# ESSENTIAL ELEMENT, LINKAGE LEVELS, AND MINI-MAP

**MATH: GRADE 6**

**M.EE.6.RP.1**

<table>
<thead>
<tr>
<th>Grade-Level Standard</th>
<th>DLM Essential Element</th>
<th>Linkage Levels</th>
</tr>
</thead>
</table>
| M.6.RP.1 Understand the concept of a ratio, and use ratio language to describe a ratio relationship between two quantities. For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes." | M.EE.6.RP.1 Demonstrate a simple ratio relationship | Initial Precursor  
- Recognize wholeness  
- Recognize a unit  
- Recognize parts of a given whole or a unit  

Distal Precursor  
- Model equal part  

Proximal Precursor  
- Partition any shape into equal parts  
- Explain unit fraction  
- Recognize fraction  

Target  
- Recognize many to 1 ratio  
- Represent many to 1 ratio  

Successor  
- Recognize many to many ratio  

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<table>
<thead>
<tr>
<th>How is the Initial Precursor related to the Target?</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial Precursor:</strong> 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.</td>
<td><strong>Distal Precursor:</strong> As students begin to recognize whole objects or shapes and parts of objects or shapes, they can move toward building and taking apart shapes.</td>
</tr>
<tr>
<td>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.</td>
<td>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.</td>
</tr>
</tbody>
</table>

A diagram showing the relationship of nodes in the mini-map appears below.

**Key to map codes in upper right corner of node boxes:**

- IP Initial Precursor
- SP Supporting
- DP Distal Precursor
- S Successor
- PP Proximal Precursor
- UN Untested
- T Target
M.EE.6.RP.1 Demonstrate the simple ratio relationship
### M.EE.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

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| M.6.NS.1             | M.EE.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 | **Initial Precursor**
  - Recognize wholeness
  - Recognize a unit
  - Recognize parts of a given whole or unit

|                      |                       | **Distal Precursor**
|----------------------|-----------------------|  - Model equal part
  - Partition any shape into equal parts

|                      |                       | **Proximal Precursor**
|----------------------|-----------------------|  - Recognize fraction
  - Explain unit fraction
  - Recognize numerator
  - Recognize denominator

|                      |                       | **Target**
|----------------------|-----------------------|  - Explain relationships between unit fractions

|                      |                       | **Successor**
|----------------------|-----------------------|  - Explain numerator
  - Explain denominator
  - Compare fractions using models
  - Decompose a fraction into a sum of unit fractions with the same denominator
  - Add fractions with common denominators

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<td><strong>Initial Precursor:</strong> In order to compare unit fractions, students need to gain experience with parts and wholes. This concept can be taught in every area of mathematics (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).</td>
<td><strong>Distal Precursor:</strong> As students begin to develop the understanding of sets and numbers, educators highlight the differences between sets on the basis of overall area or discrete number using the words &quot;more,&quot; &quot;less,&quot; and &quot;equal.&quot; Provide students with multiple opportunities to count and compare a wide variety of sets with an increasing number of items, label the sets (e.g., 8 balls, 12 bears, 15 blocks), and move items in and out of the sets, labeling and counting them again (e.g., &quot;You just said this set has 11 cubes; if I take two cubes, how many will you have?&quot;). Being able to partition shapes requires students 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.</td>
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</tbody>
</table>

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<td>Distal Precursor</td>
</tr>
<tr>
<td>PP</td>
<td>Proximal Precursor</td>
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<td>S</td>
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<td>SP</td>
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<td>UN</td>
<td>Untested</td>
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<td>T</td>
<td>Target</td>
</tr>
</tbody>
</table>
M.EE.6.NS.1 Compare the relationships between two unit fractions
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</tr>
</thead>
</table>
| **M.6.NS.5** Understand that positive and negative numbers are used together to     | **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) | **Initial Precursor**<br>• Recognize separateness<br>• Recognize set<br>**Distal Precursor**<br>• Count all objects in a set or subset<br>• Recognize different number of<br>• Recognize same number of<br>• Recognize fewer number of<br>• Recognize more number of
<p>| 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; |                                                                                         | <strong>Proximal Precursor</strong>&lt;br&gt;• recognize opposite numbers&lt;br&gt;<strong>Target</strong>&lt;br&gt;• Use positive and negative numbers in real-world contexts&lt;br&gt;<strong>Successor</strong>&lt;br&gt;• Relate the meaning of 0 to positive and negative numbers in real-world contexts&lt;br&gt;• Explain inequalities from real world contexts |
| <strong>M.6.NS.6</strong> 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; |                                                                                         |                                                                                                                                             |
| <strong>M.6.NS.7</strong> Understand ordering and absolute value of rational numbers;            |                                                                                         |                                                                                                                                             |
| <strong>M.6.NS.8</strong> 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 |                                                                                         |                                                                                                                                             |</p>
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<tr>
<td><strong>Initial Precursor:</strong> 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.</td>
<td><strong>Distal Precursor:</strong> As students begin to develop the understanding of sets and numbers, educators highlight the differences between sets on the basis of overall area or discrete number using the words &quot;same,&quot; &quot;different,&quot; &quot;fewer,&quot; and &quot;more.&quot; 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., 8 balls, 12 bears, 15 blocks), then move items in and out of the sets, labeling and counting them again (e.g., &quot;You just said this set has 11 cubes; if I take two cubes, how many will you have?&quot;).</td>
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- **UN** Untested
- **T** Target
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).
<table>
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<th>Grade-Level Standard</th>
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<tbody>
<tr>
<td>M.6.NS.2 Fluently divide multi-digit numbers using the standard algorithm</td>
<td>M.EE.6.NS.2 Apply the concept of fair share and equal shares to divide</td>
<td>Initial Precursor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Recognize separateness</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Recognize set</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Recognize subset</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Distal Precursor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Partition sets</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Partition sets into equal subsets</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Proximal Precursor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Explain repeated subtraction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Represent repeated subtraction with an equation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Represent repeated subtraction with a model</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Target</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Demonstrate the concept of division</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Successor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Divide by 1, 2, 3, 4, 5, or 10</td>
</tr>
</tbody>
</table>

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<tr>
<td><strong>Initial Precursor:</strong> In order to understand division, students must learn to organize items into groups or 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 and music I don’t like; red fidgets and black fidgets). As students become more comfortable 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.</td>
<td><strong>Distal Precursor:</strong> As students’ understanding of labeling and counting sets develops, they 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 students would place a cup on the table for each available chair) and taking equal shares away (subtracting) from each person, object, or space. Educators 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, they can make 3 equal sets, so there are 3 teams.</td>
</tr>
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M.EE.6.NS.2 Apply the concept of fair share and equal shares to divide.
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<tbody>
<tr>
<td>M.6.NS.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation</td>
<td>M.EE.6.NS.3 Solve two factor multiplication problems with products up to 50 using concrete objects and/or a calculator</td>
<td><strong>Initial Precursor</strong>&lt;br&gt;• Recognize separateness&lt;br&gt;• Recognize set&lt;br&gt;• Recognize subset&lt;br&gt;<strong>Distal Precursor</strong>&lt;br&gt;• Explain repeated addition&lt;br&gt;• Represent repeated addition with an equation&lt;br&gt;• Solve repeated addition problems&lt;br&gt;<strong>Proximal Precursor</strong>&lt;br&gt;• Demonstrate the concept of multiplication&lt;br&gt;<strong>Target</strong>&lt;br&gt;• Multiply by 1, 2, 3, 4, and/or 5&lt;br&gt;<strong>Successor</strong>&lt;br&gt;• Apply the relationship between multiplication and division&lt;br&gt;• Divide by 1, 2, 3, 4, and/or 5</td>
</tr>
</tbody>
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### How is the Initial Precursor related to the Target?

**Initial Precursor:** In order to solve multiplication problems, students must learn to organize items into groups or 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 and music I don’t like; red fidgets and black fidgets). As students become more comfortable 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?

**Distal Precursor:** As students’ understanding of labeling and counting sets develops, they begin working on adding items to a set and combining sets to create a new set. Additionally, students 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 students 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 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 also learn to represent the problem in writing (e.g., students are shown 4 equal sets each with 2 counters. The students then count the first set and write a 2 or indicate 2, then write or indicate the plus sign. The students repeat for all 4 sets and then indicate the equal sign and solve the problem).

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M.EE.6.NS.3 Solve two factor multiplication problems with products up to 50 using concrete objects and/or a calculator
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| 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 | M.EE.6.G.1 Solve real-world and mathematical problems about area using unit squares | **Initial Precursor**  
- Recognize some  
- Recognize separateness  

**Distal Precursor**  
- Explain unit square  
- Explain area  

**Proximal Precursor**  
- Calculate area by counting unit squares  
- Calculate area of a rectangle with tiling  

**Target**  
- Solve word problems involving area of rectangles  

**Successor**  
- Relate tiling and formula as methods for calculating area of a rectangle  
- Calculate area for rectangles with formula  

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<td><strong>Initial Precursor:</strong> 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.”</td>
<td><strong>Distal Precursor:</strong> 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).</td>
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</table>
M.EE.6.G.1 Solve real-world and mathematical problems about area using unit squares
### Essential Element, Linkage Levels, and Mini-Map

**Math: Grade 6**

**M.EE.6.G.2**

<table>
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<th>Grade-Level Standard</th>
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</table>
| 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 | M.EE.6.G.2 Solve real-world and mathematical problems about volume using unit cubes | **Initial Precursor**  
- Recognize separateness  
- Recognize enclosure  

**Distal Precursor**  
- Explain volume  
- Explain a unit cube  
- Explain volume as a composition of cube units  

**Proximal Precursor**  
- Calculate volume by counting unit cubes  
- Calculate volume of a right rectangular prism by packing unit cubes  

**Target**  
- Solve word problems involving volume of rectangular prisms  

**Successor**  
- Calculate volume of right rectangular prisms with formula
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial Precursor</strong>: 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.</td>
<td><strong>Distal Precursor</strong>: 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 and fingers to estimate length, blocks, or squares for area and sand and 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.</td>
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M.EE.6.G.2  Copyright © 2020 University of Kansas Center for Research. All rights reserved.  2 of 3
M.EE.6.G.2 Solve real-world and mathematical problems about volume using unit cubes
**Grade-Level Standard**

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.

<table>
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</thead>
</table>
| **M.EE.6.SP.5** Summarize data distributions shown in graphs or tables | **Initial Precursor**
- Classify
- Order objects
**Distal Precursor**
- Recognize that distribution of data can be described by overall shape of a graph
- Recognize the structure of a line plot (dot plot)
**Proximal Precursor**
- Recognize outliers
- Recognize peaks in data distribution
- Recognize symmetric distribution
- Analyze the overall shape of the data distribution
**Target**
- Summarize data by overall shape
**Successor**
- Use the overall shape of data distribution to recognize appropriate measures of center or spread

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### How is the Initial Precursor related to the Target?

**Initial Precursor:** 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?

**Distal Precursor:** 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).

A diagram showing the relationship of nodes in the mini-map appears below.

*Key to map codes in upper right corner of node boxes:*

- IP: Initial Precursor
- SP: Supporting
- DP: Distal Precursor
- S: Successor
- PP: Proximal Precursor
- UN: Untested
- T: Target
M.EE.6.SP.5 Summarize data distributions shown in graphs or tables
# Essential Element, Linkage Levels, and Mini-Map

## Math: Grade 6

### M.EE.6.EE.1-2

<table>
<thead>
<tr>
<th>Grade-Level Standard</th>
<th>DLM Essential Element</th>
<th>Linkage Levels</th>
</tr>
</thead>
</table>
| **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 | **M.EE.6.EE.1-2** Identify equivalent number sentences | **Initial Precursor**  
• Combine sets  
• Compare sets  
**Distal Precursor**  
• Demonstrate the concept of addition  
• Demonstrate the concept of subtraction  
**Proximal Precursor**  
• Represent addition with equations  
• Represent the unknown in an equation  
• Represent subtraction with equations  
**Target**  
• Evaluate if equations are true or false  
• Recognize equivalent algebraic expressions  
**Successor**  
• Use properties of addition to create an equivalent algebraic expression |

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<table>
<thead>
<tr>
<th>How is the Initial Precursor related to the Target?</th>
<th>How is the Distal Precursor related to the Target?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial Precursor:</strong> 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.</td>
<td><strong>Distal Precursor:</strong> 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.</td>
</tr>
<tr>
<td>NOTE: Educators can work on the Initial Precursor level using the sets of numbers that students working with.</td>
<td>NOTE: Educators can work on the Distal Precursor level using the sets of numbers that students working at the Target level are working with.</td>
</tr>
</tbody>
</table>

A diagram showing the relationship of nodes in the mini-map appears below.

*Key to map codes in upper right corner of node boxes:*

- **IP** Initial Precursor
- **DP** Distal Precursor
- **PP** Proximal Precursor
- **SP** Supporting
- **S** Successor
- **UN** Untested
- **T** Target
M.EE.6.EE.1-2 Identify equivalent number sentences
**Grade-Level Standard** | **DLM Essential Element** | **Linkage Levels**  
---|---|---  
**M.6.EE.3** Apply the properties of operations to generate equivalent expressions. For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y | **M.EE.6.EE.3** Apply the properties of addition to identify equivalent numerical expressions |  
**Initial Precursor**  
- Compare sets  
- Combine sets  
**Distal Precursor**  
- Represent the unknown in an equation  
- Represent subtraction with equations  
- Represent addition with equations  
**Proximal Precursor**  
- Evaluate if equations are true or false  
- Apply associative property of addition  
- Apply commutative property of addition  
**Target**  
- Recognize equivalent algebraic expressions  
- Use properties of addition to create an equivalent algebraic expression  
**Successor**  
- Use properties of operations to generate equivalent expressions involving addition  
- Use properties of operations to generate equivalent expressions involving subtraction  

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<tr>
<td><strong>Initial Precursor:</strong> 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.</td>
<td><strong>Distal Precursor:</strong> 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 = ?)).</td>
</tr>
</tbody>
</table>

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.

A diagram showing the relationship of nodes in the mini-map appears below.

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<td>Untested</td>
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</tbody>
</table>

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.
M.EE.6.EE.3 Apply the properties of addition to identify equivalent numerical expressions
### Grade-Level Standard

- **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.

### DLM Essential Element

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

### Linkage Levels

- **Initial Precursor**
  - Partition sets
  - Combine sets
- **Distal Precursor**
  - Represent subtraction with equations
  - Represent addition with equations
- **Proximal Precursor**
  - Represent expressions with variables
  - Represent the unknown in an equation
- **Target**
  - Represent real-world problems as equations
- **Successor**
  - Solve real-world problems using equations with non-negative rational numbers

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### How is the Initial Precursor related to the Target?

**Initial Precursor:** 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?

**Distal Precursor:** 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).

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