Minnesota Early Childhood Indicators of Progress

Mathematics - Cognitive

Components M1-6: Number Knowledge

M1 Rote counting: The child attends to sequences and use of number words, with or without items, sets, or numerals and without recognizing the link to quantity M1

0-1 years

M1.1 Releases one item to reach for another M1.1

M1.2 Uses body language to indicate a desire for more M1.2

1-2 years

M1.3 Imitates use of at least one number word M1.3

M1.4 Imitates counting M1.4

2-3 years

M1.5 Recites number words but not necessarily in the correct order M1.5

M1.6 Recites number words correctly, up to 3 M1.6

M1.7 Names familiar numerals M1.7

3-4 years

M1.8 Shows interest in counting or number oriented play, and notices numbers in the environment during free play M1.8

M1.9 Orders a few objects by size with assistance M1.9

M1.10 Recites number words in the correct sequence up to 10 M1.10

M1.11 Recognizes when others make errors in the number word sequence M1.11

M1.12 Points to objects while reciting number word sequence M1.12

M1.13 Begins to write number-like forms M1.13

4-5, K-Readiness

M1.14 Recites number word aloud, forward, up to at least 29 (allow for some mistakes), without objects M1.14

M1.15 Recites number words aloud, backward, down from at least 10 without objects M1.15

M1.16 Is able to name the next number word for numbers up to 9 M1.16

M1.17 Reads and writes numerals from 0 to 10, with some reversals possible M1.17

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Meaningful Counting: The child uses counting to identify how many items are in a set, using one to one correspondence; uses number words to identify "how

many” M2

2-3 years

M2.1 Imitates one to one correspondence M2.1

3-4 years

M2.2 Correctly uses 1:1 correspondence up to 4 items M2.2

4-5, K-Readiness

M2.3 Demonstrates and uses 1:1 correspondence with sets larger than four M2.3

M3 Cardinality: The child associates each of one or more number words to a unique and exact quantity, and knows that the final number word used when counting out an item set represents the exact number of items in the set M3

1-2 years

M3.1 Responds to request to give a small quantity items (one, two) M3.1

2-3 years

M3.2 Gives 1 item correctly, upon request M3.2

M3.3 Gives 2 items or more upon request for 2, inconsistently M3.3

3-4 years

M3.4 Gives exactly 4 consistently when asked M3.4

4-5, K-Readiness

M3.5 Gives 5 or more items correctly and consistently when asked M3.5

M4 Ordinality: The child matches symbols (digits or numerals) to a position in a sequence M4

2-3 years

M4.1 Identifies first or second item in a sequence, upon request M4.1

3-4 years

M4.2 Uses terms like first; most; last; before, to refer to ordinal position M4.2

4-5, K-Readiness

M4.3 Recognizes that a number can be used to represent a position in a sequence M4.3

M5 Comparing numbers and quantities: The child uses organizing strategies to know how many objects they have M5

0-1 years

M5.1 Grasps one object and reaches for another M5.1

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1-2 years

M5.2 Demonstrates understanding of some descriptive words, such as responding to questions M5.2

M5.3 Separates a few items into groups using own method such as color, size, etc. M5.3

M5.4 Nests smaller objects inside larger objects M5.4

2-3 years

M5.5 Compares two sets of up to 4 objects accurately using terms like more/ less; a little/a lot M5.5

3-4 years

M5.6 Uses terms like more/less; bigger/ smaller; a little bit/a lot; to refer to approximate quantities M5.6

4-5, K-Readiness

M5.7 Verbally estimates quantities without counting, although inconsistently and allowing for mistakes M5.7

M6 Relation and operations: The child can create a set or subset based on a rule, can combine or separate sets, and recognize the amount of items in a set does not change when the set arrangement changes M6

3-4 years

M6.1 Notices when the quantity of a set of up to 4 objects has increased or decreased M6.1

4-5, K-Readiness

M6.2 States the number that comes next or before up to 5 M6.2

M6.3 Understands that a quantity changes (increases or decreases) when a set of objects is added to/ subtracted from (respectively) M6.3

Components M1-6: Number Knowledge

M7 Measurement: Child recognizes and makes comparisons of measurable attributes (length, height, width, area, volume, physical distance, time duration.) M7

1-2 years

M7.1 Experiments with “full” and “empty” M7.1

M7.2 Orders a few objects by size with assistance M7.2

2-3 years

M7.3 Brings objects closer together to compare them M7.3

M7.4 Imitates using an object to measure another object M7.4

M7.5 Identifies which of two small sets (less than 4) is more upon request M7.5

M7.6 Uses language to describe “full” and “empty” M7.6

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3-4 years

M7.7 Shows understanding of measurement terms (longer/ shorter, taller/ shorter, fullest, farthest, closest) M7.7

M7.8 Uses terms like more/less; a little bit; a lot; to refer to continuous properties like water, sand, height M7.8

4-5, K-Readiness

M7.9 Compares and orders more than two items in some way M7.9

M7.10 Uses comparison vocabulary (longer/ shorter, taller/ shorter, farthest/ closest) M7.10

Component M8: Patterns

M8 Repeating patterns: The child can identify create and describe sequences in objects, colors or numbers with sequences that increase, decrease or grow in complexity M8

0-1 years

M8.1 Anticipates familiar routines M8.1

1-2 years

M8.2 Carries out familiar routines M8.2

M8.3 Follows a familiar simple pattern (sound, body movement sequence like Patty Cake) M8.3

2-3 years

M8.4 Follows an unfamiliar simple pattern (sound, body, color, size, movement) M8.4

3-4 years

M8.5 Recognizes repeating patterns M8.5

M8.6 Copies existing pattern with same materials M8.6

M8.7 Extends a simple pattern with the same materials M8.7

4-5, K-Readiness

M8.8 Uses words or pictures to describe a simple pattern M8.8

M8.9 Applies a simple pattern rule to different materials or mode (sound, body, color, size, movement) M8.9

M8.10 Copies complex patterns with same materials M8.10

M8.11 Applies a complex pattern rule using different materials or mode (sound, body, color, size, movement) M8.11

Components M9-11: Geometry and Spatial Thinking

M9 Knowledge and visualization of shapes: The child recognizes shapes, can describe 2 dimensional (2D) and 3 dimensional (3D) shapes and manipulate shapes with purpose. M9

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1-2 years

M9.1 Shows interest in shapes M9.1

2-3 years

M9.2 Begins to recognize 2 dimensional (2D) and 3 dimensional (3D) shapes such as circles, spheres, squares, and cubes, such as by sorting or puzzle pieces M9.2

3-4 years

M9.3 Points to familiar 2D and 3D shapes (circle, spheres, squares, cubes, triangles) when asked, thereby showing recognition of shape names M9.3

M9.4 Recognizes geometric shapes in the environment M9.4

4-5, K-Readiness

M9.5 Begins to describe the features (attributes) that define 2D and #D shapes, including sides and corners M9.5

M9.6 Puts together (composes) and takes apart (decomposes) shapes M9.6

M9.7 Composes and decomposes shapes/ constructions with increasing complexity M9.7

M10 Transformations and symmetry: The child can locate and manipulate shapes in space M10

0-1 years

M10.1 Attends and responds to moving objects and sounds, relative to themselves M10.1

1-2 years

M10.2 Develops increasing ability to change positions and move body from place to place M10.2

M10.3 Demonstrates awareness of relationship between over and under, up and down, in and out M10.3

2-3 years

M10.4 Adjusts position and movement of own body relative to objects M10.4

M10.5 Explores how objects fit together in space M10.5

M10.6 Rotates objects to fit through holes M10.6

3-4 years

M10.7 Rotates, flips, or turns an object to fit once they realize object doesn't fit a defined space M10.7

4-5, K-Readiness

M10.8 Puts together (composes) and takes apart (decomposes) shapes to create new shapes M10.8

M10.9 Recognizes and creates shapes that have symmetry M10.9

M10.10 Shows awareness that an object needs to be rotated, flipped, or turned before trying to fit the object into a hole or puzzle M10.10

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M11 Location, spatial relationships and landmark use: The child recognizes where a person or object is in relation to other people of objects M11

0-1 years

M11.1 Shows preference for familiar toys M11.1

1-2 years

M11.2 Recognizes familiar objects from different vantage points M11.2

2-3 years

M11.3 With verbal cues, uses simple maps to relate to real- world M11.3

3-4 years

M11.4 Uses terms like near/far; under; below; front; middle; end M11.4

M11.5 Uses a simple map of a visible area to locate placement M11.5

4-5, K-Readiness

M11.6 Recognizes and describes position of objects in space with greater accuracy M11.6

M11.7 Draws a simple map M11.7

M11.8 Matches 2 dimensional (2D) map with surrounding 3 dimensional (3D) layout Include this: (involves transformation, scale, dimension, and orientation distance) M11.8

Component M12: Data Analysis

M12 Sorting: The child recognizes that objects can be sorted by attributes M12

0-1 years

M12.1 Recognizes differences among people and among different objects M12.1

1-2 years

M12.2 Matches items based on attributes meaningful to the child M12.2

2-3 years

M12.3 Explores sorting M12.3

M12.4 Imitates sorting M12.4

3-4 years

M12.5 Sorts objects based on an observable attribute M12.5

12.6 Demonstrates understanding that attributes are measurable 12.6

4-5, K-Readiness

M12.7 Describes the attribute used for sorting or comparing M12.7

M12.8 While sorting, can make a shift to change the attribute being used to sort and describe the new sorting attribute M12.8

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Collects, classifies, and organizes information: The child collects, classifies and organizes data based on distinguishing characteristics. M13

3-4 year

M13.1 Participates in simple data collection discussed by an adult or other child M13.1

M13.2 Collects information by one or more attribute M13.2

4-5, K-Readiness

M13.3 Participates as group member in the collection of data that is put on a chart or graph M13.3

M13.4 Sorts information by one or more attribute M13.4

M13.5 Independently collects data to put on a chart or graph M13.5

M14 Describes data: The child can describe data by using data sets to solve problems or asking questions. M14

3-4 year

M14.1 Identifies patterns, differences, or similarities of information collected M14.1

M14.2 Uses language to describe those patterns, differences or similarities of data M14.2

4-5, K-Readiness

M14.3 Uses language to compare data M14.3

M14.4 Uses data to answer questions and solve problems M14.4

M14.5 Discusses, compares and makes sense of collected data M14.5