MILE
Math Interactive Learning Experience

Strand: Number		
Conceptual Threads	**Errors**	**Remedies for Remediation** Refer to Activity Pages:
N1 Applying the principles of counting	Unable to say the number name sequence starting with 1 and moving forward.	⇒ Counting (12, 13, 16)
	Unable to coordinate number words with counting actions, by saying one word for each object (i.e., one-to-one correspondence/ tagging).	⇒ Counting (13, 14, 15)
	Unable to say the number name sequence backward from numbers to 10.	⇒ Counting (18, 20)
	Does not know that the last counting word tells "how many" objects in a set (i.e., cardinality).	⇒ Counting (16, 18)
	Unable to say the number name sequence forward through the teen numbers.	**Consider adapting an existing activity to remediate this error**
	Unable to create a set to match a verbal number or written numeral.	⇒ Counting (17, 19)
	Unable to say the number name sequences forward and backward from a given number.	**Consider adapting an existing activity to remediate this error**
	Does not know that rearranging objects in a set does not change the quantity (i.e., conservation of number).	⇒ Addition (2, 3, 4, 5, 6)
	Unable to use number patterns to bridge tens when counting forward and backward (e.g., 39, 40, 41).	⇒ Addition (7, 8)
	Unable to fluently skip-counts by factors of 10 (e.g., 2, 5, 10) and multiples of 10 from any given number.	⇒ Division (24)

	Unable to use number patterns to bridge hundreds when counting forward and backward (e.g., 399, 400, 401).	**Consider adapting an existing activity to remediate this error**
	Unable to fluently skip-count by factors of 100 (e.g., 20, 25, 50) and multiples of 100, from any given number.	**Consider adapting an existing activity to remediate this error**
N2 Recognizing and Writing Numerals	Unable to name, write, and match numerals to numbers and quantities to 10.	⇒ Counting (17, 19)
	Unable to name, write, and match two-digit numerals to quantities.	⇒ Addition (8) ⇒ Counting (17, 19)
	Unable to name, write, and match three-digit numerals to quantities.	⇒ Addition (9)
N3 Recognizing Quantities by Subitizing	Unable to instantly recognize quantities to 5 (i.e., perceptual subitizing).	⇒ 19 * Perhaps a variation of this activity is needed to make it perceptual. The activity as it stands is conceptual.
	Unable to use grouping (e.g., arrays of dots) to determine quantity without counting by ones (i.e., conceptual subitizing).	⇒ Addition (1) ⇒ Counting (16, 19)
N4 Comparing and Ordering Quantities (Multitude or Magnitude)	Does not understand how to perceptually compare quantities to determine more/less or equal quantities.	⇒ Graphs (34, 35, 36) ⇒ Measurement/Height/Length (44) ⇒ Multiplication (51) ⇒ Ordering (60)
	Does not know that each successive number is one more than the previous number (i.e., hierarchical inclusion).	⇒ Counting (16, 18, 20) ⇒ Ordering (59)
	Unable to compare (i.e., more/less/equal) and orders quantities to 10.	⇒ Counting (16) ⇒ Measurement/Height/Length (44) ⇒ Measurement-Quantity (47) ⇒ Measurement-Weight (51) ⇒ Ordering (60)

	Unable to use ordinal number names (e.g., first, second, third).	⇒ Ordering (61)
	Unable to add/remove object(s) to make a set equal to a given set.	⇒ Addition (3) ⇒ Measurement-Time (49)
	Does not know what number is one or two more and one or two less than another number.	**Consider adapting an existing activity to remediate this error**
	Unable to compare and order quantities and written numbers using benchmarks (e.g., comparing values of coins and bills).	⇒ Ordering (59, 61)
	Does not understand how to determine how many more/less one quantity is compared to another.	⇒ Ordering (59) ⇒ Patterns (66)
	Unable to order three or more quantities to 20 using sets and/or numerals.	**Consider adapting an existing activity to remediate this error**
	Does not know how to determine and describe the relative position of objects using ordinal numbers.	⇒ Addition (18)
	Unable to use ordinal numbers in context (e.g., days on a calendar: the 3rd of March).	**Consider adapting an existing activity to remediate this error**
	Unable to order three or more quantities using sets and/or numerals.	⇒ Addition (18)
N5 Estimating Quantities and	Unable to estimate small quantities of objects (to 10) of the same size.	⇒ Addition (4) ⇒ Measurement-Height/Length (46)

Numbers	Unable to use relevant benchmarks to compare and estimate quantities (e.g., more/less than 10).	⇒ Counting (18)
	Unable to use relevant benchmarks (e.g., multiples of 10) to compare and estimate quantities.	⇒ Division (22)
	Unable to estimate large quantities using visual strategies (e.g., arrays).	**Consider adapting an existing activity to remediate this error**
N6 Decomposing Wholes into Parts and Composing Wholes from Parts	Unable to decompose/compose quantities to 5.	⇒ Addition (1, 2)
	Unable to decompose quantities to 10 into parts and remembers the whole.	⇒ Addition (4, 6)
	Composes and decomposes quantities to 20.	⇒ Addition (4, 6) ⇒ Division (21, 22, 24) ⇒ Multiplication (52)
	Unable to compose two-digit numbers from parts (e.g., 14 and 14 is 28), and unable to decompose two-digit numbers into parts (e.g., 28 is 20 and 8).	⇒ Division (21, 22, 23, 24, 27, 28)
N7	Unable to compose teen numbers from units of ten and ones and decomposes teen numbers into units of ten with leftover ones.	⇒ Regrouping (78, 79)

Unitizing Quantities into Ones, Tens, and Hundreds (Place-Value Concepts)	Unable to bundle quantities into tens and ones.	⇒ Regrouping (78, 79)
	Unable to write, read, compose, and decompose two-digit numbers as units of tens and leftover ones.	⇒ Counting (7, 8, 9, 10, 11) ⇒ Division 23, 24, 25, 26, 27, 28
	Does not understand how to determine 10 more/less than a given number without counting.	**Consider adapting an existing activity to remediate this error**
	Unable to write, read, compose and decompose three-digit numbers using ones, tens, and hundreds.	⇒ Place Value (73, 74) ⇒ Subtraction (114, 115, 116)
N8 Unitizing Quantities and Comparing Units to the Whole (Place-Value Concepts)	Unable to partition into and skip-count by equal-sized units and does not recognize that the results will be the same when counted by ones (e.g., counting a set by 1s or by 5s gives the same result).	⇒ Counting (12, 15, 16, 18, 20) ⇒ Division (21)
	Does not recognize that, for a given quantity, increasing the number of sets decreases the number of objects in each set.	⇒ Counting (15, 16, 17, 20) ⇒ Division (23, 28)
	Unable to recognize or describe equal-sized sets as units within a larger set (doubling or tripling).	⇒ Counting (15, 16, 17, 20) ⇒ Division (22, 23, 24, 28) ⇒ Multiplication (55)
	Unable to keep track of how many sets and how many in each set (e.g., 5 sets of 3 objects).	⇒ Counting (13, 15, 16, 17, 18) ⇒ Division (21, 23, 24, 25, 26, 27, 28) ⇒ Multiplication (52, 54, 55)
	Unable to recognize number patterns in repeated units (e.g., when skip counting by 2s, 5s, 10s).	⇒ Counting (14, 15, 19) ⇒ Division (22, 24, 25) ⇒ Multiplication (55)

	Unable to partition whole into equal-sized units and is unable to identify the number of units and the size of, or quantity in, each unit.	⇒ Counting (16, 17, 18, 20) ⇒ Division (21, 22, 23, 27) ⇒ Multiplication (52)
N9 Partitioning Quantities to Form Fractions	Unable to visually compare fraction sizes and is unable to fractional amounts informally (e.g., halves).	⇒ Fractions (29, 30, 31, 32, 33)
	Unable to partition wholes into equal-sized parts to make fair shares or equal groups.	⇒ Fractions (29, 30)
	Unable to partition wholes (e.g., intervals, sets) into equal parts and is unable to name the unit fractions.	⇒ Fractions (29, 30)
	Unable to relate the size of parts to the number of equal parts in a whole (e.g., a whole cut into 2 equal pieces has larger parts than a whole cut into 3 equal pieces).	⇒ Fraction (30, 31, 32)
	Unable to compare unit fractions to determine relative size.	⇒ Fraction (29, 30, 31)
	Unable to count by unit fractions (e.g., counting by ¼).	**Consider adapting an existing activity to remediate this error**
	Unable to use fraction symbols to name fractional quantities.	⇒ Fractions (29, 30, 31, 32, 33)
	Unable to use the same unit fraction to build other fractions (e.g., 1/3 and 1/3 make 2/3).	⇒ Fractions (29, 30, 31, 32, 33)
	Unable to make the comparison between related fractions (e.g., same numerator, same denominator, unit fractions, familiar fractions) to determine more/less or equal.	⇒ Fractions (30, 31)
	Unable to partition a number line (from 0 to 1) into equal parts and names the parts using fractions.	⇒Number Line (58) All pages

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N10 Developing Conceptual Meaning of Addition and Subtraction	Unable to model add-to and take-from situations with quantities to 10.	⇒ Addition (1, 2) ⇒ Subtraction (106, 107, 108, 109)
	Unable to use symbols and equations to represent addition and subtraction situations.	⇒ Addition (1–11) All pages ⇒ Subtraction (106–116) All pages
	Unable to model or symbolize addition and subtraction problem types (i.e., join, separate, part-part-whole, and compare).	⇒ Addition (1–11) All pages ⇒ Place Value (73–74) All pages ⇒ Subtraction (106, 107, 108, 109)
	Unable to relate addition and subtraction as inverse operations.	⇒ Subtraction (107, 108, 109)
	Unable to use properties of addition and subtraction to solve problems (e.g., adding or subtracting 0, commutativity of addition).	⇒ Addition (5, 7, 8, 9, 10, 11) ⇒ Subtraction (111, 112, 113, 114, 115, 116)
N11 Developing Fluency of Addition and Subtraction Computation	Unable to fluently add and subtract within 5.	⇒ Addition (1, 3, 4_ ⇒ Number Line (58) All pages ⇒ Regrouping (75) ⇒ Subtraction (106, 108)
	Unable to fluently add and subtract with quantities to 10.	⇒ Addition (2, 4, 5, 6) ⇒ Number Line (58) All pages ⇒ Regrouping (76) ⇒ Subtraction (106, 108, 109, 110)
	Unable to fluently recall complements to 10 (e.g., 6 + 4; 7 + 3).	⇒ Addition (2, 4, 5, 6) ⇒ Number Line (58) All Pages ⇒ Regrouping (76, 77, 78) ⇒ Subtraction (106, 108, 109, 110)
	Unable to extend known sums and differences to solve other equations (e.g., using 5 + 5 to add 5 + 6).	⇒ Addition (5, 6)

	Unable to fluently add and subtract with quantities to 20.	⇒ Addition (5, 6) ⇒ Subtraction (111, 112, 113)
	Has not yet developed efficient mental strategies and algorithms to solve equations with multi-digit numbers.	⇒ Addition (5, 6, 7, 8, 9, 10, 11) ⇒ Place Value (73—74) All pages ⇒ Subtraction (112, 113, 114, 115, 116)
	Unable to estimate sums and differences of multi-digit numbers.	⇒ Addition (5, 6, 7, 8, 9, 10, 11) ⇒ Place Value (73—74) All pages ⇒ Regrouping (77, 78) ⇒ Subtraction (111, 112, 113, 114, 115, 116)
	Unable to fluently recall complements to 100 (e.g., 64 + 36; 73 + 27).	**Consider adapting an existing activity to remediate this error**
	Unable to model or solve equal sharing problems to 10.	⇒ Addition (2, 4) ⇒ Place Value (73—74) All pages
N12 Developing Fluency for Multiplication and Division Computation	Unable to fluently multiply and divide to 25.	⇒ Division (21—28) All pages ⇒ Multiplication (52—57) All pages

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Strand: Patterning and Algebra		
Conceptual Threads	**Errors**	**Remedies for Remediation** Refer to Activity Pages:
PA1 Identifying, Sorting, and Classifying Attributes and Patterns Mathematically (e.g., Number of Sides, Shape, Size)	Unable to identify different attributes of objects (e.g., buttons with different sizes, colours, shapes, number of holes).	⇒ Patterns (66, 72) ⇒ Shapes (80, 82, 83) ⇒ Sorting-Categorizing (86, 87, 88, 89, 90, 91, 93) ⇒ Sorting-Matching (96, 100)
	Unable to identify variations of an attribute (e.g., buttons can have 0, 2, or 4 holes).	⇒ Patterns (64, 69, 72) ⇒ Shapes (80, 82, 83) ⇒ Sorting-Categorizing (86, 91, 93) ⇒ Sorting-Same/Different (102, 105)
	Unable to sort a set of objects in different ways using a single attribute (e.g., buttons sorted by the number of holes or by shape).	⇒ Shapes (83)
	Unable to identify the sorting rule used to sort sets.	⇒ Patterns (64, 65, 66, 67, 68, 69, 70, 71, 72) ⇒ Shapes (82)
	Unable to record and symbolize attributes in different ways (e.g., using drawings, words, letters).	⇒ Shapes (81, 83) ⇒ Sorting-Categorizing (91, 92, 94) ⇒ Sorting-Same/Different (103, 104, 105)
	Unable to sort and classify objects with multiple attributes (e.g., big red 3-sided shape).	⇒ Patterns (63, 64, 65) ⇒ Shapes (81, 83) ⇒ Sorting-Categorizing (86, 91, 92, 93, 94)

		⇒ Sorting-Matching (98, 100, 101, 102)
	Unable to sort and classify repeating patterns based on the repeating patterns based on the repeating unit (core) (e.g., AAB, ABB).	⇒ Patterns (63, 64, 65, 67, 68, 69, 70, 71, 72) ⇒ Sorting-Matching (95)
	Unable to sort a set of objects based on two attributes (e.g., uses an if-else statement to sort objects: if more than 3 vertices, not a triangle).	**Consider adapting an existing activity to remediate this error**
PA2 Identifying, Reproducing, Extending, and Creating Patterns That Repeat	Unable to identify and reproduce repeating patterns by matching elements involving sounds, actions, shapes, objects, etc.	⇒ Patterns (63, 64, 65, 67, 68, 69, 70, 71, 72) ⇒ Sorting-Matching (95)
	Unable to extend repeating patterns. Unable to distinguish between repeating and non-repeating sequences.	⇒ Patterns (63, 64, 65, 67, 68, 69, 70, 71, 72) ⇒ Sorting-Matching (95)
	Unable to identify the repeating unit (core) of a pattern.	⇒ Patterns (63, 64, 65, 67, 68, 69, 70, 71, 72) ⇒ Sorting-Matching (95)
	Unable to predict missing element(s) and correct errors in repeating patterns.	⇒ Patterns (63, 64, 65, 67, 68, 69, 70, 71, 72)
	Unable to recognize similarities and differences between patterns.	⇒ Sorting-Matching (95)
	Unable to reproduce, create, and extend repeating patterns based on copies of the repeating unit (core).	⇒ Patterns (63, 64, 65, 67, 68, 69, 70, 71, 72) ⇒ Sorting-Matching (95)
	Unable to represent the same pattern in different ways (i.e., translating to different symbols, objects, sounds, actions, coding instructions).	⇒ Patterns (63, 64, 65, 67, 68, 69, 70, 71, 72) ⇒ Sorting-Matching (95)

	Unable to compare repeating patterns and unable to describe how they are alike and different.	⇒ Patterns (63, 64, 65, 67, 68, 69, 70, 71, 72) ⇒ Sorting-Matching (95)
	Unable to recognize, extend, and create repeating patterns based on two or more attributes (e.g., shape and orientation).	⇒ Patterns (63, 64, 65, 67, 68, 69, 70, 71, 72) ⇒ Sorting-Matching (95)
	Unable to use two or more attribute patterns to represent concurrent events in coding.	**Consider adapting an existing activity to remediate this error**
	Unable to identify the repeating unit of patterns in multiple forms (e.g., circular, 2-D, 3-D, coding).	⇒ Patterns (63, 64, 65, 67, 68, 69, 70, 71, 72) ⇒ Sorting-Matching (95)
PA3 Representing and Generalizing Increasing/Decreasing Patterns	Unable to identify and extend non-numeric increasing/decreasing patterns (e.g., jump-clap; jump-clap-clap; jump-clap-clap-clap, etc.).	**Consider adapting an existing activity to remediate this error** ⇒ Number Line (58) All pages
	Unable to identify and extend familiar number patterns and makes connections to addition (e.g., skip-counting by 2s, 5s, 10s).	⇒ Division (24) ⇒ Multiplication (52, 54, 55)
	Unable to identify, reproduce, and extend, increasing/decreasing patterns concretely, pictorially, and numerically using repeated addition or subtraction.	⇒ Patterns (63, 64, 65, 67, 68, 69, 70, 71, 72) ⇒ Sorting-Matching (95)
	Unable to extend number patterns and finds missing elements (e.g., 1,3,5,__,9,...).	⇒ Addition (4) ⇒ Measurement (39)
	Unable to create an increasing/decreasing pattern (concretely, pictorially, and/or numerically) and explains the pattern rule.	⇒ Patterns (63, 64, 65, 67, 68, 69, 70, 71, 72)

	Unable to generalize and explain the rule for arithmetic patterns including the starting point and change (e.g., for 28, 32, 36, the rule is start at 28 and add 4 each time).	⇒ Division (21) **Consider adapting an existing activity to remediate this error**
	Unable to extend and represent patterns involving simple multiplicative relationships (e.g., doubling: 1, 2, 4, 8, 16, …and tripling: 1, 3, 9, 27, 81, …).	⇒ Multiplication (54)
	Unable to represent one-step addition and subtraction functions with equations.	⇒ Addition (3, 4, 5, 6)
PA4 Understanding Equality and Inequality, Building on Generalized Properties of Numbers and Operations	Unable to compare sets to determine more/less or equal.	⇒ Sorting-Categorizing (91, 92, 93, 98) ⇒ Sorting-Matching (99, 100)
	Unable to create a set that is more/less or equal to a given set.	⇒ Sorting-Same/Different (101, 103, 105) ⇒ Graphs (34, 35, 36)
	Unable to model and describe equality (balance; the same as) and inequality (imbalance; not the same as).	⇒ Measurement-Weight (50)
	Unable to write equivalent addition and subtraction equations in different forms (e.g., 8 = 5+ 3; 3 + 5 = 8).	⇒ Subtraction (108, 109)
	Unable to record different expressions of the same quantity as equalities (e.g., 2 + 4 = 5 + 1).	**Consider adapting an existing activity to remediate this error**
	Unable to decompose and combine numbers in equations to make them easier to solve (e.g., 8+5=3 + 5+5).	**Consider adapting an existing activity to remediate this error**
	Unable to investigate addition and subtraction as inverse operations.	⇒ Addition (2) ⇒ Subtraction (107, 108, 109)

	Unable to explore properties of addition and subtraction (e.g., adding or subtracting 0, commutativity of addition).	**Consider adapting an existing activity to remediate this error**
	Unable to investigate multiplication and division as inverse operations.	⇒ Division (26, 27, 28)
	Unable to explore properties of multiplication and division (e.g., multiplying and dividing by 1, commutativity of multiplication).	⇒ Division (27, 28)
	Unable to write equivalent multiplication and division equations in different forms (e.g., 3x4=12; 12=4x3).	⇒ Multiplication (52, 54, 55) ⇒ Division (21)
	Unable to justify equivalence/non-equivalence of expressions using relational thinking (e.g., 25+88-0=88+25).	**Consider adapting an existing activity to remediate this error**
PA5 Using Symbols, Unknowns, and Variables to Represent Mathematical Relations	Unable to use the equal (=) symbol in equations and knows its meaning (i.e., equivalent; is the same as).	⇒ 3, 4, 5, 6 ⇒ Subtraction (108, 109, 110)
	Does not understand and use the equal (=) and not equal (≠) symbols when comparing expressions.	**Consider adapting an existing activity to remediate this error**
	Unable to use placeholders (e.g., □) for unknown values in equations).	**Consider adapting an existing activity to remediate this error**
	Unable to solve for an unknown value in a one-step addition and subtraction problem (e.g., $n + 5 = 15$).	**Consider adapting an existing activity to remediate this error**

	Does not understand and use the "greater than" (>) and "less than" (<) symbols when comparing expressions.	**Consider adapting an existing activity to remediate this error**
	Unable to solve for an unknown in a one–step multiplication problem (e.g., $3 \times n = 12$).	**Consider adapting an existing activity to remediate this error**
	Unable to use variables - i.e., letters or icons to describe relations. (e.g., $10 = \square + \bigcirc$).	**Consider adapting an existing activity to remediate this error**

MILE Math Interactive
Learning Experience

Strand: Measurement		
Conceptual Threads	**Errors**	**Remedies for Remediation**
M1 Understanding Attributes That Can Be Measured	Unable to explore measurement of visible attributes (e.g., length, capacity, area) and non-visible attributes (e.g., mass, time, temperature).	⇒ Measurement (37—40) ⇒ Measurement-Area (41—43) ⇒ Measurement-Height/Length (44—46) ⇒ Measurement-Quantity (47,48) ⇒ Measurement-Time (49) ⇒ Measurement-Weight (50,51)
	Unable to use language to describe attributes (e.g., long, tall, short, wide, heavy).	⇒Measurement-Height/Length (44) All Pages ⇒ Measurement-Quantity (47) All Pages ⇒ Measurement-Weight (50) All Pages
	Does not understand that some things have more than one attribute that can be measured (e.g., an object can have both length and mass).	**Consider adapting an existing activity to remediate this error**
	Does not understand conservation of length (e.g., a string is the same length when straight and not straight), capacity (e.g., two differently shaped containers may hold the same amount), and area (e.g., two surfaces of different shapes can have the same area).	⇒ Measurement (38, 40) ⇒ Measurement-Height/Length (44) All pages ⇒ Measurement-Quantity (47) All pages
	Unable to extend understanding of length to other linear measurements (e.g., height, width, distance around).	⇒ Measurement (37, 39) ⇒ Measurement-Height/Length (44) All pages ⇒ Measurement-Quantity (48) ⇒ Measurement-Time (49) All pages

M2 Directly and Indirectly Comparing and Ordering Objects with the Same Measurable Attribute	Unable to directly compare and order objects by length (e.g., by aligning ends), mass (e.g., using a balance scale), and area (e.g., by covering).	⇒ Measurement (37) All pages ⇒ Measurement-Area (41) All pages ⇒ Measurement-Height/Length (44) All pages ⇒ Measurement-Weight (50) All pages
	Unable to compare objects indirectly by using an intermediary object.	⇒ Measurement-Area (41) All pages ⇒ Measurement-Height/Length (44) All pages ⇒ Measurement-Quantity (47—48) All pages ⇒ Measurement-Time (49) All pages ⇒ Measurement-Weight (50) All pages
	Unable to use relative attributes to compare and order (e.g., longer/longest, taller/tallest, shorter/shortest).	⇒ Measurement-Height/Length (44) All pages ⇒ Measurement-Quantity (47) All pages ⇒ Measurement-Time (49) All pages ⇒ Measurement-Weight (50) All pages
	Unable to compare and order objects in more than one way using different measurable attributes.	⇒ Measurement (39) ⇒ Measurement-Area (41) ⇒ Measurement-Height/Length (44) All pages ⇒ Measurement-Quantity (47) All pages ⇒ Measurement-Time (49) All pages ⇒ Measurement-Weight (50) All pages
M3 Selecting and Using Non-standard units to Estimate, Measure, and Make	Unable to use relative language to describe measures (e.g., close/far, tall, taller, tallest).	⇒ Measurement-Area (41, 43) ⇒ Measurement-Height/Length (44) All pages ⇒ Measurement-Quantity (47) All pages

Comparisons		⇒ Measurement-Time (49) All pages ⇒ Measurement-Weight (50) All pages
	Unable to understand that units must be the same for measurements to be meaningful (e.g., must use same sized cubes to measure a desk).	**Consider adapting an existing activity to remediate this error**
	Unable to understand that there should be no gaps or overlaps when measuring.	**Consider adapting an existing activity to remediate this error**
	Unable to use whole number measures to estimate, measure, and compare (e.g., this book is 8 cubes long and my pencil is 5 cubes long).	⇒ Measurement-Height/Length (44) All pages ⇒ Measurement-Quantity (47) All pages ⇒ Measurement-Time (49) All pages ⇒ Measurement-Weight (50) All pages
	Unable to demonstrate ways to estimate, measure, compare, and order objects by length, area, capacity, and mass with non-standard units by: - using an intermediary object - using multiple copies of a unit - iterating a single unit	⇒ Measurement-Area (41) All pages ⇒ Measurement-Height/Length (44) All pages ⇒ Measurement-Quantity (41) All pages ⇒ Measurement-Weight (50) All pages
	Selects and uses appropriate non-standard units to estimate, measure, and compare length, area, capacity, and mass.	**Consider adapting an existing activity to remediate this error**
	Unable to recognize that smaller units or partial units (e.g., halves) can increase precision.	**Consider adapting an existing activity to remediate this error**
	Unable to use non-standard units as referents to estimate length (e.g., paper clips), area, (e.g., square tiles), mass (e.g., cubes), and capacity (e.g., cups).	⇒ Measurement-Area (41) All pages ⇒ Measurement-Height/Length (44) All pages

		⇒ Measurement-Quantity (47) All pages ⇒ Measurement-Weight (50) All pages ⇒ Measurement-Area (41) All pages ⇒ Measurement-Height/Length (44) ⇒ Measurement-Quantity (47) All pages ⇒ Measurement-Weight (50)
M4 Selecting and Using Standard Units to Estimate, Measure, and Make Comparisons	Unable to use standard sized objects to measure (e.g., 10 centicube rod).	⇒ Measurement-Height/Length (44) All pages
	Unable to demonstrate ways to estimate, measure, compare, and order objects by length, perimeter, area, capacity, and mass with standard units by ● using an intermediary object of a known measure ● using multiple copies of a unit ● iterating a single unit	⇒ Measurement-Area (41) All pages ⇒ Measurement-Height/Length (44) All pages ⇒ Measurement-Quantity (47) All pages ⇒ Measurement-Weight (50) All pages
	Unable to select and use appropriate standard units to estimate, measure, and compare length, perimeter, area, capacity, mass, and time.	**Consider adapting an existing activity to remediate this error** ⇒ Measurement (37) All pages
	Unable to use the measurement of familiar objects as benchmarks to estimate another measure in standard units (e.g., doorknob is 1 m from the ground; room temperature is 21℃).	⇒ Measurement-Height/Length (46) ⇒ Measurement-Quantity (47) All pages ⇒ Measurement-Time (49) All pages ⇒ Measurement-Weight (50) All pages
M5 Understanding Relationships Among Measurement Units	Unable to compare different sized units and the effects on measuring objects (e.g., small cubes vs. large cubes to measure length).	⇒ Measurement-Height/Length (44) All pages ⇒ Measurement-Quantity (47) All pages ⇒ Measurement-Weight (50) All pages
	Unable to understand the inverse relationship between the size of the unit and the number of units (length, area, capacity, and mass).	⇒ Measurement (37) All pages ⇒ Measurement-Area (41) All pages ⇒ Measurement-Height/Length (44) All pages ⇒ Measurement-Quantity (47) All pages

		⇒ Measurement-Weight (50) All pages
	Unable to understand that decomposing and rearranging does not change the measure of an object.	**Consider adapting an existing activity to remediate this error**
	Unable to understand the relationship of units of length (mm, cm, m), mass (g, kg), capacity (mL, L), and time (e.g., seconds, minutes, hours).	⇒ Measurement-Height/Length (44) All pages ⇒ Measurement-Quantity (47) All pages ⇒ Measurement-Time (49) All pages ⇒ Measurement-Weight (50) All pages

Strand: Geometry

Conceptual Threads	Errors	Remedies for Remediation
G1 Investigating Geometric Attributes and Properties of 2-D Shapes and 3-D Solids	Unable to explore and make distinctions among different geometric attributes of 2-D shapes and 3-D solids (e.g., sides, edges, corners, surfaces, open/closed).	⇒ Shapes (80, 81, 82, 83)
	Unable to recognize, match, and name familiar 2-D shapes (e.g., circle, triangle, square, rectangle) and 3–D solids (e.g., cube, cone).	**Consider adapting an existing activity to remediate this error**
	Unable to compare 2–D shapes and 3–D solids to find the similarities and differences.	**Consider adapting an existing activity to remediate this error**
	Unable to recognize 2–D shapes and 3–D solids embedded in other images or objects.	**Consider adapting an existing activity to remediate this error**
	Unable to identify 2-D shapes in 3-D objects in the environment.	⇒ Shapes (81, 83)
	Unable to analyze geometric attributes of 2–D shapes and 3–D solids (e.g., number of sides/edges, faces, corners).	⇒ Shapes (80, 81, 82)
	Unable to classify and name 2–D shapes and 3–D solids based on common attributes.	⇒ Shapes (80, 81, 82, 83)

	Unable to construct and compare 2-D shapes and 3-D solids with given attributes (e.g., number of vertices, faces).	**Consider adapting an existing activity to remediate this error**
	Unable to classify and name 2-D shapes and 3–D solids using geometric properties (e.g., a rectangle has 4 right angles).	⇒ Measurement (37) ⇒ Measurement-area (43) ⇒ Sorting - matching (100)
G2 Investigating 2-D Shapes, 3-D Solids, and their Attributes Through Composition and Decomposition	Unable to model and draw 2–D shapes and 3–D solids from component parts.	⇒ Measurement (39) ⇒ Measurement-Weight (51) ⇒ Ordering (62) ⇒ Patterns (65, 69, 70, 71, 72) ⇒ Shapes (82, 84)
	Unable to construct composite pictures or structures with 2-D shapes and 3-D solids.	⇒ Sorting - matching (98) **Consider adapting an existing activity to remediate this error**
	Unable to construct and identify new 2–D shapes and 3–D solids as a composite of other 2–D shapes and 3–D solids.	**Consider adapting an existing activity to remediate this error**
	Unable to decompose 2–D shapes and 3–D solids into other known 2–D shapes and 3–D solids.	⇒ Fractions (29,30)
G3 Exploring 2-D Shapes and 3-D Solids by Applying and Visualizing Transformations	Unable to match familiar 2–D shapes and 3–D solids (e.g., square, triangle, cone) in different orientations.	⇒ Sorting - matching (95, 96, 97, 99) ⇒ Sorting - same/different (104)
	Unable to identify congruent 2–D shapes and 3–D solids through physical movement (e.g., by rotating).	**Consider adapting an existing activity to remediate this error**

	Unable to identify congruent 2–D shapes and 3–D solids through visualizing transformations.	**Consider adapting an existing activity to remediate this error**
	Unable to predict (visualize) and describe the transformation (i.e., rotation, reflection, translation) needed to match two congruent shapes.	**Consider adapting an existing activity to remediate this error**
	Unable to perform and describe the transformations of shapes on a grid including direction and turn (e.g., predicting the outcome for a given code to transform a shape or altering code to a new endpoint).	**Consider adapting an existing activity to remediate this error**
G4 Exploring Symmetry to Analyze 2-D Shapes and 3-D Solids	Unable to physically explore symmetry of images by folding, cutting, and matching parts.	⇒ Shapes (84)
	Unable to identify 2–D shapes and 3–D solids that have symmetry (limited to line or plane symmetry) (e.g., slicing an apple through its core).	**Consider adapting an existing activity to remediate this error**
	Unable to construct and complete 2–D/3–D symmetrical designs.	⇒ Shapes (84)
	Unable to identify line(s) of symmetry on regular 2–D shapes.	⇒ Shapes (84)
	Unable to compare and classify 2-D shape based on lines of symmetry.	⇒ Shapes (84)
	Unable to identify 2-D shapes that have rotational symmetry.	**Consider adapting an existing activity to remediate this error**
G5 Locating and Mapping	Unable to use positional language and gesture to describe locations and movement, and give simple directions (e.g., in, on, around, right, left; creates, tests and adjusts instructions to move between two points in the classroom).	**Consider adapting an existing activity to remediate this error**

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Objects in Space	Unable to use relative positions to describe the location and order of objects (e.g., between, beside, next, before).	⇒ Addition (6) ⇒ Division (24) ⇒ Measurement-Weight (50) ⇒ Multiplication (55) ⇒ Number Line (58) All pages ⇒ Ordering (59) All pages ⇒ Patterns (63) 70 ⇒ Regrouping (78) ⇒ Shapes (82) ⇒ Sorting - matching (100) ⇒ Sorting - same/different (104)
	Unable to locate objects in environment (e.g., playground) by interpreting a map.	**Consider adapting an existing activity to remediate this error**
	Unable to provide instructions to locate an object in the environment (e.g., listing instructions to find a hidden object in classroom).	⇒ Shapes (81) **Consider adapting an existing activity to remediate this error**
	Unable to make simple maps based on familiar settings.	**Consider adapting an existing activity to remediate this error**
	Unable to describe the movement of an object from one location to another on a grid map (e.g., creates a code with symbols to represent the path of an object, → → → ↓ ↓).	**Consider adapting an existing activity to remediate this error**
	Unable to describe the relative position of two locations on a map.	**Consider adapting an existing activity to remediate this error**
G6 Viewing and Representing Objects from Multiple Perspectives	Unable to recognize and draw 2–D images of 3–D solids.	⇒ Patterns (72) ⇒ Shapes (81, 83, 84)
	Unable to recognize 3–D solids from multiple perspectives.	⇒ Shapes (83)
	Unable to visualize and describe the view of a 3–D solid from multiple perspectives	⇒ Shapes (83)

	(e.g., top/front/side views).	
	Unable to visualize and create 2–D representations (e.g., top/front/side views) of 3–D objects.	**Consider adapting an existing activity to remediate this error**
	Unable to complete 3-D compositions from 2-D drawings.	**Consider adapting an existing activity to remediate this error**
	Unable to create simple perspective drawings of 3-D objects from different views.	**Consider adapting an existing activity to remediate this error**

Strand: Data Management and Probability

Conceptual Threads	Errors	Remedies for Remediation
DMP1 Formulating Questions to Learn About Groups, Collections, and Events by Collecting Relevant Data	Unable to formulate questions that can be addressed through simple surveys (e.g., Should we get bananas for the class picnic?).	**Consider adapting an existing activity to remediate this error**
	Unable to formulate questions that can be addressed by counting collections (e.g., How many of us come to school by bus, by car, walking?) and questions that can be addressed through observation (e.g., How many people do/do not use the crosswalk?).	⇒ Counting (12) All Pages
	Unable to formulate questions that can be addressed through simple experiments (e.g., Which way will the cup land?)	**Consider adapting an existing activity to remediate this error**
	Unable to clarify and refine questions to make them statistical in nature (e.g., Do you like bananas or strawberries? vs. Should we purchase bananas or strawberries for our class fruit snack?).	**Consider adapting an existing activity to remediate this error**
DMP2 Collecting Data and Organizing It Into Categories	Unable to collect data from simple surveys concretely (e.g., shoes, popsicle sticks) or using simple records (e.g., checkmarks, tallies).	⇒ Sorting - categorizing (85) All Pages ⇒ Patterns (71) ⇒ Graphs (34,36)

	Unable to collect data by determining (most) categories in advance (e.g., yes/no; list of choices).	⇒ Sorting - categorizing (85) All Pages
	Unable to order categories by frequency (e.g., most to least).	⇒ Sorting - Matching (95, 99, 100) ⇒ Graphs (35, 36) ⇒ Measurement-Quantity (48) ⇒ Sorting - categorizing (88, 90, 91, 92, 93, 94)
	Unable to generate data by counting or measuring (e.g., linking cube tower: number of cubes or height). Limited to whole units.	⇒ Measurement-Height/Length (44, 45, 46) ⇒ Measurement-Quantity (47,48)
	Unable to choose an appropriate method to collect, categorize, and organize data..	**Consider adapting an existing activity to remediate this error**
	Unable to collect and compare data from multiple trials of the same experiment.	**Consider adapting an existing activity to remediate this error**
DMP3 Creating Graphical Displays of Collected Data	Unable to create displays by arranging concrete data or with simple picture graphs (using actual objects or images).	⇒ Graphs (34, 35, 36)
	Unable to create displays using objects or simple pictographs (may use symbol for data).	⇒ Graphs (34, 35, 36)
	Unable to organize display so categories are ordered by frequency.	⇒ Graphs (34, 35, 36)
	Unable to create one-to-one displays (e.g., line plot, dot plot, bar graph).	⇒ Graphs (34, 35, 36)
	Unable to display data collected in more than one way and describe the differences (e.g., bar graph, pictograph).	⇒ Graphs (34, 35, 36)

	Unable to display data collected in more than one way and describe the differences (e.g., bar graph, pictograph).	⇒ Graphs (34, 35, 36)
	Unable to create simple many-to-one displays (e.g., pictograph where each symbol represents 5 data points).	⇒ Graphs (34, 35, 36)
	Unable to create displays in different formats and scales (e.g., horizontal/vertical, one–to–one/many–to–one, bar graph, line plot).	⇒ Graphs (34, 35, 36)
	Unable to create displays to represent data with two or more attributes (e.g., carrroll diagram, venn diagram).	⇒ Graphs (34, 35, 36)
DMP4 Reading and Interpreting Data Displays	Unable to determine the most frequent response/outcome on the data display.	**Consider adapting an existing activity to remediate this error**
	Unable to interpret displays by noting outcomes that are more/less/same.	⇒ Graphs (34, 35, 36)
	Unable to interpret displays by noting how many more/less than other categories.	⇒ Graphs (34, 35, 36)
	Unable to read and interpret information from data displays (e.g., orders by frequency, compares frequencies, determines total number of data points).	⇒ Graphs (34, 35, 36)
	Unable to describe the shape of data in informal ways (e.g., range, spread, gaps, mode, mean).	**Consider adapting an existing activity to remediate this error**
	Unable to critique whether the display used in the appropriate way for the data collected.	**Consider adapting an existing activity to remediate this error**
DMP5 Using the Language of Chance to Describe and Predict Events	Unable to describe the likelihood of an event (e.g., impossible, unlikely, certain).	**Consider adapting an existing activity to remediate this error**
	Unable to make predictions based on the question, context, and data presented.	⇒ Measurement-Height/Length (46) ⇒ Patterns (70)

		⇒ Regrouping (77) ⇒ Addition (4) ⇒ Measurement-Quantity (47)
	Unable to list the possible outcomes of independent events (e.g., tossing coin, rolling number cube, spinning a spinner).	**Consider adapting an existing activity to remediate this error**
	Unable to compare the likelihood of two events (e.g., more likely, less likely, equally likely).	**Consider adapting an existing activity to remediate this error**
	Unable to predict the likelihood of an outcome in simple probability experiments or games.	**Consider adapting an existing activity to remediate this error**
	Unable to investigate and describe the fairness of games.	**Consider adapting an existing activity to remediate this error**
	Unable to understand that data collected about past events can help predict the likelihood of future events, but not with certainty.	**Consider adapting an existing activity to remediate this error**
DMP6 Drawing Conclusions by Making Inferences and Justifying Decisions Based on Data Collected	Unable to use data collected and displayed to answer initial questions directly.	⇒ Measurement-Quantity (47,48) ⇒ Measurement-Time (49) ⇒ Measurement-Weight (50, 51)
	Unable to pose and answer questions about data collected and displayed.	⇒ Measurement-Quantity (47, 48) ⇒ Measurement-Time (49) ⇒ Measurement-Weight (50, 51)
	Unable to make simple inferences about a population based on sample data collected.	**Consider adapting an existing activity to remediate this error**
	Unable to explain why a game is fair or unfair.	**Consider adapting an existing activity to remediate this error**
	Unable to judge the validity of statements made from displayed data.	**Consider adapting an existing activity to remediate this error**