, such as circles, squares, and/or rectangles, into two or more equal parts.	Recognize a fraction as a number expressed as a quotient of two integers in the form a/b, with b not equal to zero. 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 the number above the fraction bar as the numerator and the number below the fraction bar as the denominator.	Communicate understanding that when a whole is divided into more parts, each part is smaller than when that same whole is divided into fewer parts (e.g., 1/5 is smaller than 1/2 because in 1/5 the whole is divided into five equal parts and in 1/2 the same whole is divided into two equal parts).	Communicate understanding that the numerator represents a number of equal parts and the denominator represents how many equal parts make up the whole. Compare fractions (i.e., which fraction is greater than and which is less than) using manipulatives. Add fractions with common denominators (e.g., 2/5 + 1/5 = 3/5), and decompose fractions into sums of unit fractions with the same denominator

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
				(e.g., 3/7 = 1/7 + 1/7 + 1/7).

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

How is the Initial Precursor related to the Target?

In order to compare unit fractions, students need to gain experience with parts and wholes. This concept can literally be taught in every area of mathmatics (i.e., sets, number sense, counting, operations, patterns, measurement, data analysis, geometry, and algebra). Educators can start by having students work with sets, taking whole sets and breaking them into parts based on attributes. When counting, label what has been counted (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 develop the understanding of sets and numbers, educators will highlight the differences between sets on the basis of overall area or discrete number using the words more, less, and equal. Provide students with multiple opportunities to count and compare a wide variety of sets with an increasing number of items, label the set (e.g., eight ball, 12 bears, 15 blocks), and move items in and out of the sets, labeling and counting them again (e.g., "You just said this set has 11 cubes; if I take two cubes, how many will you have?").

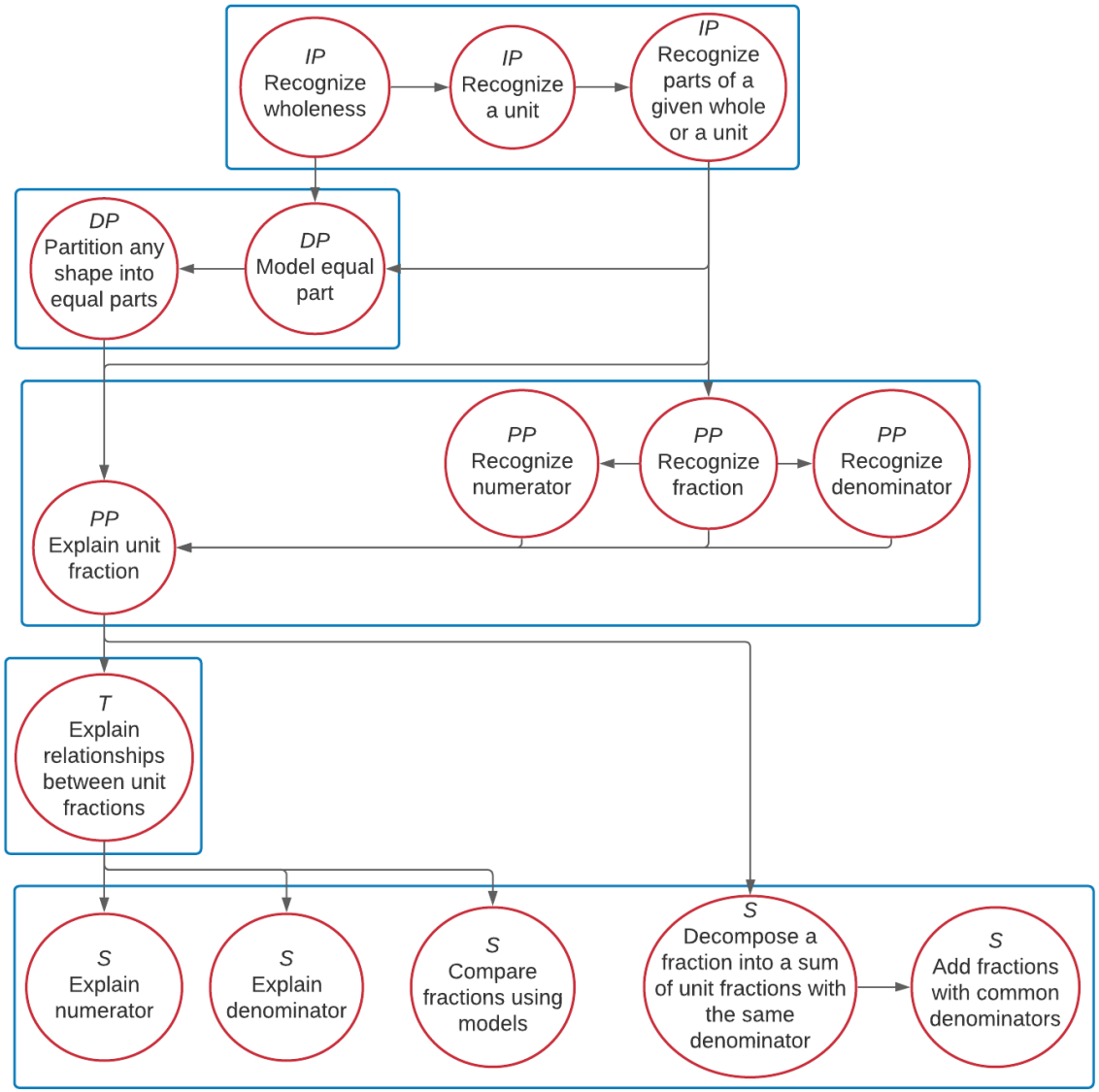
Being able to partition shapes requires a student to recognize a unit and recognize when basic objects are in whole and part forms. Work on this understanding by giving students an opportunity to observe, feel, or otherwise interact with objects and shapes in their whole and part forms. The general goal is to explore the differences between whole units or objects and parts of units or objects. As students explore shapes, label them and describe them as whole or part. Have students build (construct) and take apart (deconstruct) shapes.

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.6.NS.1 Compare the relationships between two unit fractions.



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Mini-Map for M.EE.6.NS.5-8

Subject: Mathematics
The Number System (NS)
Grade: 6

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.6.NS.5-8 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero).	**M.6.NS.5** Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. **M.6.NS.6** Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. **M.6.NS.7** Understand ordering and absolute value of rational numbers. **M.6.NS.8** Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

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.	Count all objects in a set to communicate the total number of objects in that set. Identify sets having the same number of objects. Identify a set containing a different number of objects than the other two sets. Recognize a set containing more or fewer objects than the other set.	Communicate understanding that opposite numbers are equidistant from zero but in opposite directions, or that when two opposite numbers are added together they yield a sum of zero (e.g., 3 + (- 3) = 0, thus 3 and -3 are opposite numbers).	Demonstrate use of positive and negative numbers in real-world contexts such as temperature, elevation, credits, and debits (e.g., representing a debit of 500 dollars as -500 dollars).	Communicate understanding of inequalities in real-world contexts (e.g., -3 degrees > -7 degrees means that -3 degrees is warmer than -7 degrees). Communicate the meaning of zero in relation to positive and negative numbers in real-world contexts (e.g., recognize that no elevation, or 0 feet, means "at sea level"; positive elevation, for example, 200 feet, means "above sea level"; and negative elevation, for example, -200 feet, means "below sea level").

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

How is the Initial Precursor related to the Target?

In order to use positive and negative numbers, students need to gain experience with creating sets. Educators can help students learn this by providing 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 encourage them to separate them again based on another characteristic.

How is the Distal Precursor related to the Target?

As students begin to develop the understanding of sets and numbers, educators will highlight the differences between sets on the basis of overall area or discrete number using the words same, different, fewer and more. Provide students with multiple opportunities to count and compare a wide variety of sets with an increasing number of items, label the set (e.g., eight ball, 12 bears, 15 blocks), and move items in and out of the sets, labeling and counting them again (e.g., "You just said this set has 11 cubes; if I take two cubes, how many will you have?").

Instructional Resources

Released Testlets
See the Guide to Practice Activities and Released Testlets.
Using Untested (UN) Nodes
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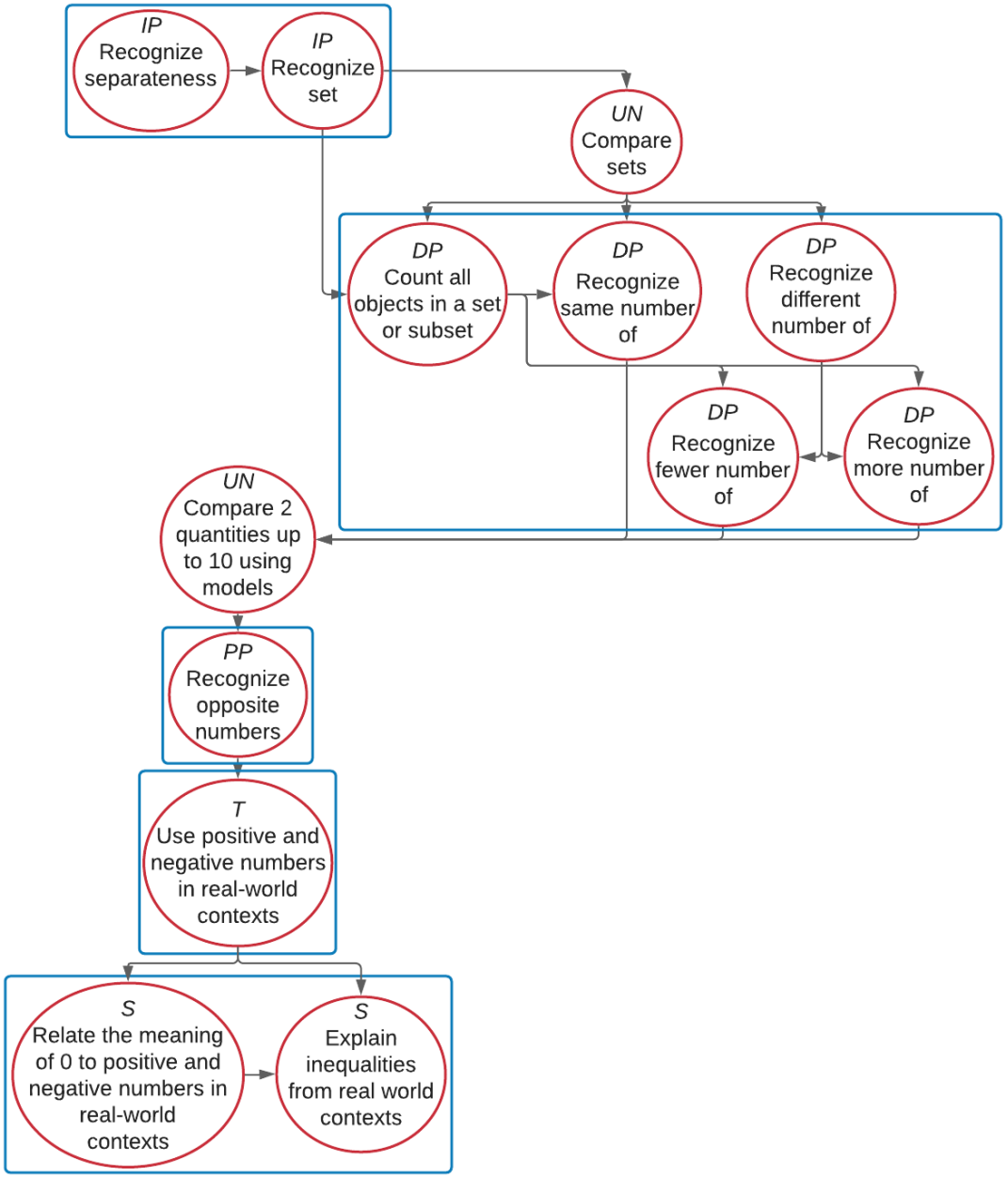
M.EE.6.NS.5-8 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero).



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Mini-Map for M.EE.6.NS.2

Subject: Mathematics
The Number System (NS)
Grade: 6

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.6.NS.2 Apply the concept of fair share and equal shares to divide.	**M.6.NS.2** Fluently divide multi-digit numbers using the standard algorithm.

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 a set containing 10 or fewer objects into equal subsets (e.g., divide a set consisting of 10 counters into two subsets with 5 counters each).	Communicate understanding that repeated subtraction is subtracting equal groups from a number (e.g., 15 - 5 - 5 - 5). Represent repeated subtraction using equations (e.g., 15 - 5 - 5 - 5 = 0), and model repeated subtraction using concrete manipulatives.	Demonstrate understanding of division by splitting a set into an equal number of subsets and communicating the quotient as the number of equal subsets (e.g., a set consisting of 15 objects has three subsets, each containing 5 objects).	Divide a number within 12 by a divisor from 1 to 5 to determine the quotient, using manipulatives as needed.

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 working at the Initial Precursor linkage level 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 communicate 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 partitioning 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 can 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 repeatedly, we made 3 equal sets so there are 3 teams.

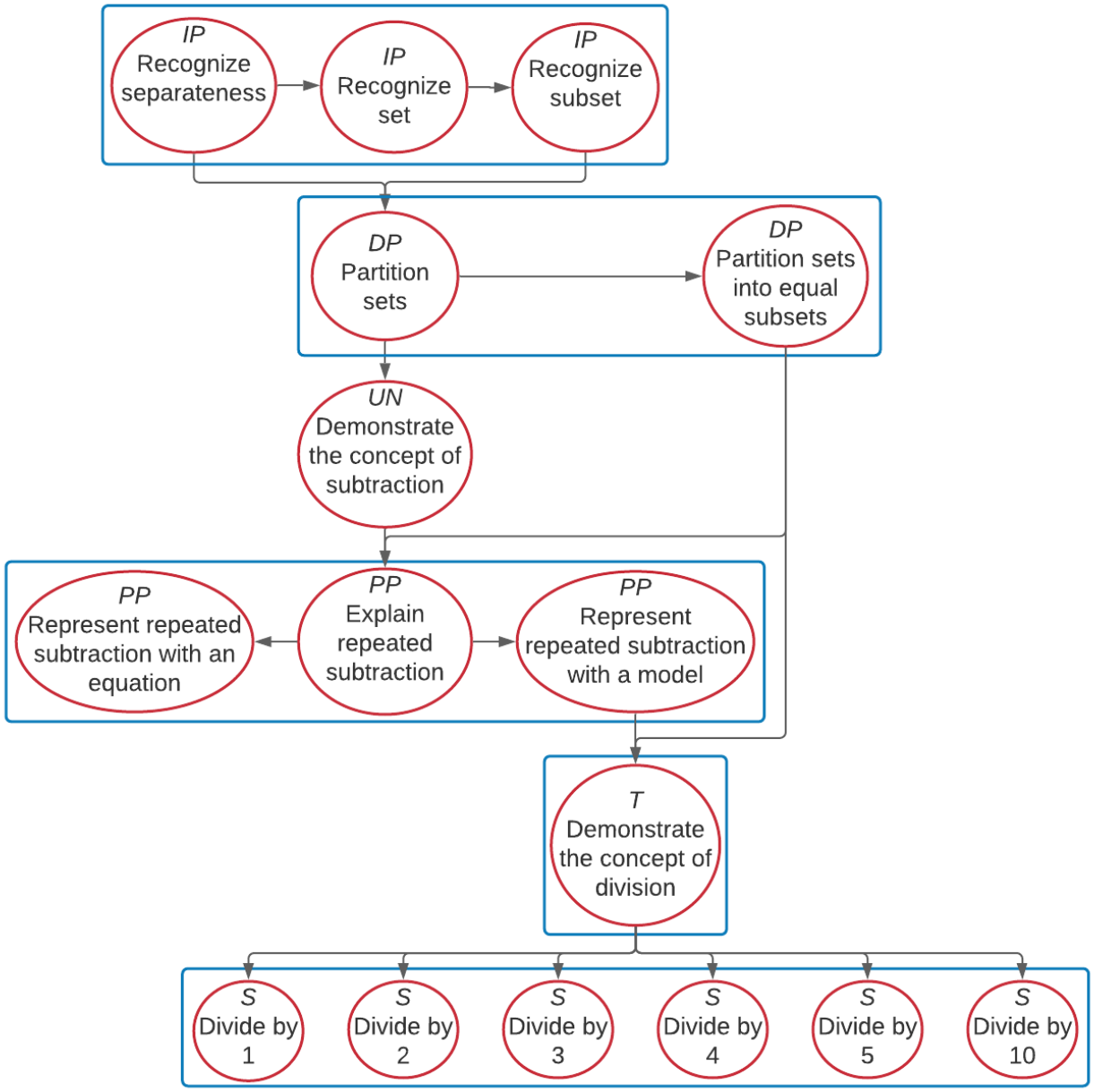
12 - 4=8 8 - 4=4 4 - 4=0

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.6.NS.2 Apply the concept of fair share and equal shares to divide.



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Mini-Map for M.EE.6.NS.3

Subject: Mathematics
The Number System (NS)
Grade: 6

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.6.NS.3 Solve two-factor multiplication problems with products up to 50 using concrete objects and/or a calculator.	**M.6.NS.3** Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

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.	Represent repeated addition problems in the form of an equation, including displaying the addition of the same numeral more than twice (e.g., 3 + 3 + 3 + 3) and finding the sum by adding the same number a certain number of times (e.g., 3 + 3 + 3 + 3 = 12). Communicate understanding of repeated addition as adding the same addend a given number of times (e.g., in the repeated addition equation 3 + 3 + 3 + 3 =	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 numbers up to 12 by factors 1 to 5, using manipulatives or repeated addition (e.g., multiply 3 x 5 by adding 5 + 5 + 5 = 15).	Divide a number (up to 12) by one, two, three, four, or five, and determine the quotient using diagrams or manipulatives. Communicate understanding that the number of groups times the number of objects in each group equals the total number of objects (multiplication) and that the total number of objects divided by the number of groups equals the number of objects in each group (division).

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
	12, the addend 3 is added four times).			

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

How is the Initial Precursor related to the Target?

In order to solve multiplication problems, 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 communicate 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 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 in writing (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
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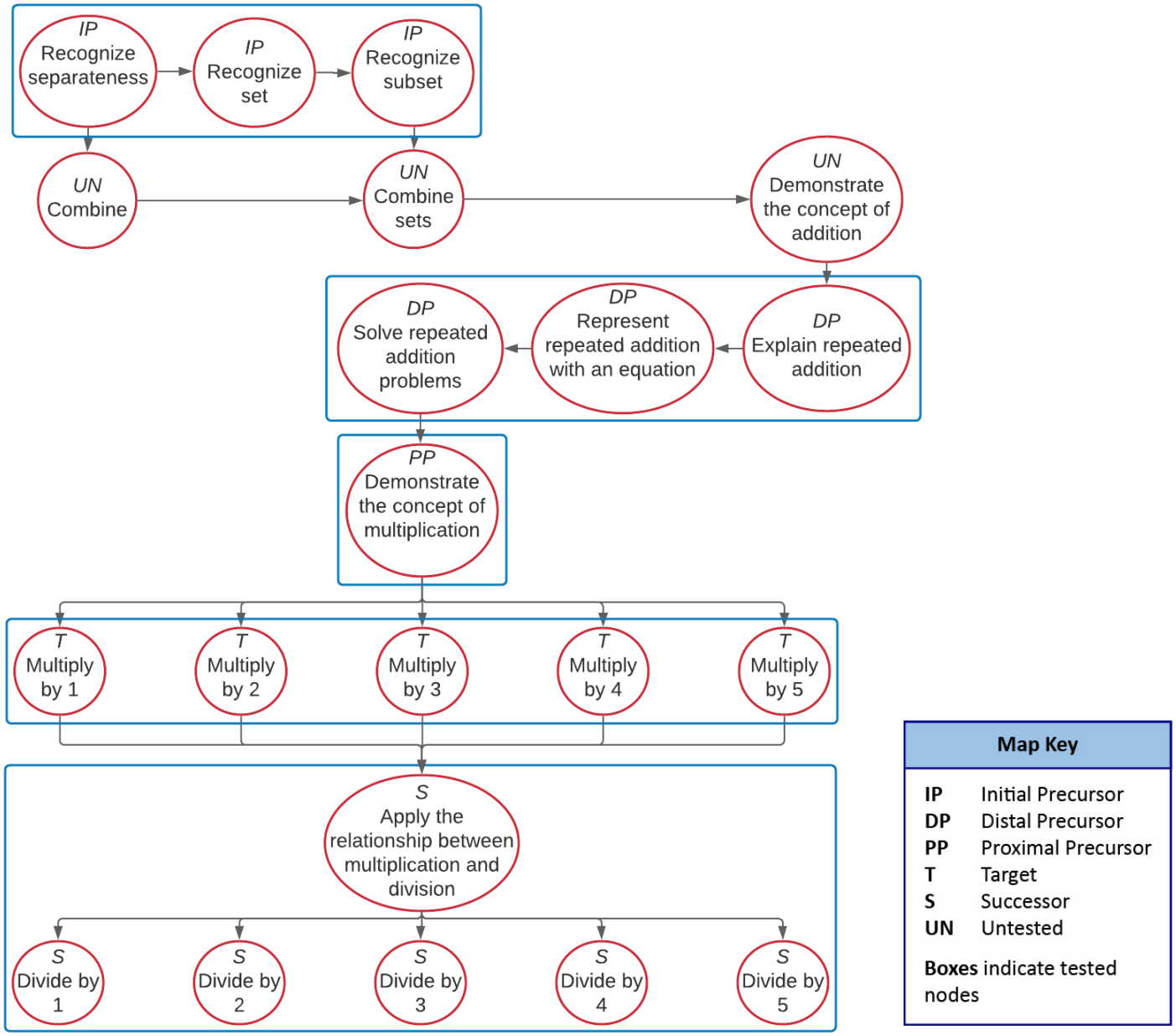
Link to Text-Only Map

M.EE.6.NS.3 Solve two-factor multiplication problems with products up to 50 using concrete objects and/or a calculator.



Mini-Map for M.EE.6.G.1

Subject: Mathematics
Geometry (G)
Grade: 6

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.6.G.1 Solve real-world and mathematical problems about area using unit squares.	**M.6.G.1** Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical 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 generic understanding of "some" as a certain amount or a number of people or things.	Communicate understanding that a unit square is a square with edge lengths of 1 unit and area of 1 square unit. Communicate understanding of area as the measure of space contained within the outline or boundary of a two-dimensional object or figure.	Calculate the area of a square or rectangle by filling a figure with unit squares or tiles and counting the total number of unit squares or tiles. Calculate the area of a square or rectangle by counting the number of square units drawn to cover the area.	Find the unknown quantity in the word problem by determining the area of a rectangle.	Communicate understanding that length and width measures of a rectangle can be used to find the number of unit tiles needed to fill the rectangle and that the number of tiles equals the product of the length and width. Calculate area of a rectangle using the area formula (area = length x width).

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

How is the Initial Precursor related to the Target?

In order to solve problems using unit squares, students at this level start with learning to recognize that two or more sets or groups of items exist. Work on this skill using a variety of sets with 1-4 items. Help students recognize when items are grouped together into a set or separated out. The educator presents a set, labels it, and then counts the items (e.g., two balls, 1, 2) and encourages students to use numerals to label and count the separate sets. Begin working on the quantifier "some" as students are developing an understanding of the quantities 1-4, using the students' communication system to demonstrate the use of the word "some".

How is the Distal Precursor related to the Target?

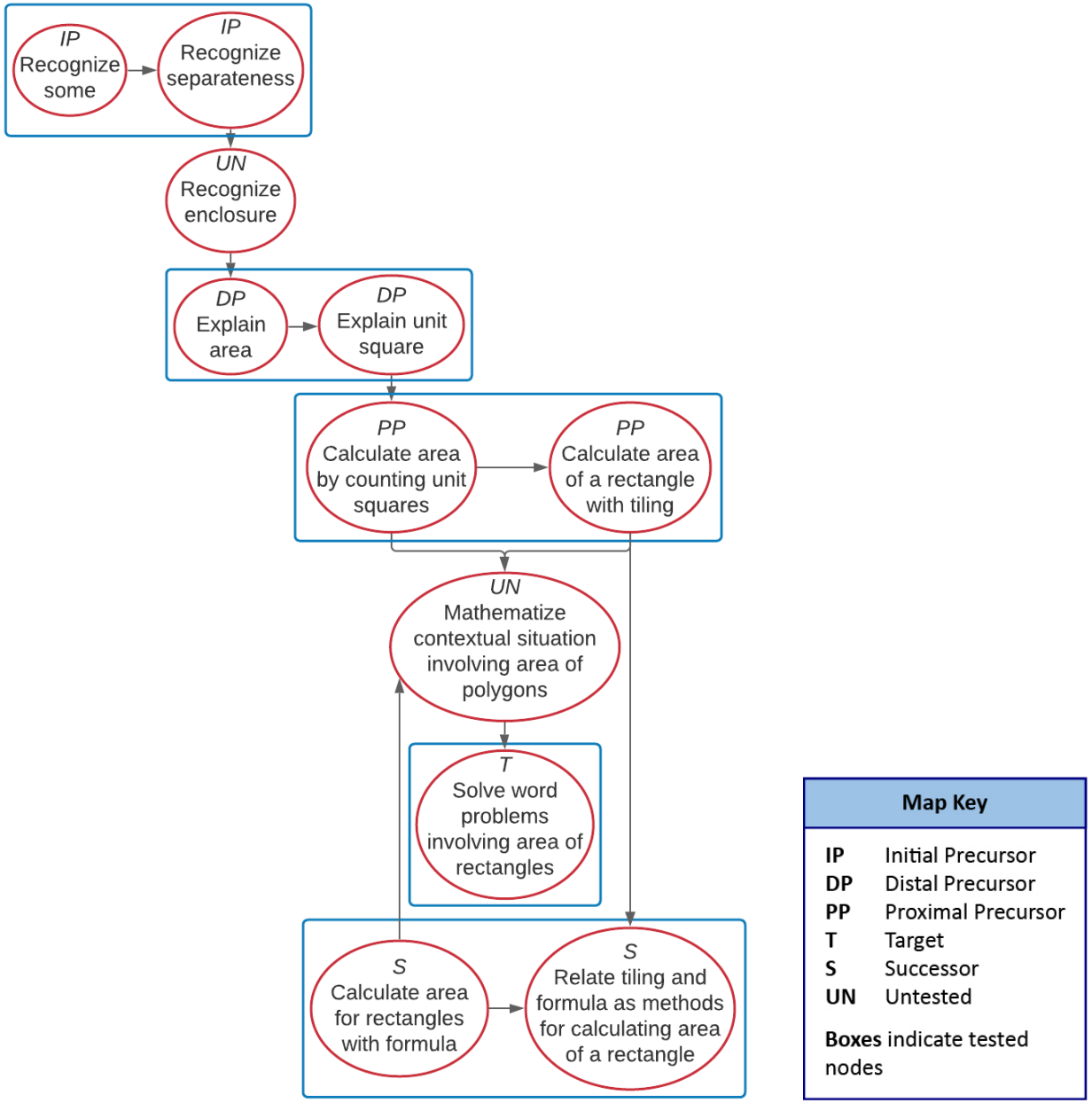
As students continue to develop their understandings of number and sets, they can also work on covering small rectangles with unit squares and counting each one as it is placed. Core vocabulary can be used to demonstrate the language associated with these concepts (e.g., all, all on, put on, it here, unit squares are to be placed on a rectangle side by side if one is on the diagonal the word turn can be used, finished).

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.6.G.1 Solve real-world and mathematical problems about area using unit squares.



Mini-Map for M.EE.6.G.2

Subject: Mathematics
Geometry (G)
Grade: 6

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.6.G.2 Solve real-world and mathematical problems about volume using unit cubes.	**M.6.G.2** Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = lwh$ and $V = bh$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.

Linkage Level Descriptions

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
Communicate understanding of "separateness" by recognizing objects that are not joined together. Recognize enclosure as an enclosed space that lies within a boundary that distinguishes it from the space that lies outside the boundary.	Communicate understanding that volume is the space enclosed by a shape or an object, that a unit cube is a cube with edge lengths of one unit and a volume of one cubic unit, and that volume can be measured by counting the number of unit cubes needed to completely fill a container or space.	Calculate the volume of a solid figure by counting the total number of unit cubes in a solid figure. Calculate the volume of a rectangular prism by packing the box with unit cubes and counting them.	Solve word problems involving the volume of a rectangular prism by determining the volume of the prism. (The volume of a rectangular prism should be determined by packing the prism with unit cubes.)	Calculate volume of a rectangular prism using the volume formula (volume = height x length x width).

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

How is the Initial Precursor related to the Target?

In order to solve problems using unit cubes, students at this level start by exploring objects and experiencing putting various materials into various containers. Educators demonstrate the language of in/out, more/less, big/little, longer/shorter, taller/smaller, wider/thinner, etc.

How is the Distal Precursor related to the Target?

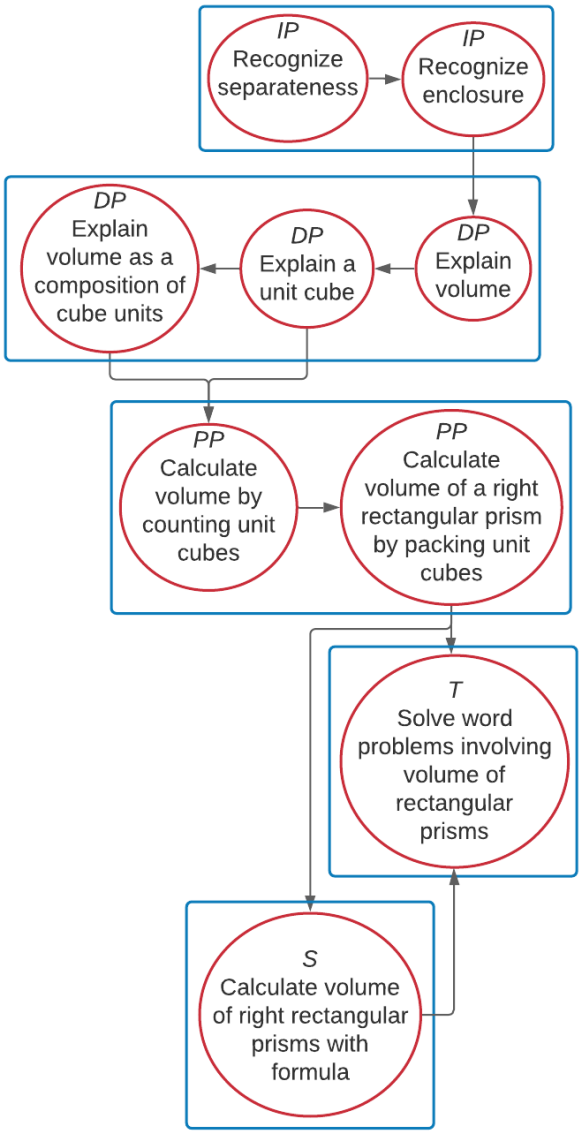
As students learn about how various materials do or do not fit in a given space, educators provide opportunities to compare and order by length, area, and capacity. Educators may use non-standard measurement tools such as hands or fingers to estimate length, blocks or squares for area, and sand or water for capacity.Educators should take care to use the word "volume" while defining and demonstrating its meaning as students are filling enclosed shapes or objects. While students do not need to say the word "volume", they do need to learn its 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.

Link to Text-Only Map

M.EE.6.G.2 Solve real-world and mathematical problems about volume using unit cubes.



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Mini-Map for M.EE.6.SP.5

Subject: Mathematics
Statistics and Probability (SP)
Grade: 6

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.6.SP.5 Summarize data distributions shown in graphs or tables.	**M.6.SP.5** Summarize numerical data sets in relation to their context, such as by: Reporting the number of observations. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

Linkage Level Descriptions

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
Arrange objects in a specific order (e.g., smallest to largest). Group objects by some attribute value (e.g., shape, size, texture, numerical pattern).	Communicate understanding that distribution of data can be described by the overall shape of the distribution. Recognize that in a line plot, "x" is used to represent the data values, and labels are used to represent *x*-	Analyze data distribution to recognize outliers, peaks, or symmetric distribution. Recognize data values substantially larger or smaller than the other values as outliers. Recognize peaks as data	Summarize data distribution by describing the overall shape of data in terms of outliers, peaks, and symmetric distribution.	Recognize appropriate measures of center, such as mean or median, by analyzing the overall shape of the data distribution. For example, use the mean to describe the center if the data distribution is symmetric, and use

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
	axis, *y*-axis, and the title of the graph.	values that most frequently occur. Recognize symmetric distribution as distributions where the left- and right-hand sides of the distributions are roughly equal.		median to describe the center if the data distribution is not symmetric.

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

How is the Initial Precursor related to the Target?

In order to summarize data, students begin by learning to recognize what is the same and different between familiar items; color, shape, quantity, 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?

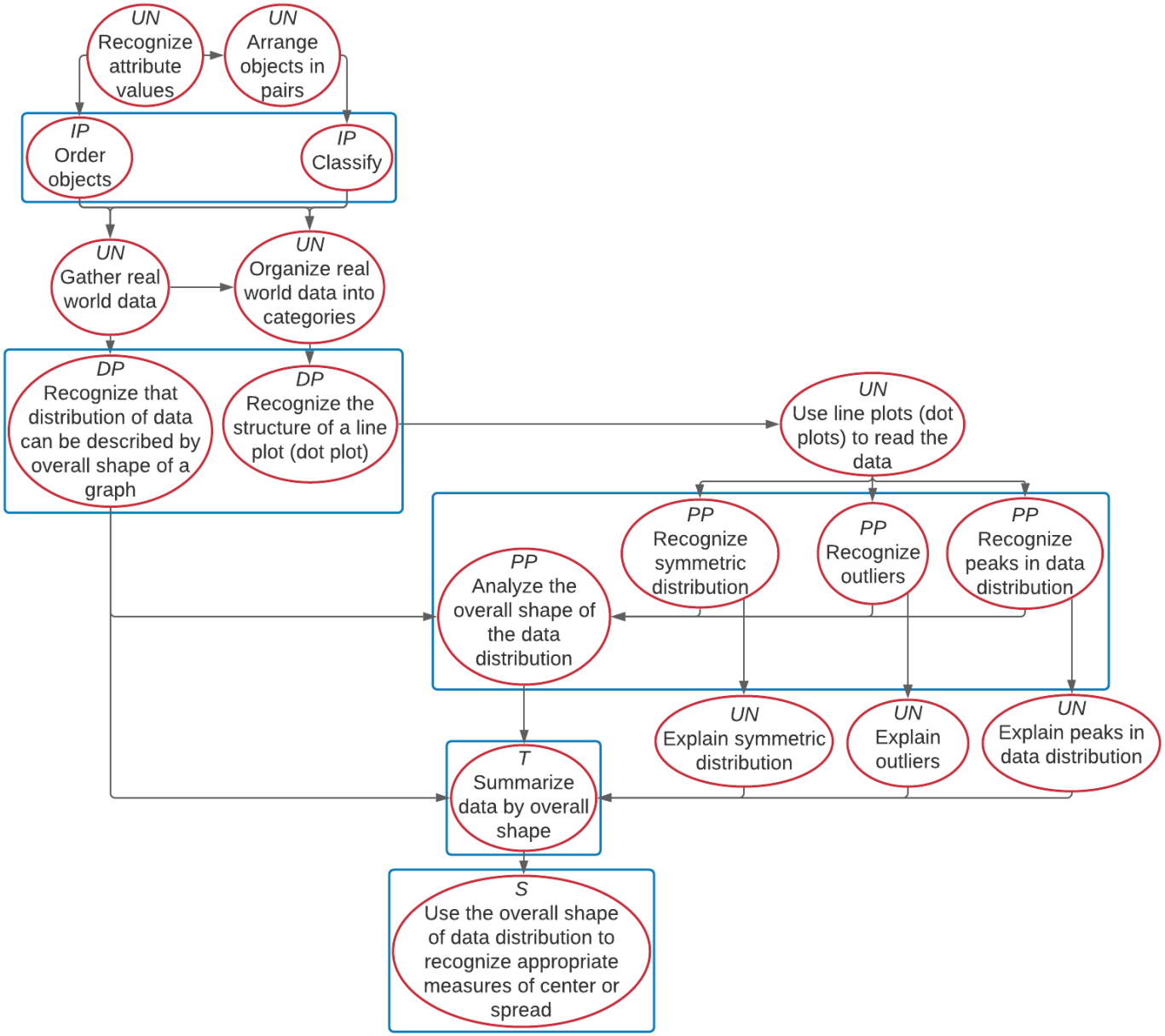
Students can actively participate in the creation of graphs and line plots by placing representations, x's, or dots for each response to the research question. When the graph or line plot is complete, the educator will encourage students to use their core vocabulary to describe the overall shape of the data and will also demonstrate the description (e.g., up, not up, same).

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.6.SP.5 Summarize data distributions shown in graphs or tables.



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.6.EE.1-2

Subject: Mathematics
Expressions and Equations (EE)
Grade: 6

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.6.EE.1-2 Identify equivalent number sentences.	**M.6.EE.1** Write and evaluate numerical expressions involving whole-number exponents. **M.6.EE.2** Write, read, and evaluate expressions in which letters stand for numbers.

Linkage Level Descriptions

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
Combine two or more sets of objects to form a new set. Compare two or more sets containing objects to communicate whether a set has the same, different, or an equal number of objects than the other set.	Demonstrate understanding of addition by combining the objects of two or more sets, and demonstrate understanding of subtraction by removing some objects from a larger set.	Represent addition or subtraction word problems or models with equations (e.g., 8 marbles + 3 marbles = 11 marbles). Recognize that the unknown quantity in an equation is represented using a symbol or letter (e.g., 5 + *b* = 8).	Recognize a numerical expression that is equivalent to a given expression (e.g., 3 + 4 + 5 is equivalent to 4 + 3 + 5). Evaluate an equation to be true or false by determining whether the numerical value on both sides of an equation is the same or different (e.g., analyze whether 5 + 7 = 8 + 4).	Recognize equivalent expressions by applying commutative and associative properties of addition (e.g., the expression 5 + 8 is equal to 8 + 5 due to the commutative property of addition).

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

How is the Initial Precursor related to the Target?

Understanding how to evaluate equations and recognize equivalent expressions 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. The educator presents a set, labels it (e.g., two balls, one marker, three CDs), counts the items, labels it again, and encourages students to use numbers to label and count the separate sets. Then, combine the sets, give it a new label, and count the set.

NOTE: Educators can work on the Initial Precursor level using the sets of numbers that students are working with.

How is the Distal Precursor related to the Target?

As students begin to understand labeling and counting small sets, they begin to use the number sequence, and students become more adept at tracking individual objects and can recognize when items are added to a set or when items are taken away. Work on this skill using a variety of sets, labeling and counting the set, and moving items in and out of the set labeling and counting the set again.

NOTE: Educators can work on the Distal Precursor level using the sets of numbers that students working at the Target level are working with.

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.6.EE.1-2 Identify equivalent number sentences.

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Mini-Map for M.EE.6.EE.3

Subject: Mathematics
Expressions and Equations (EE)
Grade: 6

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.6.EE.3 Apply the properties of addition to identify equivalent numerical expressions.	**M.6.EE.3** Apply the properties of operations to generate equivalent expressions.

Linkage Level Descriptions

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
Combine two or more sets of objects to form a new set. Compare two or more sets containing objects to communicate whether a set has the same, different, or an equal number of objects than the other set.	Represent addition or subtraction word problems or models with equations (e.g., 8 marbles + 3 marbles = 11 marbles). Recognize that the unknown quantity in an equation is represented using a symbol or letter (e.g., 5 + *b* = 8).	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. Evaluate an equation to be true or false by determining whether the numerical value on both sides of an equation is the same or different (e.g., analyze whether 5 + 7 = 8 + 4).	Create equivalent expressions by applying commutative and associative properties of addition (e.g., the expression 5 + 8 is equal to 8 + 5 due to the commutative property of addition).	Recognize or generate an equivalent expression involving addition or subtraction operations using commutative and associative properties of addition and multiplication [e.g., recognize that the expression (8 + 6) x 5 is equivalent to 5 x (6 + 8)].

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

How is the Initial Precursor related to the Target?

Understanding how to evaluate equations and using the properties of addition to create equivalent expressions 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. The educator presents a set, labels it (e.g., two balls, one marker, three CDs), counts the items, labels it again, and encourages students to use numbers to label and count the separate sets. Then, combine the sets, give it a new label, and count the set.

NOTE: Educators can work on the Initial Precursor level using the sets of numbers that students working at the Target level are adding and subtracting.

How is the Distal Precursor related to the Target?

As students begin to understand labeling and counting small sets, they begin to use the number sequence and become more adept at tracking individual objects. Work on this skill using a variety of sets, labeling and counting the sets, and moving items in and out of the sets, labeling and counting the set again. Additionally, the educators will pair those sets with the symbolic representations for addition and subtraction (e.g., 3 + 2 = ?, 3 - 2 = ?).

NOTE: Educators can work on the Distal Precursor level using the sets of numbers that students working at the Target level are adding and subtracting.

Instructional Resources

Released Testlets
See the Guide to Practice Activities and Released Testlets.
Using Untested (UN) Nodes
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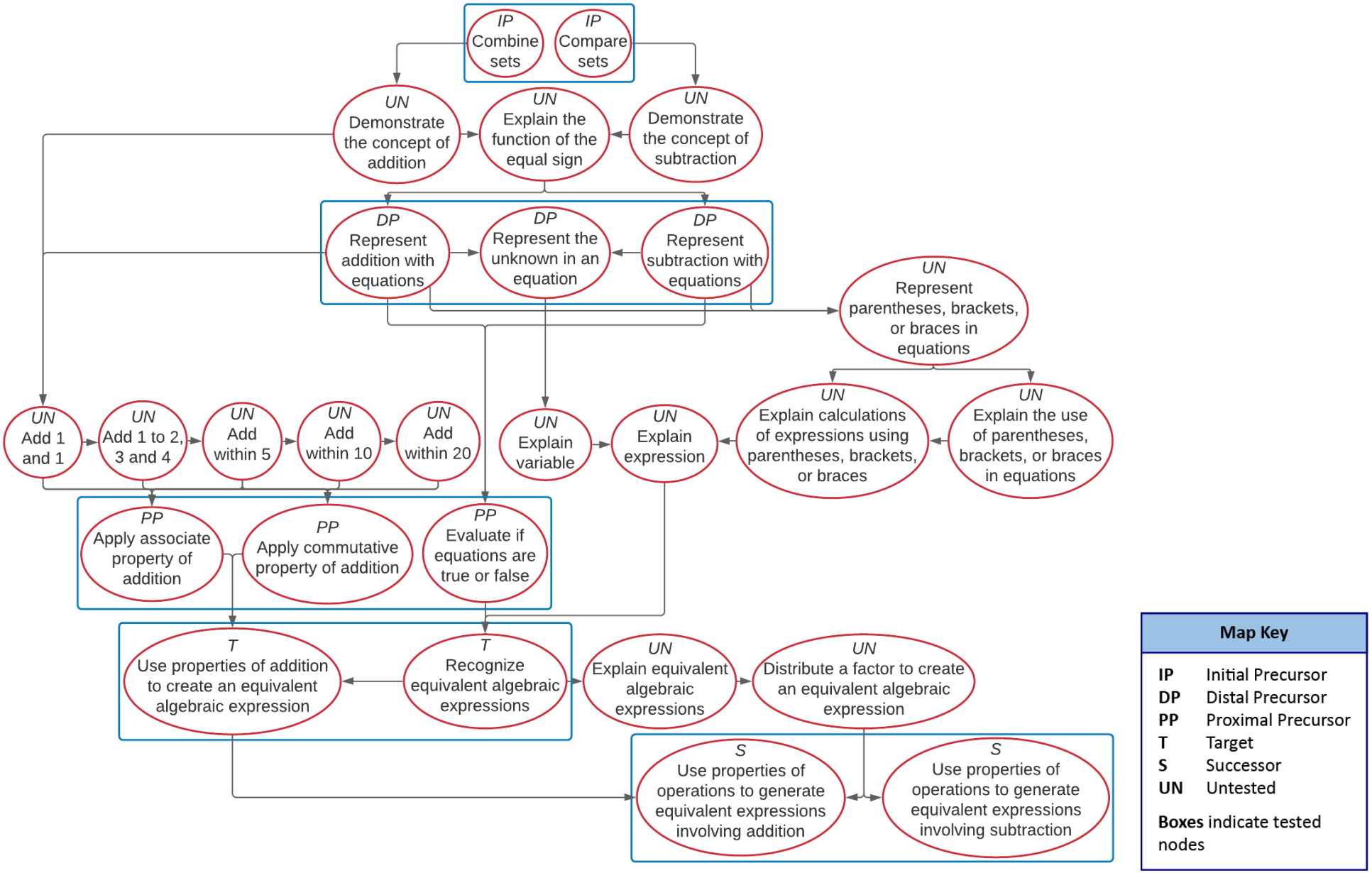
M.EE.6.EE.3 Apply the properties of addition to identify equivalent numerical expressions.



Mini-Map for M.EE.6.EE.5-7

Subject: Mathematics
Expressions and Equations (EE)
Grade: 6

Learning Outcome

DLM Essential Element	Grade-Level Standard
M.EE.6.EE.5-7 Match an equation to a real-world problem in which variables are used to represent numbers.	**M.6.EE.5** Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true. **M.6.EE.6** Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set. **M.6.EE.7** Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers.

Linkage Level Description

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
Combine two sets of objects to form a new set. Divide objects in a set into two or more subsets.	Represent addition or subtraction word problems or models with equations (e.g., representing 6 marbles plus 2 marbles equal 8 marbles as 6 + 2 = 8 marbles).	Represent expressions using variables and numbers (e.g., express subtract k from 12 as 12 - k). Recognize that the unknown quantity in an equation is represented using a symbol or letter (e.g., 5 + b = 8).	Represent a given real-world problem (e.g., Joe has 6 markers. Joe has some crayons. Joe has a total of 10 art supplies. How many crayons does Joe have?) with a mathematical equation (e.g., 6 + x = 10).	Solve real-world problems with non-negative rational numbers by representing the situation with a mathematical equation (e.g., Mark has 3.5

Initial Precursor	Distal Precursor	Proximal Precursor	Target	Successor
				inches of string. Mark gets 1 more inch of string. Which equation shows how much string Mark has all together? $3.5 + 1 = x$).

Initial Precursor and Distal Precursor Linkage Level Relationships to the Target

How is the Initial Precursor related to the Target?

The knowledge needed to solve addition and subtraction real-world problems links back to an understanding of how to create sets, but it also requires learning to manipulate sets (i.e., combining and separating or partitioning). Provide students many 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, and separate them again based on another characteristic. Guide students to notice how the set size changes each time the educator combines or partitions the sets.

How is the Distal Precursor related to the Target?

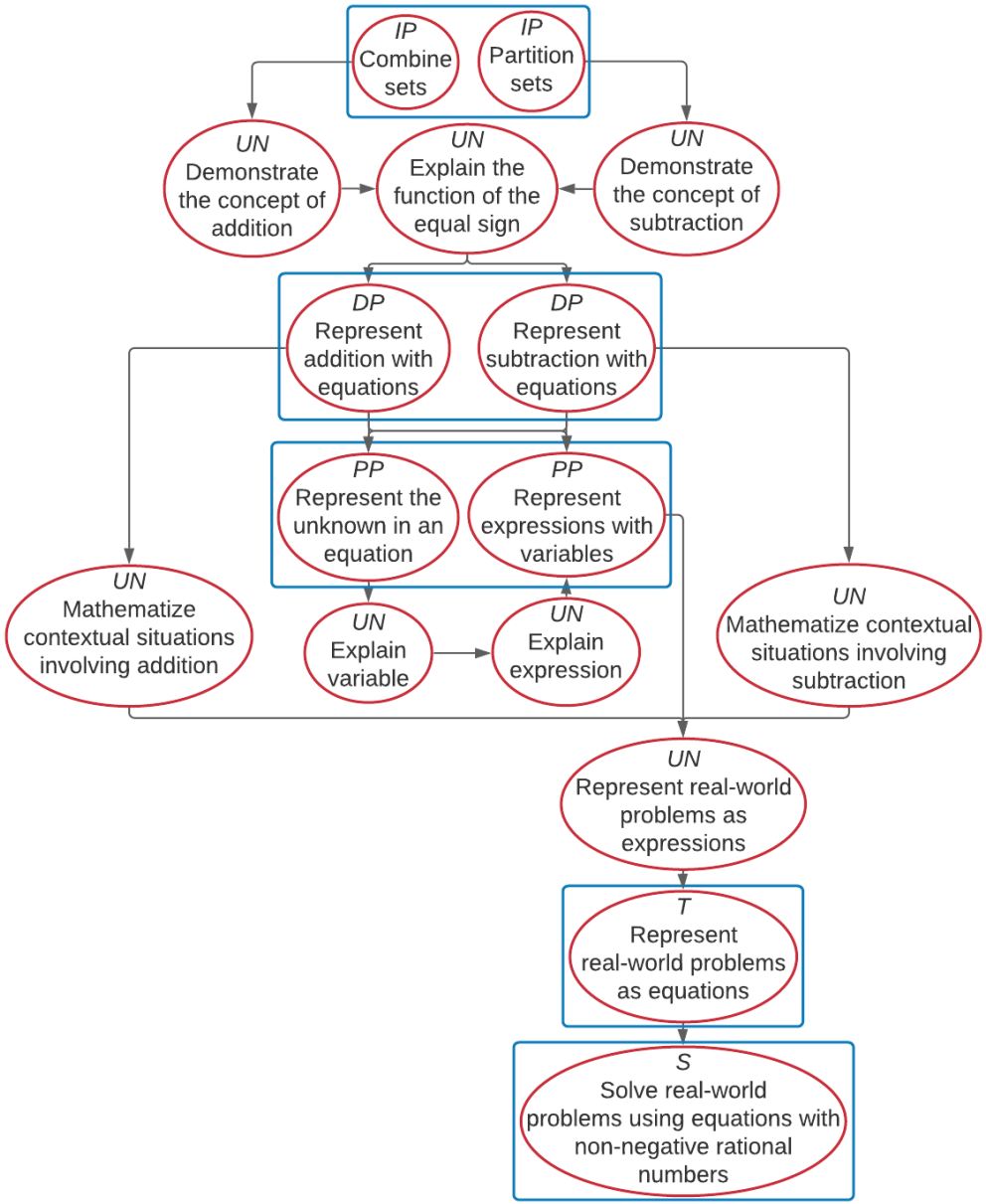
As student understanding of combining and partitioning sets increases, educators should take care to use the words "addition" and "subtraction" while defining and demonstrating their meanings and as students combine and partition sets. While students do not need to say the words, they do need to learn the meanings. Educators provide lessons that help students represent addition and subtraction in multiple ways (e.g., using objects, fingers, drawings, sounds, acting out situations, and writing equations).

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.6.EE.5-7 Match an equation to a real-world problem in which variables are used to represent numbers.



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