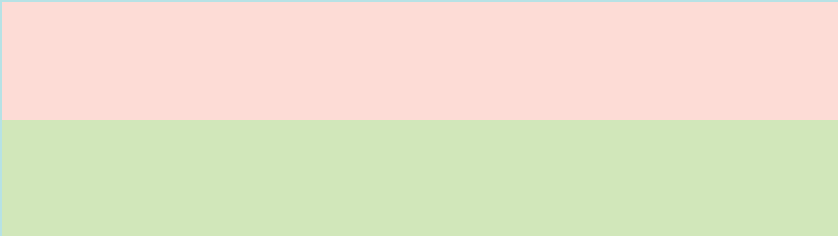


# CCSS Math & Geometry



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| Math Cluster Overview Chart           |                                                                                                                                |   |   |   |   |   |   |   |   |   |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|---|---|---|---|
| Domain                                | Cluster Objectives                                                                                                             | K | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Counting and Cardinality              | Know number names and the count sequence.                                                                                      | x |   |   |   |   |   |   |   |   |
|                                       | Count to tell the number of objects.                                                                                           | x |   |   |   |   |   |   |   |   |
|                                       | Compare numbers.                                                                                                               | x |   |   |   |   |   |   |   |   |
| Operations and Algebraic Thinking     | Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.             | x |   |   |   |   |   |   |   |   |
|                                       | Represent and solve problems involving addition and subtraction.                                                               |   | x | x |   |   |   |   |   |   |
|                                       | Understand and apply properties of operations and the relationship between addition and subtraction.                           |   | x |   |   |   |   |   |   |   |
|                                       | Add and subtract within 20.                                                                                                    |   | x | x |   |   |   |   |   |   |
|                                       | Work with addition and subtraction equations.                                                                                  |   | x |   |   |   |   |   |   |   |
|                                       | Work with equal groups of objects to gain foundations for multiplication.                                                      |   |   | x |   |   |   |   |   |   |
|                                       | Represent and solve problems involving multiplication and division.                                                            |   |   |   | x |   |   |   |   |   |
|                                       | Understand properties of multiplication and the relationship between multiplication and division.                              |   |   |   | x |   |   |   |   |   |
|                                       | Multiply and divide within 100.                                                                                                |   |   |   | x |   |   |   |   |   |
|                                       | Solve problems involving the four operations, and identify and explain patterns in arithmetic.                                 |   |   |   | x |   |   |   |   |   |
|                                       | Use the four operations with whole numbers to solve problems.                                                                  |   |   |   |   | x |   |   |   |   |
|                                       | Gain familiarity with factors and multiples.                                                                                   |   |   |   |   | x |   |   |   |   |
|                                       | Generate and analyze patterns.                                                                                                 |   |   |   |   | x |   |   |   |   |
|                                       | Write and interpret numerical expressions.                                                                                     |   |   |   |   |   | x |   |   |   |
|                                       | Analyze patterns and relationships.                                                                                            |   |   |   |   |   | x |   |   |   |
| Number and Operations in Base 10      | Work with numbers 11–19 to gain foundations for place value.                                                                   | x |   |   |   |   |   |   |   |   |
|                                       | Extend the counting sequence.                                                                                                  |   | x |   |   |   |   |   |   |   |
|                                       | Understand place value.                                                                                                        |   | x | x |   |   |   |   |   |   |
|                                       | Use place value understanding and properties of operations to add and subtract                                                 |   | x | x |   |   |   |   |   |   |
|                                       | Use place value understanding and properties of operations to perform multi-digit arithmetic.                                  |   |   |   | x | x |   |   |   |   |
|                                       | Generalize place value understanding for multi-digit whole numbers.                                                            |   |   |   |   | x |   |   |   |   |
|                                       | Understand the place value system.                                                                                             |   |   |   |   |   | x |   |   |   |
|                                       | Perform operations with multi-digit whole numbers and with decimals to hundredths.                                             |   |   |   |   |   | x |   |   |   |
| Measurement and Data                  | Describe and compare measurable attributes.                                                                                    | x |   |   |   |   |   |   |   |   |
|                                       | Classify objects and count the number of objects in each category.                                                             | x |   |   |   |   |   |   |   |   |
|                                       | Measure lengths indirectly and by iterating length units.                                                                      |   | x |   |   |   |   |   |   |   |
|                                       | Tell and write time.                                                                                                           |   | x |   |   |   |   |   |   |   |
|                                       | Represent and interpret data.                                                                                                  |   | x | x | x | x | x |   |   |   |
|                                       | Measure and estimate lengths in standard units.                                                                                |   |   | x |   |   |   |   |   |   |
|                                       | Relate addition and subtraction to length.                                                                                     |   |   | x |   |   |   |   |   |   |
|                                       | Work with time and money.                                                                                                      |   |   | x |   |   |   |   |   |   |
|                                       | Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.               |   |   |   | x |   |   |   |   |   |
|                                       | Geometric measurement: understand concepts of area and relate area to multiplication and to addition.                          |   |   |   | x |   |   |   |   |   |
|                                       | Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.  |   |   |   | x |   |   |   |   |   |
|                                       | Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.                      |   |   |   |   | x |   |   |   |   |
|                                       | Geometric measurement: understand concepts of angle and measure angles.                                                        |   |   |   |   | x |   |   |   |   |
|                                       | Convert like measurement units within a given measurement system.                                                              |   |   |   |   |   | x |   |   |   |
|                                       | Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.                      |   |   |   |   |   | x |   |   |   |
| Geometry                              | Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).        | x |   |   |   |   |   |   |   |   |
|                                       | Analyze, compare, create, and compose shapes.                                                                                  | x |   |   |   |   |   |   |   |   |
|                                       | Reason with shapes and their attributes.                                                                                       |   | x | x | x |   |   |   |   |   |
|                                       | Draw and identify lines and angles, and classify shapes by properties of their lines and angles.                               |   |   |   |   | x |   |   |   |   |
|                                       | Graph points on the coordinate plane to solve real-world and mathematical problems.                                            |   |   |   |   |   | x |   |   |   |
|                                       | Classify two-dimensional figures into categories based on their properties.                                                    |   |   |   |   |   | x |   |   |   |
|                                       | Solve real-world and mathematical problems involving area, surface area, and volume.                                           |   |   |   |   |   |   | x |   |   |
|                                       | Draw, construct, and describe geometrical figures and describe the relationships between them.                                 |   |   |   |   |   |   |   | x |   |
|                                       | Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.                             |   |   |   |   |   |   |   | x |   |
|                                       | Understand congruence and similarity using physical models, transparencies, or geometry software.                              |   |   |   |   |   |   |   |   | x |
|                                       | Understand and apply the Pythagorean Theorem.                                                                                  |   |   |   |   |   |   |   |   | x |
|                                       | Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.                                  |   |   |   |   |   |   |   |   | x |
| Number and Operations--Fractions      | Develop understanding of fractions as numbers.                                                                                 |   |   |   | x |   |   |   |   |   |
|                                       | Extend understanding of fraction equivalence and ordering.                                                                     |   |   |   |   | x |   |   |   |   |
|                                       | Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.          |   |   |   |   | x |   |   |   |   |
|                                       | Understand decimal notation for fractions, and compare decimal fractions.                                                      |   |   |   |   | x |   |   |   |   |
|                                       | Use equivalent fractions as a strategy to add and subtract fractions.                                                          |   |   |   |   |   | x |   |   |   |
|                                       | Apply and extend previous understandings of multiplication and division to multiply and divide fractions.                      |   |   |   |   |   | x |   |   |   |
| Ratios and Proportional Relationships | Understand ratio concepts and use ratio reasoning to solve problems.                                                           |   |   |   |   |   |   | x |   |   |
|                                       | Analyze proportional relationships and use them to solve real-world and mathematical problems.                                 |   |   |   |   |   |   |   | x |   |
| The Number System                     | Apply and extend previous understandings of multiplication and division to divide fractions by fractions.                      |   |   |   |   |   |   | x |   |   |
|                                       | Compute fluently with multi-digit numbers and find common factors and multiples.                                               |   |   |   |   |   |   | x |   |   |
|                                       | Apply and extend previous understandings of numbers to the system of rational numbers.                                         |   |   |   |   |   |   | x |   |   |
|                                       | Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. |   |   |   |   |   |   |   | x |   |
|                                       | Know that there are numbers that are not rational, and approximate them by rational numbers.                                   |   |   |   |   |   |   |   |   | x |
| Expressions and Equations             | Apply and extend previous understandings of arithmetic to algebraic expressions.                                               |   |   |   |   |   |   | x |   |   |
|                                       | Reason about and solve one-variable equations and inequalities.                                                                |   |   |   |   |   |   | x |   |   |
|                                       | Represent and analyze quantitative relationships between dependent and independent variables.                                  |   |   |   |   |   |   | x |   |   |
|                                       | Use properties of operations to generate equivalent expressions.                                                               |   |   |   |   |   |   |   | x |   |
|                                       | Solve real-life and mathematical problems using numerical and algebraic expressions and equations.                             |   |   |   |   |   |   |   | x |   |
|                                       | Work with radicals and integer exponents.                                                                                      |   |   |   |   |   |   |   |   | x |
|                                       | Understand the connections between proportional relationships, lines, and linear equations.                                    |   |   |   |   |   |   |   |   | x |
|                                       | Analyze and solve linear equations and pairs of simultaneous linear equations.                                                 |   |   |   |   |   |   |   |   | x |
| Statistics and Probability            | Develop understanding of statistical variability.                                                                              |   |   |   |   |   |   | x |   |   |
|                                       | Summarize and describe distributions.                                                                                          |   |   |   |   |   |   | x |   |   |
|                                       | Use random sampling to draw inferences about a population.                                                                     |   |   |   |   |   |   |   | x |   |
|                                       | Draw informal comparative inferences about two populations.                                                                    |   |   |   |   |   |   |   | x |   |
|                                       | Investigate chance processes and develop, use, and evaluate probability models.                                                |   |   |   |   |   |   |   | x |   |
|                                       | Investigate patterns of association in bivariate data.                                                                         |   |   |   |   |   |   |   |   | x |
|                                       |                                                                                                                                |   |   |   |   |   |   |   |   |   |
| Functions                             | Define, evaluate, and compare functions.                                                                                       |   |   |   |   |   |   |   |   | x |
|                                       | Use functions to model relationships between quantities.                                                                       |   |   |   |   |   |   |   |   | x |

Representative AMI Math Curriculum

| Activity ID | Content Strand                                 | Material                                  | Presentations/Activities                                          |
|-------------|------------------------------------------------|-------------------------------------------|-------------------------------------------------------------------|
|             | Great story of mathematics/history             |                                           |                                                                   |
| 40001       |                                                | Charts/story                              | The story of our numerals                                         |
| 40002       |                                                |                                           | Making charts/making models                                       |
| 40003       |                                                |                                           | Making timelines                                                  |
| 40004       |                                                |                                           | Research: number systems, cultural history, decimal system        |
|             |                                                |                                           |                                                                   |
|             | The decimal system, categories and place value |                                           |                                                                   |
| 40008       |                                                | Golden beads & presentation tray          | Introduce decimal/whole number categories                         |
| 40009       |                                                | Golden beads & decimal cards              | Association of symbol & quantity 1, 10, 100, 1000's               |
| 40010       |                                                | Decimal cards                             | Understanding zero                                                |
| 40011       |                                                | Golden beads & trays                      | Forming numbers using concrete quantities of beads                |
| 40012       |                                                | Golden beads & decimal cards              | Forming numbers w/decimal cards, hiding zeroes                    |
| 40013       |                                                | Golden beads, decimal cards & trays       | Creating quantities w/symbols up to 9,999                         |
|             |                                                |                                           |                                                                   |
| 40015       |                                                | Wooden hierarchical material              | Introduction to quantity & language, up to million                |
| 40016       |                                                |                                           | Geometric shape and families to millions                          |
| 40017       |                                                | Number cards 1, 10, 100... 1,000,000      | Introduction to symbol to millions                                |
| 40018       |                                                | Whm & number cards                        | Symbol and quantity into millions                                 |
| 40019       |                                                | Golden beads, decimal cards               | Expanded notation/decomposing numbers                             |
| 40020       |                                                | Sbf/lbf & sbf/lbf paper                   | Expanded notation/decomposing numbers                             |
| 40021       |                                                | Bank game                                 | Expanded notation (along w/multiplication)                        |
|             |                                                |                                           |                                                                   |
|             | Quantity & symbol: whole numbers: numeration   |                                           |                                                                   |
| 40024       |                                                | Spindle boxes (0 - 9), bead stair (1 - 9) | Introduce/review numbers 1 - 10                                   |
| 40025       |                                                | Snake game (1-10), memory games           | Introduce/review numbers 1 - 10                                   |
| 40026       |                                                | Cards & counters                          | Introduce odd/even numbers                                        |
| 40027       |                                                | Golden beads                              | Counting and numbers 1 – 10                                       |
| 40028       |                                                | Golden beads                              | Exchange/change game across categories                            |
| 40029       |                                                | Teen boards, bead bars                    | Introduce/review counting 11 - 20                                 |
| 40030       |                                                | Ten boards & bead bars                    | Introduce/review counting 1 - 100                                 |
| 40031       |                                                | Golden beads, base board                  | Decimal system (numbers to thousands using base board in base 10) |
| 40032       |                                                | Small bead frame                          | Counting to 1000                                                  |
| 40033       |                                                | Hundred & thousand chain & labels         | Counting to 1000                                                  |
| 40034       |                                                | Short/square bead chains & labels         | Linear & skip counting                                            |
| 40035       |                                                | Long/cube bead chains & labels            | Linear & skip counting                                            |
| 40036       |                                                | Large bead frame                          | Counting to millions                                              |
| 40037       |                                                | Sbf/lbf and sbf/lbf paper                 | Presentation of symbol up to millions                             |
|             |                                                |                                           |                                                                   |
|             |                                                |                                           |                                                                   |
|             | Whole numbers: addition                        |                                           |                                                                   |
| 40041       |                                                | Golden beads                              | Concept of static addition with whole numbers                     |
| 40042       |                                                | Golden beads & decimal cards              | Static addition (no carrying)                                     |
| 40043       |                                                | Large bead frame                          | Static addition (no carrying)                                     |
| 40044       |                                                | Stamp game                                | Static addition (no carrying)                                     |
| 40045       |                                                | Stamp game w/square paper                 | Static addition w/recording                                       |
| 40046       |                                                | Golden beads & decimal cards              | Dynamic addition (w/carrying)                                     |
| 40047       |                                                | Large bead frame                          | Dynamic addition (w/carrying)                                     |
| 40048       |                                                | Dot game                                  | Dynamic addition (w/carrying)                                     |
| 40049       |                                                | Stamp game                                | Dynamic addition (w/carrying)                                     |
| 40050       |                                                | Lbf and lbf paper                         | Dynamic addition w/recording                                      |
| 40051       |                                                | Stamp game w/square paper                 | Dynamic addition w/recording                                      |
| 40052       |                                                | Golden beads & decimal cards              | Special cases, using zero in all terms of equation                |
| 40053       |                                                | Lbf, stamp game w/paper                   | Introduce/consolidate algorithm                                   |
| 40054       |                                                | Golden beads                              | Addition word problems, problem solving                           |
| 40055       |                                                | Bead bar material and pencil/paper        | Addition word problems, problem solving                           |
| 40056       |                                                | Bead bar material and pencil/paper        | Commutative law of addition                                       |
| 40057       |                                                | Bead bar material and pencil/paper        | Associative property of addition                                  |

| Activity ID | Content Strand                     | Material                                    | Presentations/Activities                                                                                                           |
|-------------|------------------------------------|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
|             |                                    |                                             |                                                                                                                                    |
| 40059       | Memorization of addition facts     | Addition strip board                        | Addition math facts, memorization                                                                                                  |
| 40060       |                                    | Addition practice/finger charts             | Addition math facts, memorization                                                                                                  |
| 40061       |                                    | Addition snake game                         | Addition math facts, memorization                                                                                                  |
| 40062       |                                    | Bead bar material and pencil/paper          | Memorization of facts (addition)                                                                                                   |
|             |                                    |                                             |                                                                                                                                    |
| 40064       | Whole numbers: subtraction         |                                             |                                                                                                                                    |
| 40065       |                                    | Golden beads                                | Concept of static subtraction with whole numbers                                                                                   |
| 40066       |                                    | Golden beads & decimal cards                | Static subtraction (no borrowing)                                                                                                  |
| 40067       |                                    | Large bead frame                            | Static subtraction (no borrowing)                                                                                                  |
| 40068       |                                    | Stamp game                                  | Static subtraction (no borrowing)                                                                                                  |
| 40069       |                                    | Stamp game w/square paper                   | Static addition w/recording                                                                                                        |
| 40070       |                                    | Golden beads & decimal cards                | Dynamic subtraction (w/borrowing)                                                                                                  |
| 40071       |                                    | Large bead frame                            | Dynamic subtraction (w/borrowing)                                                                                                  |
| 40072       |                                    | Dot game                                    | Dynamic subtraction (w/borrowing)                                                                                                  |
| 40073       |                                    | Stamp game                                  | Dynamic subtraction (w/borrowing)                                                                                                  |
| 40074       |                                    | Lbf and lbf paper                           | Dynamic subtraction (w/borrowing)                                                                                                  |
| 40075       |                                    | Stamp game w/square paper                   | Dynamic subtraction (w/borrowing)                                                                                                  |
| 40076       |                                    | Golden beads & decimal cards                | Special cases, using zero in all terms of equation                                                                                 |
| 40077       |                                    | Lbf, stamp game w/paper                     | Introduce/consolidate algorithm                                                                                                    |
| 40078       |                                    | Golden beads                                | Subtraction word problems, problem solving                                                                                         |
| 40079       |                                    | Bead bar material and pencil/paper          | Subtraction word problems, problem solving                                                                                         |
|             |                                    |                                             |                                                                                                                                    |
| 40081       | Memorization of subtraction facts  | Subtraction strip board                     | Subtraction math facts, memorization                                                                                               |
| 40082       |                                    | Subtraction practice/finger charts          | Subtraction math facts, memorization                                                                                               |
| 40083       |                                    | Subtraction snake game                      | Subtraction math facts, memorization                                                                                               |
| 40084       |                                    | Bead bar material and pencil/paper          | Memorization of facts (subtraction)                                                                                                |
|             |                                    |                                             |                                                                                                                                    |
|             | Laws of multiplication             |                                             |                                                                                                                                    |
| 40087       |                                    | Golden beads w/decimal cards                | Introduce multiplication                                                                                                           |
| 40088       |                                    | Bead bars                                   | Concept of simple multiplication (facts)                                                                                           |
| 40089       |                                    | Bead bars                                   | Build the decanomial w/bead bars                                                                                                   |
| 40090       |                                    | Practice charts, bead bars, booklets        | Memorization of multiplication facts                                                                                               |
| 40091       |                                    | Bead chains                                 | Skip counting, memorization of facts                                                                                               |
|             |                                    |                                             |                                                                                                                                    |
|             | Commutative law of multiplication  |                                             |                                                                                                                                    |
| 40094       |                                    | Bead bars and cards                         | Concept and language of commutative law                                                                                            |
|             | Distributive law of multiplication |                                             |                                                                                                                                    |
| 40096       |                                    | Bead bars, cards, parentheses, envelopes    | Concept and language of distributive law                                                                                           |
| 40097       |                                    | Bead bars                                   | Sensorial exploration                                                                                                              |
| 40098       |                                    |                                             | Passage to more symbolic representations with beads                                                                                |
| 40099       |                                    |                                             | Passage to more symbolic representations without beads                                                                             |
| 40100       |                                    |                                             | Passage to more symbolic representations on paper                                                                                  |
| 40101       |                                    | Golden beads & decimal cards                | Extension to the decimal system: multiplication of composite numbers                                                               |
| 40102       |                                    |                                             | Extension to the decimal system: multiplication of composite numbers and passage to more symbolic representation with number cards |
| 40103       |                                    | Paper                                       | Extension to the decimal system: multiplication of composite numbers and passage to more symbolic representation on paper          |
| 40104       |                                    |                                             |                                                                                                                                    |
|             | Long multiplication                |                                             |                                                                                                                                    |
|             | Checkerboard                       |                                             |                                                                                                                                    |
| 40107       |                                    | Checkerboard & bead bars                    | Introduction to the checkerboard                                                                                                   |
| 40108       |                                    | Checkerboard & bead bars & number tickets   | Multiplication by a one-digit multiplier                                                                                           |
| 40109       |                                    | Checkerboard & bead bars & number tickets   | Multiplication by a multi-digit multiplier (using bead bars, no facts)                                                             |
| 40110       |                                    | Checkerboard & bead bars & number tickets   | Multiplication by a multi-digit multiplier (using bead bars, some facts)                                                           |
| 40111       |                                    | Checkerboard, bead bars, no. Tickets, paper | Multiplication by a multi-digit multiplier (using all facts, recording problem and final product)                                  |

| Activity ID | Content Strand                         | Material                                    | Presentations/Activities                                                                                         |
|-------------|----------------------------------------|---------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| 40112       |                                        | Checkerboard, bead bars, no. Tickets, paper | Multiplication by a multi-digit multiplier (using facts, recording problem, partial products, and final product) |
| 40113       |                                        |                                             | Multiplication by a multi-digit multiplier (no beads, using facts, recoding problem and final product)           |
|             | Large bead frame                       |                                             |                                                                                                                  |
| 40115       |                                        | Large bead frame & lbf paper                | Multiplication by a one-digit multiplier                                                                         |
| 40116       |                                        | Large bead frame & lbf paper                | Multi-digit multiplier                                                                                           |
| 40117       |                                        | Large bead frame & lbf paper                | Multi-digit multiplier (recording partial products, adding partial products, checking)                           |
| 40118       |                                        |                                             |                                                                                                                  |
|             | Bank game                              |                                             |                                                                                                                  |
| 40120       |                                        | Bank game                                   | Multiplication by a one-digit multiplier                                                                         |
| 40121       |                                        | Bank game                                   | Two-digit multiplier                                                                                             |
| 40122       |                                        | Bank game                                   | Three-digit multiplier                                                                                           |
|             | Flat bead frame                        |                                             |                                                                                                                  |
| 40124       |                                        | Flat/gold bead frame & paper                | Multiplication by a two-to four-digit multiplier (writing final product only)                                    |
| 40125       |                                        | Flat/gold bead frame & paper                | Multiplication by a two-to four-digit multiplier (writing partial products)                                      |
|             | Geometric form of multiplication       |                                             |                                                                                                                  |
| 40127       |                                        | Graph paper, colored pencils                | Geometric form of multiplication                                                                                 |
|             | Multiplication summary                 |                                             |                                                                                                                  |
| 40129       |                                        | Paper/pencil                                | Consolidate multiplication fact memorization                                                                     |
| 40130       |                                        | Paper/pencil & appropriate material         | Traditional multiplication algorithm                                                                             |
| 40131       |                                        | Paper/pencil                                | Multiplication word problems                                                                                     |
|             |                                        |                                             |                                                                                                                  |
|             | Long division                          |                                             |                                                                                                                  |
|             | Division with boards, racks, and tubes |                                             |                                                                                                                  |
| 40134       |                                        | Racks & tubes materials                     | Division by a one-digit divisor                                                                                  |
| 40135       |                                        | Racks & tubes materials                     | Division by a multi-digit divisor                                                                                |
| 40136       |                                        | Racks & tubes and paper/pencil              | Recording intermediate remainders, quotient, final remainder                                                     |
| 40137       |                                        | Racks & tubes and paper/pencil              | Recording what has been used, intermediate remainders, quotient, final remainder                                 |
| 40138       |                                        | Racks & tubes and paper/pencil              | Special cases                                                                                                    |
|             | Division with stamps                   |                                             |                                                                                                                  |
| 40140       |                                        | Stamp game                                  | Division with stamps                                                                                             |
|             | Division summary                       |                                             |                                                                                                                  |
| 40142       |                                        | Pencil/paper                                | Traditional division algorithm                                                                                   |
| 40143       |                                        | Pencil/paper                                | Division word problems                                                                                           |
|             |                                        |                                             |                                                                                                                  |
|             | Multiples, factors, and primes         |                                             |                                                                                                                  |
|             | Multiples                              |                                             |                                                                                                                  |
| 40146       |                                        | Short bead chains $1^2 - 10^2$              | Concept and language of multiple using short chains                                                              |
| 40147       |                                        | Bead bars                                   | Further investigation of multiples using bead bars (one-and two-digit numbers)                                   |
| 40148       |                                        | Multiples of numbers paper                  | Further investigation of multiples using multiples of numbers paper                                              |
| 40149       |                                        | Tables A & B                                | Calculation of multiples using table A and table B                                                               |
| 40150       |                                        | Bead bars & paper/pencil                    | Concept and language of common multiple                                                                          |
| 40151       |                                        | Multiples of numbers paper                  | Investigation of common multiple using multiples of numbers paper                                                |
| 40152       |                                        | Table C                                     | Investigation of numbers using table C (leading to concept and language of prime number)                         |
| 40153       |                                        | Bead bars & paper/pencil                    | Concept, language, and notation for least common multiple (lcm)                                                  |
|             | Factors                                |                                             |                                                                                                                  |
| 40155       |                                        | Pegs and pegboard                           | Concept and language of factor using pegs/pegboard                                                               |
| 40156       |                                        | Pegs & pegboard with white strips           | Concept and language of common factor                                                                            |
| 40157       |                                        | Table C                                     | Concept and language for prime factor using table C                                                              |
| 40158       |                                        | Pegs & pegboard                             | Calculation of prime factors using pegboard                                                                      |

| Activity ID | Content Strand                                    | Material                                     | Presentations/Activities                                                                          |
|-------------|---------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------------------------------|
| 40159       |                                                   | Pegs & pegboard, pencil/paper                | Using prime factors to find the least common multiple (lcm) of numbers                            |
| 40160       |                                                   | Pegs & pegboard, pencil/paper                | Concept, language, and notation for greatest common factor (gcf)                                  |
| 40161       |                                                   | Sieve of eratosthenes                        | Handout: sieve of eratosthenes                                                                    |
| 40162       |                                                   |                                              |                                                                                                   |
|             | Divisibility                                      |                                              |                                                                                                   |
| 40165       |                                                   | Gold beads and paper tickets                 | Divisibility by 2, 5, and 25                                                                      |
| 40166       |                                                   | Gold beads and paper tickets                 | Divisibility by 4 and 8                                                                           |
| 40167       |                                                   | Gold beads, paper tickets, pencil/paper      | Divisibility chart                                                                                |
| 40168       |                                                   | Gold beads and paper tickets                 | Divisibility by 3 and 9                                                                           |
| 40169       |                                                   | Gold beads and paper tickets                 | Divisibility by 11                                                                                |
| 40170       |                                                   |                                              |                                                                                                   |
|             | Fractions                                         |                                              |                                                                                                   |
|             | Introduction and equivalence                      |                                              |                                                                                                   |
| 40173       |                                                   | Red metal fraction insets                    | Fractions: quantity and language                                                                  |
| 40174       |                                                   | Fraction insets & labels                     | Fractions: symbol, notation, further language                                                     |
| 40175       |                                                   |                                              | Fractions: other representations                                                                  |
| 40176       |                                                   | Fraction insets                              | Equivalence: sensorial                                                                            |
|             | Operations: simple cases                          |                                              |                                                                                                   |
| 40178       |                                                   | Fraction insets and paper tickets            | Simple addition (denominators common, reduction)                                                  |
| 40179       |                                                   | Fraction insets and paper tickets            | Simple subtraction (denominators common, reduction)                                               |
| 40180       |                                                   | Fraction insets and paper tickets            | Simple multiplication (by single-digit whole number, reduction)                                   |
| 40181       |                                                   | Fraction insets and paper tickets            | Simple division (by single-digit whole number, reduction)                                         |
|             | Operations: beyond simple cases                   |                                              |                                                                                                   |
| 40183       |                                                   | Fraction insets and paper tickets            | Addition/subtraction: uncommon denominators                                                       |
| 40184       |                                                   | Fraction insets and paper tickets            | Multiplication by a fraction less than one                                                        |
| 40185       |                                                   | Fraction insets and paper tickets            | Division by a fraction less than one (measurement/group)                                          |
| 40186       |                                                   | Fraction insets, paper tickets, lg. Skittles | Division by a fraction less than one (partitive / sharing)                                        |
|             | Operations: passages to abstraction               |                                              |                                                                                                   |
| 40188       |                                                   | Transparencies prepared with fraction lines  | Addition/subtraction: finding a common denominator using transparencies                           |
| 40189       |                                                   | Pencil/paper                                 | Addition/subtraction: finding a common denominator by multiplying the denominators                |
| 40190       |                                                   | Pencil/paper                                 | Addition/subtraction: known denominator, finding the numerators by raising or reducing a fraction |
| 40191       |                                                   | Pencil/paper                                 | Addition/Subtraction: Finding the Least Common Denominator (LCD)                                  |
| 40192       |                                                   | Pencil/paper                                 | Abstraction of the rules for operations with fractions                                            |
| 40193       | Applications with Fractions                       |                                              |                                                                                                   |
|             |                                                   |                                              |                                                                                                   |
|             | Decimal Fractions                                 |                                              |                                                                                                   |
|             | Introduction to Decimal Fractions                 |                                              |                                                                                                   |
| 40197       |                                                   | Decimal cubes and beads                      | Decimals: quantity and language                                                                   |
| 40198       |                                                   | Label strip for decimal board                | Decimals: symbol                                                                                  |
| 40199       |                                                   | Decimal board (yellow board) & cubes/beads   | Decimals: formation and reading                                                                   |
|             | Operations: Simple Cases                          |                                              |                                                                                                   |
| 40201       |                                                   | Decimal board (yellow board) & cubes/beads   | Addition and subtraction using the decimal board                                                  |
| 40202       |                                                   | Pencil/paper                                 | Algorithm for addition and subtraction of decimals                                                |
| 40203       |                                                   | Decimal board (yellow board) & cubes/beads   | Multiplication by a unit multiplier                                                               |
| 40204       |                                                   | Decimal cubes and skittles                   | Division by a unit divisor                                                                        |
|             | Multiplication with Decimals: Beyond Simple Cases |                                              |                                                                                                   |
| 40206       |                                                   | Decimal checkerboard                         | Multiplication by a fraction using the decimal checkerboard                                       |
| 40207       |                                                   | Felt squares for decimal checkerboard        | Category multiplication in the decimal system (whole and decimal numbers, using felt squares)     |

| Activity ID | Content Strand                                       | Material                                      | Presentations/Activities                                                                                                      |
|-------------|------------------------------------------------------|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| 40208       | Division with decimals: beyond simple cases          | Decimal checkerboard and beads                | Multiplication of a fraction by a fraction using the decimal board                                                            |
| 40209       |                                                      | Pencil/paper                                  | Algorithm for multiplication of decimals                                                                                      |
|             |                                                      |                                               |                                                                                                                               |
| 40211       | Introduction to percentage with the centesimal frame | Decimal beads and skittles                    | Division by a mixed number or by a decimal using skittles                                                                     |
| 40212       |                                                      | Pencil/paper                                  | Algorithm for division of decimals                                                                                            |
|             |                                                      |                                               |                                                                                                                               |
| 40214       | Special topics extending the exploration of decimals | Centesimal frame                              | Concept, language, and notation of percentage                                                                                 |
| 40215       |                                                      | Red fraction insets and centesimal frame      | Conversion of fraction insets to percentage using the centesimal frame                                                        |
|             |                                                      |                                               |                                                                                                                               |
| 40217       |                                                      | Pencil/paper                                  | Relative size of terms when multiplying and dividing (positive) numbers                                                       |
| 40218       |                                                      | Pencil/paper                                  | Rounding of decimal fractions                                                                                                 |
| 40219       |                                                      | Pencil/paper                                  | Conversion of common to decimal fractions (and vice versa)                                                                    |
| 40220       | Squares and cubes of numbers                         |                                               |                                                                                                                               |
|             |                                                      |                                               |                                                                                                                               |
|             |                                                      |                                               |                                                                                                                               |
| 40223       | Squares                                              | Bead squares and short chains                 | Concept and notation of the square of a number                                                                                |
| 40224       |                                                      | Bead squares and short chains                 | Exploring squares of numbers 1 – 10                                                                                           |
| 40225       |                                                      | Numerical (paper) decanomial                  | Numerical decanomial                                                                                                          |
|             | Cubes                                                |                                               |                                                                                                                               |
| 40227       |                                                      | Bead cubes and long chains                    | Concept and notation of the cube of a number                                                                                  |
| 40228       |                                                      | Bead cubes and long chains                    | Exploring cubes of numbers 1 – 10                                                                                             |
| 40229       | Operations with squares and cubes                    | Bead cubes and long chains                    | Building the tower of jewels                                                                                                  |
|             |                                                      |                                               |                                                                                                                               |
|             |                                                      |                                               |                                                                                                                               |
| 40231       |                                                      | Bead squares and cubes and paper tickets      | Operations with numbers written as squares and cubes                                                                          |
| 40232       |                                                      |                                               |                                                                                                                               |
|             |                                                      |                                               |                                                                                                                               |
|             | Squaring                                             |                                               |                                                                                                                               |
|             | Squaring: arithmetic passages                        |                                               |                                                                                                                               |
| 40235       |                                                      | Gold square of 10 & rubber bands & tickets    | Transformation of the square of 10 into a binomial                                                                            |
| 40236       |                                                      | Gold square of 10 & rubber bands & tickets    | Transformation of the square of 10 into a trinomial, quadranomial, polynomial                                                 |
| 40237       |                                                      | Bead squares and bead bars and tickets        | Exploring the binomial: building a larger square from a smaller square                                                        |
| 40238       |                                                      | Bead squares and bead bars and tickets        | Exploring a polynomial: squaring a sum (one-digit terms)                                                                      |
| 40239       |                                                      | Golden beads and tickets                      | Application to decimal numbers: squaring a binomial using golden beads (whole numbers $\leq 99$ )                             |
| 40240       |                                                      | Pegboard & pegs, guide square & tickets       | Application to decimal numbers: squaring a binomial using hierarchical pegs (whole numbers) and introduction to guide squares |
| 40241       | Squaring: algebraic passages                         | Guide squares and paper/pencil                | Guide squares: deriving the decimal formula for the square of a polynomial                                                    |
|             |                                                      |                                               |                                                                                                                               |
|             |                                                      |                                               |                                                                                                                               |
| 40243       |                                                      | Gold bead squares, rubber bands, bi-cube lid  | Squaring a binomial, algebraic                                                                                                |
| 40244       |                                                      | Gold bead squares, rubber bands, tri-cube lid | Squaring a trinomial, algebraic                                                                                               |
| 40245       |                                                      |                                               |                                                                                                                               |
|             | Cubing                                               |                                               |                                                                                                                               |
|             | Cubing: arithmetic passages                          |                                               |                                                                                                                               |
| 40248       |                                                      | Wooden cubing material                        | Transformation of a given cube into a cube of a binomial                                                                      |
| 40249       |                                                      | Wooden cubing material                        | Building from a cube to a larger cube with wooden cubing material                                                             |
| 40250       |                                                      |                                               | Cubing a binomial, numeric, starting from the square                                                                          |
| 40251       |                                                      |                                               | Cubing a binomial, numeric, staring from the cube of the first term                                                           |
| 40252       |                                                      |                                               | Cubing a trinomial, numeric, starting from the square                                                                         |

| Activity ID | Content Strand                         | Material                                  | Presentations/Activities                                                                                                                                                  |
|-------------|----------------------------------------|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 40253       | Cubing: algebraic passages             |                                           | Cubing a trinomial, numeric, staring from the cube of the first term                                                                                                      |
|             |                                        |                                           |                                                                                                                                                                           |
| 40255       |                                        |                                           | Cubing a binomial, algebraic                                                                                                                                              |
| 40256       | Cubing: application to decimal numbers |                                           | Cubing a trinomial, algebraic                                                                                                                                             |
|             |                                        |                                           |                                                                                                                                                                           |
|             |                                        |                                           |                                                                                                                                                                           |
| 40258       |                                        | Trinomial & hierarchical cubes & tickets  | Cubing a decimal number (three-digit) using the hierarchical cube                                                                                                         |
| 40259       |                                        |                                           |                                                                                                                                                                           |
|             | Square root                            |                                           |                                                                                                                                                                           |
|             | Square root: sensorial passages        |                                           |                                                                                                                                                                           |
| 40262       |                                        | Bead squares 1-10, paper/pencil           | Concept, language, and notation for square root                                                                                                                           |
| 40263       |                                        | Bead squares 1-10, paper/pencil           | Introduction: one-digit roots                                                                                                                                             |
| 40264       |                                        | Gold bead material, paper/pencil          | Two-digit roots: using golden bead material                                                                                                                               |
| 40265       |                                        | Gold bead material, n-n^2 chart           | Two-digit roots: observing the n – n2 chart                                                                                                                               |
| 40266       |                                        | Pegboard/pegs, n-n^2 chart, guide squares | Two-digit roots: using pegboard (writing results only)                                                                                                                    |
| 40267       |                                        | Pegboard/pegs, n-n^2 chart, guide squares | Two-digit roots: writing                                                                                                                                                  |
| 40268       |                                        | Pegboard/pegs, n-n^2 chart, guide squares | Two- digit roots: four-digit numbers                                                                                                                                      |
| 40269       |                                        | Pegboard/pegs, n-n^2 chart, guide squares | Three-digit roots and beyond: three-digit roots                                                                                                                           |
| 40270       |                                        | Pegboard/pegs, n-n^2 chart, guide squares | Three-digit roots and beyond: zero in the root                                                                                                                            |
| 40271       |                                        | Pegboard/pegs, n-n^2 chart, guide squares | Three-digit roots and beyond: zero at the end of the root                                                                                                                 |
| 40272       |                                        | Pegboard/pegs, n-n^2 chart, guide squares | Three-digit roots and beyond: four-digit roots, writing                                                                                                                   |
|             | Square root: passages to abstraction   |                                           |                                                                                                                                                                           |
| 40274       |                                        | Pegboard/pegs, n-n^2 chart, guide squares | Leading to abstraction: using more than one category at a time                                                                                                            |
| 40275       |                                        | Pegboard/pegs, n-n^2 chart, guide squares | Leading to abstraction: calculating the next root digit                                                                                                                   |
| 40276       |                                        | Paper/pencil, guide squares               | Calculating square root on paper                                                                                                                                          |
| 40277       |                                        | Paper/pencil                              | Rule for extraction of square root                                                                                                                                        |
| 40278       |                                        |                                           |                                                                                                                                                                           |
|             | Cube root                              |                                           |                                                                                                                                                                           |
|             | Cube root: sensorial passages          |                                           |                                                                                                                                                                           |
| 40281       |                                        | Bead cubes 1-10, tickets                  | Concept, geometric representation, language, and notation for cube root                                                                                                   |
| 40282       |                                        | White 2cm cubes                           | Extracting a cube root using 2cm cubes (for numbers less than 250)                                                                                                        |
| 40283       |                                        | Wooden cubing material                    | Extracting a cube root for four- to six-digit numbers using chart and wooden cubing material (by category)                                                                |
|             | Cube root: passages to abstraction     |                                           |                                                                                                                                                                           |
| 40285       |                                        | Wooden cubing material, n-n^3 chart       | Extracting a cube root of four- to six-digit numbers using wooden cubing material: consolidation of the calculations of identical groups of prisms                        |
| 40286       |                                        | Hierarchical cube, n-n^3 chart            | Extracting a cube root of seven- to nine-digit numbers using the hierarchical/decimal trinomial: writing the calculations from the decimal values of the cubes and prisms |
| 40287       |                                        | Paper/pencil                              | Rule for extraction of cube root                                                                                                                                          |
|             |                                        |                                           |                                                                                                                                                                           |
|             |                                        |                                           |                                                                                                                                                                           |
|             | Signed numbers                         |                                           |                                                                                                                                                                           |
| 40291       |                                        | Elementary/negative snake game            | Introduction to signed numbers                                                                                                                                            |
| 40292       |                                        | Elementary/negative snake game            | Addition of signed numbers                                                                                                                                                |
| 40293       |                                        | Elementary/negative snake game            | Multiplication of signed numbers                                                                                                                                          |
| 40294       |                                        | Elementary/negative snake game            | Subtraction of signed numbers                                                                                                                                             |
| 40295       |                                        | Elementary/negative snake game            | Division of signed numbers                                                                                                                                                |
| 40296       |                                        | Paper/pencil                              | Word problems using signed numbers                                                                                                                                        |
| 40297       |                                        |                                           |                                                                                                                                                                           |
|             | Powers of Numbers                      |                                           |                                                                                                                                                                           |
| 40300       |                                        | Box of 1cm cubes, powers of two material  | Factors of the same number for the power of that number                                                                                                                   |

| Activity ID | Content Strand                        | Material                                 | Presentations/Activities                                                           |
|-------------|---------------------------------------|------------------------------------------|------------------------------------------------------------------------------------|
| 40301       |                                       | Powers of two material                   | Unit can be any physical size                                                      |
| 40302       |                                       | Wooden cubing material                   | Any number has powers                                                              |
| 40303       |                                       | Wooden cubing material, pencil/paper     | Special case: multiplication or division of powers of numbers having the same base |
| 40304       |                                       | Decimal board & reciprocal strip         | Negative exponents for base 10                                                     |
| 40305       |                                       | Paper/pencil                             | Operations with numbers written in exponential notation                            |
| 40306       |                                       | Paper/pencil                             | Operations: numbers written in expanded power notation                             |
| 40307       |                                       |                                          |                                                                                    |
|             | Non-decimal bases                     |                                          |                                                                                    |
| 40310       |                                       | Number base board & gold beads           | Counting in a non-decimal base                                                     |
| 40311       |                                       | Number base board & gold beads           | Operations in different bases                                                      |
| 40312       |                                       | Number base board, gold beads, bead bars | Conversion of notation from one base to another using bead material                |
| 40313       |                                       | Number base board, gold beads, bead bars | Conversion from notation of any base to base 10 using expanded power notation      |
| 40314       |                                       | Paper/pencil                             | Algorithm for conversion of notation from one base to another                      |
| 40315       |                                       |                                          |                                                                                    |
|             | Ratio and proportion                  |                                          |                                                                                    |
| 40318       | Ratio                                 | Objects from environment, paper/pencil   | Concept, language, and notation for ratio                                          |
| 40319       |                                       | Paper/pencil                             | Ratio can be expressed as a fraction                                               |
| 40320       |                                       | Pegboard & pegs, paper/pencil            | Ratios are equal if they are equivalent fractions                                  |
| 40321       |                                       | Paper/pencil, objects from environment   | Problem-solving using ratio                                                        |
|             |                                       |                                          |                                                                                    |
|             | Proportion                            |                                          |                                                                                    |
| 40323       |                                       | Metal inset material, powers of two      | Concept, language, and notation for proportion                                     |
| 40324       |                                       | Paper/pencil, objects from environment   | Solving equations with proportion                                                  |
| 40325       |                                       | Paper/pencil                             | Cross multiplication                                                               |
| 40326       |                                       | Word problems                            | Paper/pencil, objects from environment                                             |
|             |                                       |                                          |                                                                                    |
|             | Introduction to algebra               |                                          |                                                                                    |
| 40329       |                                       | Bead bars, number & operations tickets   | Concept of an equation and balancing an equation using the laws of equivalence     |
| 40330       |                                       | Bead bars, number & operations tickets   | Order of operations                                                                |
| 40331       |                                       | Bead bars, number & operations tickets   | Solving an equation for one unknown using the laws of inverse operations           |
| 40332       |                                       | Bead bars, number & operations tickets   | Solving for one unknown using more than one operation                              |
| 40333       |                                       | Paper/pencil                             | Solving equations having fractional coefficients                                   |
| 40334       |                                       | Paper/pencil                             | Translating verbal problems into equations                                         |
| 40335       |                                       | Paper/pencil                             | Solving for two unknowns when there is a pair of equations                         |
| 40336       |                                       | Paper/pencil                             | Solving for two unknowns                                                           |
| 40337       |                                       | Paper/pencil, prepared word problems     | Algebraic word problems                                                            |
| 40338       |                                       |                                          |                                                                                    |
|             | Graphing                              |                                          |                                                                                    |
| 40340       |                                       | Graph examples, paper/pencils            | Introduce graphing (interpreting & constructing graphs)                            |
| 40341       |                                       | Graph paper/pencils                      | Types of graphs                                                                    |
| 40342       |                                       |                                          |                                                                                    |
|             | Statistics & probability              |                                          |                                                                                    |
| 40344       |                                       | Graph paper/pencil                       | Introduce statistics                                                               |
| 40345       |                                       | Graph paper/pencil                       | Statistic concepts: range, median, mode, mean                                      |
| 40346       |                                       | Bead bars, objects from the environment  | Probability, estimation                                                            |
|             |                                       |                                          |                                                                                    |
|             | Word problems                         |                                          |                                                                                    |
|             | Solving for distance, time, and speed |                                          |                                                                                    |
| 40349       |                                       | Group of children                        | Preliminary: run a race                                                            |
| 40350       |                                       | Gold beads & word problem labels         | Solving for distance                                                               |

| Activity ID | Content Strand                                  | Material                                  | Presentations/Activities                                                                         |
|-------------|-------------------------------------------------|-------------------------------------------|--------------------------------------------------------------------------------------------------|
| 40351       | Solving for principal, time, interest, and rate | Gold beads & word problem labels          | Solving for time                                                                                 |
| 40352       |                                                 | Gold beads & word problem labels          | Solving for speed                                                                                |
|             |                                                 |                                           |                                                                                                  |
| 40354       |                                                 |                                           | Preliminary: discuss banking                                                                     |
| 40355       |                                                 | Gold beads & word problem labels          | Solving for interest                                                                             |
| 40356       |                                                 | Gold beads & word problem labels          | Solving for rate                                                                                 |
| 40357       |                                                 | Gold beads & word problem labels          | Solving for principal                                                                            |
| 40358       |                                                 | Gold beads & word problem labels          | Solving for time                                                                                 |
| 40359       |                                                 |                                           |                                                                                                  |
|             | Measurement                                     |                                           |                                                                                                  |
| 40361       |                                                 | Objects from environment, e.G. Paperclips | Concept of measurement: non-standard unit of measurement for length                              |
| 40362       |                                                 | Measuring tools                           | Concept of measurement: standard unit for measurement for length                                 |
| 40363       |                                                 | Measuring tools                           | Introduction to the customary/english system                                                     |
|             |                                                 |                                           |                                                                                                  |
| 40365       | Metric system                                   | Decimal board & handmade cards            | Introduction to the metric system                                                                |
| 40366       |                                                 | Card material                             | Metric system abbreviations                                                                      |
| 40367       |                                                 |                                           | Metric system conversions: how many smaller units are in a larger unit?                          |
| 40368       |                                                 |                                           | Metric system conversions: how many larger units are in a smaller unit?                          |
|             |                                                 |                                           |                                                                                                  |
| 40370       | Other measurements                              |                                           | Volume                                                                                           |
| 40371       |                                                 |                                           | Weight                                                                                           |
| 40372       |                                                 |                                           | Area                                                                                             |
| 40373       |                                                 |                                           | Temperature                                                                                      |
|             | Geometry                                        |                                           |                                                                                                  |
|             |                                                 |                                           |                                                                                                  |
|             | The history of geometry                         |                                           |                                                                                                  |
| 40377       | Stories for geometry                            | Rope for the story (3-4-5)                | The story of how geometry got its name                                                           |
| 40378       |                                                 |                                           | Thales of miletus                                                                                |
| 40379       |                                                 |                                           | Pythagoras of croton                                                                             |
| 40380       |                                                 |                                           | Plato of athens                                                                                  |
| 40381       |                                                 |                                           | Euclid of alexandria                                                                             |
| 40382       |                                                 |                                           |                                                                                                  |
|             | Congruency, similarity, and equivalence         |                                           |                                                                                                  |
| 40384       |                                                 | Red metal inset material                  | Concept, language, and notation for congruent geometric figures                                  |
| 40385       |                                                 | Red metal inset material                  | Concept, language, and notation for similar geometric figures                                    |
| 40386       |                                                 | Red metal inset material                  | Concept, language, and notation for equivalent geometric figures                                 |
| 40387       |                                                 | Constructive triangles                    | Further investigation of congruent, similar, and equivalent figures using constructive triangles |
| 40388       |                                                 |                                           |                                                                                                  |
|             | Geometry nomenclature                           |                                           |                                                                                                  |
| 40390       |                                                 | Geometry nomenclature material            | Introduction to the material                                                                     |
| 40391       |                                                 | Geometry nomenclature material            | Activity one                                                                                     |
| 40392       |                                                 | Geometry nomenclature material            | Activity two                                                                                     |
| 40393       |                                                 | Geometry nomenclature material            | Activity three                                                                                   |
| 40394       |                                                 | Geometry nomenclature material            | Activity four                                                                                    |
| 40395       |                                                 |                                           |                                                                                                  |
|             | Lines                                           |                                           |                                                                                                  |
| 40397       |                                                 | String                                    | Types of lines                                                                                   |
| 40398       |                                                 | String/scissors/marker                    | Parts of a straight line                                                                         |
| 40399       |                                                 | Box of geometry sticks                    | Positions of a straight line                                                                     |
| 40400       |                                                 | Box of geometry sticks                    | Positions of two straight lines                                                                  |
| 40401       |                                                 |                                           |                                                                                                  |
|             | Angles                                          |                                           |                                                                                                  |
| 40403       |                                                 | Box of geometry sticks, right angle tool  | Types of angles                                                                                  |
| 40404       |                                                 | Box of geometry sticks                    | Parts of an angle                                                                                |
| 40405       |                                                 | Box of geometry sticks                    | Pairs of angles                                                                                  |
| 40406       |                                                 | Box of geometry sticks                    | Angles formed by two lines cut by a transversal                                                  |

| Activity ID | Content Strand                                    | Material                                       | Presentations/Activities                                                    |
|-------------|---------------------------------------------------|------------------------------------------------|-----------------------------------------------------------------------------|
| 40407       |                                                   |                                                | Story of the babylonians                                                    |
| 40408       |                                                   | Montessori protractor                          | Measurement of an angle in degrees using the montessori protractor          |
| 40409       |                                                   | Standard protractor                            | Measurement of an angle in degrees using the standard protractor            |
| 40410       |                                                   |                                                |                                                                             |
|             | Polygons                                          |                                                |                                                                             |
| 40412       |                                                   | Box of geometry sticks                         | Types of polygons, named by the number of sides                             |
| 40413       |                                                   | Box of geometry sticks                         | Parts of a polygon                                                          |
| 40414       |                                                   | Box of geometry sticks                         | Diagonals of a polygon related to the sum of interior angles of a polygon   |
| 40415       |                                                   | Box of geometry sticks                         | Regular and irregular polygons                                              |
| 40416       |                                                   | Box of geometry sticks                         | Parts of a regular polygon                                                  |
|             |                                                   |                                                |                                                                             |
| 40418       | Triangles                                         | Box of geometry sticks                         | Parts of a triangle                                                         |
| 40419       |                                                   | Box of geometry sticks                         | Types of triangles according to sides                                       |
| 40420       |                                                   | Box of geometry sticks, right angle tool       | Types of triangles according to angles                                      |
| 40421       |                                                   | Pythagorean plate                              | The story of pythagoras                                                     |
| 40422       |                                                   | Box of geometry sticks                         | Types of triangles according to sides and angles                            |
|             |                                                   |                                                |                                                                             |
| 40424       | Quadrilaterals                                    | Box of geometry sticks                         | Types of quadrilaterals                                                     |
| 40425       |                                                   | Box of geometry sticks                         | Parts of a quadrilateral                                                    |
| 40426       |                                                   | Box of geometry sticks                         | Family tree of quadrilaterals                                               |
|             |                                                   |                                                |                                                                             |
|             | Circles                                           |                                                |                                                                             |
| 40429       |                                                   | Lg. Paper/box of sticks/pencils/string         | Parts of a circle                                                           |
| 40430       |                                                   | Insets of polygons/circle, ruler, paper/pencil | Circumference                                                               |
| 40431       |                                                   | Box of sticks w/curved lines or circle         | Positions of a circle and a straight line                                   |
| 40432       |                                                   | Box of sticks w/curved lines or circle         | Position of two circumferences                                              |
|             |                                                   |                                                |                                                                             |
|             | Equivalence with iron material                    |                                                |                                                                             |
| 40435       |                                                   | Red metal equivalence insets                   | Triangle equivalent to rectangle                                            |
| 40436       |                                                   | Red metal equivalence insets                   | Rhombus equivalent to rectangle                                             |
| 40437       |                                                   | Red metal equivalence insets                   | Trapezoid equivalent to rectangle                                           |
| 40438       |                                                   | Red metal equivalence insets                   | Decagon equivalent to rectangles i and ii                                   |
| 40439       |                                                   | Red metal equivalence insets                   | Equivalence of regular polygon to rectangle (example: pentagon)             |
|             |                                                   |                                                |                                                                             |
|             | Area                                              |                                                |                                                                             |
| 40442       | Introduction to area                              | Yellow area material (w/grid lines)            | Concept of measuring a surface with unit squares                            |
| 40443       |                                                   | Yellow area material, rectangle                | Concept of transforming a surface into a rectangle in order to measure area |
| 40444       |                                                   | Yellow area material                           | Identifying base and height of rectangle, parallelogram, and triangles      |
|             | Deriving area formulas using yellow area material |                                                |                                                                             |
| 40446       |                                                   | Yellow area material, paper/pencil             | Deriving the formula for the area of a rectangle                            |
| 40447       |                                                   | Yellow area material, paper/pencil             | Deriving the formula for the area of a parallelogram                        |
| 40448       |                                                   | Yellow area material, paper/pencil             | Deriving the formula for the area of a triangle                             |
|             | Deriving area formulas using iron material        |                                                |                                                                             |
| 40450       |                                                   | Red metal equivalence insets/iron material     | Area of triangle                                                            |
| 40451       |                                                   | Red metal equivalence insets/iron material     | Area of rhombus                                                             |
| 40452       |                                                   | Red metal equivalence insets/iron material     | Area of trapezoid                                                           |
| 40453       |                                                   | Red metal equivalence insets/iron material     | Area of decagon: rectangle i                                                |
| 40454       |                                                   | Red metal equivalence insets/iron material     | Area of decagon: rectangle ii                                               |
| 40455       |                                                   | Red metal equivalence insets/iron material     | Area of regular polygon (example: pentagon)                                 |

| Activity ID | Content Strand                              | Material                                       | Presentations/Activities                                                |
|-------------|---------------------------------------------|------------------------------------------------|-------------------------------------------------------------------------|
|             |                                             |                                                |                                                                         |
|             | Deriving area formulas using paper material |                                                |                                                                         |
| 40458       |                                             | Prepared divided circles and rectangles        | Area of circle                                                          |
|             |                                             |                                                |                                                                         |
|             | Pythagorean theorem                         |                                                |                                                                         |
| 40461       | Equivalence with iron material              | Pythagorean plate i                            | Pythagorean theorem: plate i                                            |
| 40462       |                                             | Pythagorean plate ii                           | Pythagorean theorem: plate ii                                           |
| 40463       |                                             | Euclid's plate                                 | Pythagorean theorem: plate iii (euclid's plate)                         |
|             |                                             |                                                |                                                                         |
|             | Volume                                      |                                                |                                                                         |
| 40466       |                                             | 2Cm and 1cm white cube material                | Concept of volume                                                       |
| 40467       |                                             | Rectangular prism, volume material, a 2cm cube | Volume of right prism                                                   |
| 40468       |                                             | Solid and divided prism materials              | Volume of right prisms with non-rectangular bases                       |
| 40469       |                                             | Hollow prisms and sand                         | Volume of square pyramid                                                |
| 40470       |                                             | Geometric solids and sand                      | Solids of rotation                                                      |
| 40471       |                                             | Geometric solid cylinder, paper/ pencil        | Volume of a cylinder                                                    |
| 40472       |                                             | Geometric solid cone, paper/pencil             | Volume of a cone                                                        |
| 40473       |                                             | Geometric solid sphere, paper/ pencil          | Volume of a sphere                                                      |
|             |                                             |                                                |                                                                         |
|             | Surface area                                |                                                |                                                                         |
| 40476       | Lateral and total surface area:             | Geometric solids, paper/pencil                 | Rectangular prism                                                       |
| 40477       |                                             |                                                |                                                                         |
|             | Geometric design and construction           |                                                |                                                                         |
| 40479       | Geometric design                            | Metal insets                                   | Metal inset techniques                                                  |
| 40480       |                                             | Metal insets and paper/pencils                 | Designing using the metal insets                                        |
| 40481       |                                             | Ruler, paper/pencil                            | Techniques using a straight-edge or ruler                               |
| 40482       |                                             | Compass, paper/pencil                          | Techniques using a compass                                              |
| 40483       |                                             | Geometry tools, paper/pencil                   | Designing geometric figures/ designing with a straight-edge and compass |
|             |                                             |                                                |                                                                         |
| 40485       | Geometric constructions                     | Straws/string, geometric solids, paper/pencil  | Geometric constructions                                                 |

| CCSS DOMAIN                           | CCSS CLUSTER OBJECTIVES                                                                                            | CCSS STANDARDS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | RELEVANT A.M.I. ACTIVITIES                                                                                                                                                                                                                                                                                                                                                            | RESOURCES / MATERIALS                                                                                                                                                                                                 | “COMPLETENESS<br><i>C = completely covers;</i><br><i>P = partially covers;</i><br><i>X = no coverage/ nothing maps”</i> | COMMENTS                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CC: Counting and Cardinality          | Know number names and the count sequence.                                                                          | Kindergarten                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                       |                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                       | Count to tell the number of objects.                                                                               | Kindergarten                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                       |                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                       | Compare numbers.                                                                                                   | Kindergarten                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                       |                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| OA: Operations and Algebraic Thinking | Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from. | Kindergarten                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                       |                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                       | Represent and solve problems involving addition and subtraction                                                    | 1.OA.A.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.                                                                                                                                                                                                                        | 40041/40065 Golden Beads /Static Addition and Subtraction<br>40042/40066 Golden Beads & Decimal Cards/Static Addition and Subtraction<br>40043/40067 Large Bead Frame/Static Addition and Subtraction<br>40044/40068 Stamp Game/Static Addition and Subtraction<br>40045/40069 Stamp Game w/square paper/writing using symbolic representation<br>40051 Stamp Game with Squared Paper | Golden Bead Material<br>Large Bead Frame<br>Stamp Game                                                                                                                                                                | C                                                                                                                       | Attention should be given to some problems with missing addends. (8+?= 10) Some problems that show missing minuends and subtrahends. (10 - what number = 6)                                                                                                                                                                                                                                                                                        |
|                                       |                                                                                                                    | 1.OA.A.2. Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.                                                                                                                                                                                                                                                                                                           | 40054/40078 Word Problems Golden Beads Addition and Subtraction<br>40055/40079 Bead Bar Addition and Subtraction<br>40051 Stamp Game with Squared Paper                                                                                                                                                                                                                               | Stamp Game<br>Golden Bead Material<br>Bead Bars<br>Symbols for operations, and solving for the unknown in an equation                                                                                                 | C                                                                                                                       | Lessons should include a variety of ways to solve for the unknown and balance equations                                                                                                                                                                                                                                                                                                                                                            |
|                                       |                                                                                                                    | 2.OA.A.1. Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.                                                                                                                                                                                                              | 40054/40078 Golden Beads/Addition and Subtraction Word Problems<br>40055/40079 Bead Bars/Addition and Subtraction Word Problems                                                                                                                                                                                                                                                       | Golden Bead Material<br>Bead Bars                                                                                                                                                                                     | C                                                                                                                       | Lessons should include a variety of ways to solve for the unknown and balance equations. Word problems should include the language “adding to, taking from, putting together, taking apart, and compare”                                                                                                                                                                                                                                           |
|                                       | Understand and apply properties of operations and the relationship between addition and subtraction.               | 1.OA.B.3. Apply properties of operations as strategies to add and subtract. Examples: If $8 + 3 = 11$ is known, then $3 + 8 = 11$ is also known. (Commutative property of addition.) To add $2 + 6 + 4$ , the second two numbers can be added to make a ten, so $2 + 6 + 4 = 2 + 10 = 12$ . (Associative property of addition.)                                                                                                                                                                                                             | 40056 Bead Bar/Commutative Property of Addition<br>40061 Snake Game (Associative Property)                                                                                                                                                                                                                                                                                            | Bead Bars                                                                                                                                                                                                             | C                                                                                                                       | Acknowledge the Commutative and Associative Properties apparent in these lessons. Add vocabulary of “Unknown Quantity”. IMPORTANT: AMI math curriculum includes math problems beyond 20 and introduces both Static and Dynamic Addition and Subtraction. These concepts are presented early and supported by materials which include quantity and symbol. (40046 ,40047, 40048, 40049 for addition and 40070 ,40071, 40072, 40073 for subtraction) |
|                                       |                                                                                                                    | 1.OA.B.4. Understand subtraction as an unknown-addend problem. For example, subtract $10 - 8$ by finding the number that makes 10 when added to 8.                                                                                                                                                                                                                                                                                                                                                                                          | 40083 Snake Game Subtraction                                                                                                                                                                                                                                                                                                                                                          | Subtraction Snake Game                                                                                                                                                                                                | C                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                       | Add and subtract within 20.                                                                                        | 1.OA.C.5. Relate counting to addition and subtraction (e.g., by counting on 2 to add 2).                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 40091 Bead Chains<br>40034/40044 Review of Skip Counting<br>40036 Large Bead Frame                                                                                                                                                                                                                                                                                                    | Short and Long Bead Chains                                                                                                                                                                                            | C                                                                                                                       | The intention of this standard is to help a child understand how to ‘count up’ from the known quantity: if you add 5 and three, you begin with 5 and count up: “6, 7, 8.”                                                                                                                                                                                                                                                                          |
|                                       |                                                                                                                    | 1.OA.C.6. Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making ten (e.g., $8 + 6 = 8 + 2 + 4 = 10 + 4 = 14$ ); decomposing a number leading to a ten (e.g., $13 - 4 = 13 - 3 - 1 = 10 - 1 = 9$ ); using the relationship between addition and subtraction (e.g., knowing that $8 + 4 = 12$ , one knows $12 - 8 = 4$ ); and creating equivalent but easier or known sums (e.g., adding $6 + 7$ by creating the known equivalent $6 + 6 + 1 = 12 + 1 = 13$ ). | 40061/40083 Snake Game<br>40059 Addition Strip Board<br>40060 Addition Finger Charts<br>40081 Subtraction Strip Board<br>40082 Subtraction Finger Charts                                                                                                                                                                                                                              | Bead Bars<br>Addition Strip Board and Finger Charts<br>Subtraction Strip Board and Finger Charts                                                                                                                      | C                                                                                                                       | These materials continue to support the concepts of missing number and unknown quantity found in algebra. Previous knowledge of decomposition of numbers with golden beads is needed. The purpose of this standard is for children to be able to create equivalent sums and for this they need to know that different added can create a sum to build tens for mental addition and subtraction                                                     |
|                                       |                                                                                                                    | 2.OA.B.2. Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.                                                                                                                                                                                                                                                                                                                                                                                               | 40059 Addition Strip Board<br>40060 Addition Finger Charts<br>40061 Addition Snake Game<br>40081 Subtraction Strip Board<br>40082 Subtraction Finger Charts<br>40083 Subtraction Snake Game<br>40027 Golden Beads<br>40047/40071 Large Bead Frame                                                                                                                                     | Addition Strip Board and Finger Charts<br>Subtraction Strip Board and Finger Charts<br>Bead Bars<br>Golden Beads<br>Large and Small Bead Frame<br>Boxes of tickets with equations and answers for all four operations | C                                                                                                                       | Flash cards can help here as well                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                       | Work with addition and subtraction equations                                                                       | 1.OA.D.7. Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. For example, which of the following equations are true and which are false? $6 = 6$ , $7 = 8 - 1$ , $5 + 2 = 2 + 5$ , $4 + 1 = 5 + 2$ .                                                                                                                                                                                                                                                                | Introduction to Algebra<br>40329 Concept of Equation and Balancing<br>40330 Order of Operations<br>40331 Solving Equation/Inverse Operations<br>40332 Solving Equation/More than One Operation                                                                                                                                                                                        | Bead Bars and Operations Tickets                                                                                                                                                                                      | C                                                                                                                       | For first grade, the concept of balance can be easily shown as a child weighs objects on a balance scale, apply language, number and symbols to the relationships seen                                                                                                                                                                                                                                                                             |
|                                       |                                                                                                                    | 1.OA.D.8. Determine the unknown whole number in an addition or subtraction equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations $8 + ? = 11$ , $5 = \quad - 3$ , $6 + 6 = \quad$ .                                                                                                                                                                                                                                                                        | 40061/40083 Snake Game<br>40059 Addition Strip Board<br>40060 Addition Finger Charts<br>40081 Subtraction Strip Board<br>40082 Subtraction Finger Charts<br>40094 Concept Commutative Law                                                                                                                                                                                             | Bead Bars and Cards<br>Snake Game<br>Addition and Subtraction Strip Boards<br>Addition and Subtraction Finger Charts<br>Number Cards and Symbols                                                                      | C                                                                                                                       | Emphasize the missing addend or subtrahend in a variety of ways                                                                                                                                                                                                                                                                                                                                                                                    |

| CCSS DOMAIN                           | CCSS CLUSTER OBJECTIVES                                                                          | CCSS STANDARDS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | RELEVANT A.M.I. ACTIVITIES                                                                                                                                                                    | RESOURCES / MATERIALS                                                       | “COMPLETENESS<br><i>C = completely covers;</i><br><i>P = partially covers;</i><br><i>X = no coverage/ nothing maps”</i> | COMMENTS                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OA: Operations and Algebraic Thinking | Work with equal groups of objects to gain foundations for multiplication.                        | 2.OA.C.3. Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.                                                                                                                                                                                                                                                                                                         | 40087 Golden Beads/Intro. To Multiplication<br>40088 Concept of Simple Multiplication<br>40091 Skip Counting                                                                                  | Cards and counters                                                          | C                                                                                                                       | The concept of odd and even would have been practiced in the primary, but this material could be borrowed for a review in elementary                                                                                                                                                                                                                               |
|                                       |                                                                                                  | 2.OA.C.4. Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.                                                                                                                                                                                                                                                                                                                                  | 40107 Introduction of Checkerboard<br>40108 Multiplication by a One-Digit Multiplier<br>40109 Multiplication by a Multi-Digit Multiplier (Using Bead Bars, No Facts)                          | Bead bars/number tickets<br>Checkerboard                                    | C                                                                                                                       | Graph the multiplication equation on graph paper to visually see the array                                                                                                                                                                                                                                                                                         |
|                                       | Represent and solve problems involving multiplication and division.                              | 3.OA.A.1. Interpret products of whole numbers, e.g., interpret 5 x 7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5 x 7.                                                                                                                                                                                                                                                                                                    | 40089 Decanomial w/bead bars                                                                                                                                                                  | Bead bar box (decanomial)                                                   | C                                                                                                                       | Emphasis on additional language as extension. Array   Graph the array on graph paper so that the child can visually see the array                                                                                                                                                                                                                                  |
|                                       |                                                                                                  | 3.OA.A.2. Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.                                                                                                                                       | 40051 Stamp Game with Squared Paper<br>40134 Racks and Tubes/Division by a One-Digit Divisor                                                                                                  | Stamp game<br>Racks and tubes                                               | C                                                                                                                       | Reminder to use CCSS language as it applies to work in division (divisor, dividend, quotient)                                                                                                                                                                                                                                                                      |
|                                       |                                                                                                  | 3.OA.A.3. Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.                                                                                                                                                                                                                                                                          | 40131 Multiplication Word Problems<br>40143 Division Word Problems<br>40442 ff. Area Work                                                                                                     |                                                                             | C                                                                                                                       | Practicing with instruments of measurement (metric and standard), graphing, gaining the concept and practice measuring perimeter, area, and practice with hand made and oral word problems would all help with this standard                                                                                                                                       |
|                                       |                                                                                                  | 3.OA.A.4. Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations 8 x ? = 48, 5 = ? ÷ 3, 6 x 6 = ?.                                                                                                                                                                                                                                                                               |                                                                                                                                                                                               | Finger charts<br>Decanomial                                                 | C                                                                                                                       | Emphasize various ways to consider the unknown quantity being asked using finger charts: Multiplication 8x6=(what number), 8x(what number)=48, (what number)x6=48. Division 48 : 6=(what number), 48 : 8=(what number), (what number) divided by 8=6, and (what number) divided by 6=8.                                                                            |
|                                       | Understand properties of multiplication and the relationship between multiplication and division | 3.OA.B.5. Apply properties of operations as strategies to multiply and divide. Examples: If 6 x 4 = 24 is known, then 4 x 6 = 24 is also known. (Commutative property of multiplication.) 3 x 5 x 2 can be found by 3 x 5 = 15, then 15 x 2 = 30, or by 5 x 2 = 10, then 3 x 10 = 30. (Associative property of multiplication.) Knowing that 8 x 5 = 40 and 8 x 2 = 16, one can find 8 x 7 as 8 x (5 + 2) = (8 x 5) + (8 x 2) = 40 + 16 = 56. (Distributive property.)                                                              | 40056 Commutative Law of Addition<br>40057 Associative Property of Addition<br>40094 Commutative Law of Multiplication<br>40096-40104 Distributive Law of Multiplication and Associative Laws | Materials for commutative, distributive and associative properties          | C                                                                                                                       | All three laws are inherent in this objective.                                                                                                                                                                                                                                                                                                                     |
|                                       |                                                                                                  | 3.OA.B.6. Understand division as an unknown-factor problem. For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                               |                                                                             | C                                                                                                                       | Practice inverse number operations                                                                                                                                                                                                                                                                                                                                 |
|                                       | Multiply and divide within 100                                                                   | 3.OA.C.7. Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 x 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.                                                                                                                                                                                                                                  | 40110 Checkerboard and Bead bars (Multi-Digit Multiplier, some facts.)<br>40111 Checkerboard (Multi-Digit Multiplier, recording/ final product)<br>40112-400113 Checkerboard                  | Materials for checkerboard                                                  | C                                                                                                                       | AMI curriculum creates problems in categories of units, tens, hundreds, thousands,to millions. Problems are not confined within 100. Emphasize and practice the concept of fact families, and written and oral story problems to show the relationship of multiplication and division.                                                                             |
|                                       | Solve problems involving the four operations, and identify and explain patterns in arithmetic.   | 3.OA.D.8. Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. This standard is limited to problems posed with whole numbers and having whole- number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order (Order of Operations). | 40330 Order of Operations<br>40331 Solving an Equation for One Unknown Using the Laws of Inverse Operations<br>40337 Algebraic Word Problems<br>40056 Commutative Law of Addition             | Bead bars<br>Box of operation symbols and number cards<br>Algebra materials | P                                                                                                                       | Concepts covered in Montessori Math Curriculum can support additional problems. For example: Rounding off using Golden Beads. Stressing concept of estimating while using large bead frame, checkerboard, racks and tubes, stamp game for problems in all four operations. Practice with oral and written word problems. Translate verbal problems into equations. |
|                                       |                                                                                                  | 3.OA.D.9. Identify arithmetic patterns (including patterns in the addition table or multiplication table) and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.                                                                                                                                                                                                                                    |                                                                                                                                                                                               | Golden beads                                                                | C                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                    |
|                                       | Use the four operations with whole numbers to solve problems.                                    | 4.OA.A.1. Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 x 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.                                                                                                                                                                                                                                                                           | Previously presented Montessori materials are applicable to these concepts.                                                                                                                   |                                                                             | C                                                                                                                       | Create oral and written word problems as extensions to the concepts learned with Montessori materials.                                                                                                                                                                                                                                                             |
|                                       |                                                                                                  | 4.OA.A.2. Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.                                                                                                                                                                                                                                                                    | Previously presented Montessori materials are applicable to these concepts.                                                                                                                   |                                                                             | P                                                                                                                       | AMI Guide responsible to create extensions to previously presented Montessori materials                                                                                                                                                                                                                                                                            |
|                                       |                                                                                                  | 4.OA.A.3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.                                                                                                                                       | Previously presented Montessori materials are applicable to these concepts.                                                                                                                   |                                                                             | P                                                                                                                       | Help the child to look at various ways to see the operation/missing number/remainder etc. For example: when using racks and tubes, help the child analyze the relationship of the physical remainder left in the bowl(s) with the equation written with the remainder.                                                                                             |

| CCSS DOMAIN                           | CCSS CLUSTER OBJECTIVES                                      | CCSS STANDARDS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | RELEVANT A.M.I. ACTIVITIES                                                                                                                                                                                                                                                                                                                                                                                       | RESOURCES / MATERIALS                                                                                                        | “COMPLETENESS<br><i>C = completely covers;</i><br><i>P = partially covers;</i><br><i>X = no coverage/ nothing maps”</i> | COMMENTS                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OA: Operations and Algebraic Thinking | Gain familiarity with factors and multiples.                 | 4.OA.B.4. Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.                                                                                                                                                                                                                                    | 40146 Multiples using Short Bead Chains<br>40147 Investigating Multiples Bead Bars<br>40148 Further Investigation of Multiples Using Multiples of Numbers Paper<br>40149 Multiples Tables A & B<br>40150 Concept Common Multiple<br>40151 Investigating Common Multiple<br>40152 Table C<br>40153 Least Common Multiple/LCM<br>40155 Pegs and Pegboard/Factors                                                   | Bead bars/100 paper/tables a,b and c peg board                                                                               | C                                                                                                                       | Generally: We must use mathematical language from the beginning so that the children understand and are comfortable using it themselves - it is an integral part of any math presentation. AMI guides are aware of and can use the language inherent in the Montessori Math Curriculum and introduce it naturally, so when children encounter it in the CCSS, it is very familiar to them.                                           |
|                                       | Generate and analyze patterns.                               | 4.OA.C.5. Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. For example, given the rule “Add 3” and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.                                                                                                                                        | 40148 Further Investigation of Multiples Using Multiples of Numbers Paper<br>40152 Multiples - Table C<br>40155 Pegs and Pegboard/Factors<br>40156 Pegs and Pegboard/Common Factor<br>40157 Table C<br>40158 Pegs and Pegboard/Prime Factor<br>40159 Pegs and Pegboard/Paper LCM<br>40160 Pegs and Pegboard/ Greatest Common Factor (GCF) or Highest Common Factor (HCF)                                         | Multiples - table C<br>Pegs/pegboard                                                                                         | C                                                                                                                       | Oral and written word problems.                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                       | Write and interpret numerical expressions.                   | 5.OA.A.1. Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.                                                                                                                                                                                                                                                                                                                                                                                                                                               | 40235 Transform Square of 10 Binomial<br>40236 Transform Square of 10 Trinomial, Quadranomial, Polynomial.<br>40237 Binomial Squares Larger Sq. from Smaller Sq.<br>40238 Binomial Squaring a Sum<br>40239 Squaring a Binomial Golden Beads<br>40240 Pegboard/Binomial Hierarchical Pegs<br>40241 Deriving Formula/Guide Square<br>40242 Squaring a Binomial, Algebraic<br>40243 Squaring a Trinomial, Algebraic | Golden beads/ bead bars/ pegboard and hierarchical pegs/guide squares<br>Box of numbers and symbols                          | C                                                                                                                       | Emphasize the symbols used in Algebraic expressions: parentheses, brackets, equal signs, exponents, etc.. Stress also the idea of Order of Operations. Become increasingly aware of the Distributive, Commutative, Associative properties that are part of the squaring of binomials, trinomials, quadranomials and polynomials. Extend understanding into the further exploration of Order of Operations found in derived formulas. |
|                                       |                                                              | 5.OA.A.2. Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. For example, express the calculation “add 8 and 7, then multiply by 2” as 2 x (8 + 7). Recognize that 3 x (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.                                                                                                                                                                                                    | 40056 Bead Bar Material and Pencil and Paper<br>40337 Algebraic Word Problems                                                                                                                                                                                                                                                                                                                                    | Bead bars<br>Box of numbers and symbols                                                                                      | C                                                                                                                       | Oral and written word problems.                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                       | Analyze patterns and relationships                           | 5.OA.B.3. Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. For example, given the rule “Add 3” and the starting number 0, and given the rule “Add 6” and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so. |                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                              | P                                                                                                                       | Bringing awareness of this simple concept may be comparatively easy as children already extend lessons on graph paper - for example: children are already familiar with using graph paper when graphing a Checkerboard problem, or when they find the square root of a number and represent that on graph paper. Using the graph paper as a number line would be easy.                                                               |
| NBT: Number and Operations in Base 10 | Work with numbers 11–19 to gain foundations for place value. | Kindergarten                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                              | C                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                       | Extend the counting sequence.                                | Kindergarten                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                              | C                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                       |                                                              | 1.NBT.A.1. Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.                                                                                                                                                                                                                                                                                                                                                                                                     | 40030 Introduce/Review counting 1 - 100<br>40031Decimal System (Numbers to 1000's Using Base Board in Base 10)                                                                                                                                                                                                                                                                                                   | Teen boards, bead bars<br>Golden beads, base board                                                                           | C                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                       | Understand place value.                                      | 1.NBT.B.2. Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases: a. 10 can be thought of as a bundle of ten ones — called a “ten.” b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones. c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).                                                                                         | 40008 Introduce Decimal/Whole Number Categories<br>40009 Association of Symbol & Quantity 1, 10, 100, 1000's<br>40010 Understanding zero<br>40011Forming numbers using concrete quantities of beads<br>40012 Forming numbers w/decimal cards, hiding zeroes                                                                                                                                                      | Teen boards, bead bar<br>Golden beads & decimal cards & trays                                                                | C                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                       |                                                              | 1.NBT.B.3. Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.                                                                                                                                                                                                                                                                                                                                                                                                          | #####                                                                                                                                                                                                                                                                                                                                                                                                            | Red metal inset material<br>Golden bead material<br>Decimal cards                                                            | C                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                       |                                                              | 2.NBT.A.1. Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases: a. 100 can be thought of as a bundle of ten tens — called a “hundred.” b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).                                                                                                                 | 40012 Forming numbers w/decimal cards, hiding zeroes<br>40013Creating Quantities w/Symbols up to 9,999                                                                                                                                                                                                                                                                                                           | Golden beads<br>Decimal cards<br>Trays                                                                                       | C                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                       |                                                              | 2.NBT.A.2. Count within 1000; skip-count by 5s, 10s, and 100s.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 40032 Counting to 1000<br>40033 Counting to 1000<br>40034 Linear & Skip Counting<br>40035 Linear and Skip Counting                                                                                                                                                                                                                                                                                               | Small bead frame<br>Hundred & thousand chain & labels<br>Short/square bead chains & labels<br>Long/cube bead chains & labels | C                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                       |                                                              | 2.NBT.A.3. Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 40019 Expanded Notation/Decomposing numbers<br>40020 Expanded Notation/Decomposing numbers                                                                                                                                                                                                                                                                                                                       | Golden Beads, Decimal Cards<br>LBF Paper                                                                                     | C                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                      |

| CCSS DOMAIN                           | CCSS CLUSTER OBJECTIVES                                                                       | CCSS STANDARDS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | RELEVANT A.M.I. ACTIVITIES                                                                                                                                                                                                                                                        | RESOURCES / MATERIALS                                                          | “COMPLETENESS<br>C = <i>completely</i> covers;<br>P = <i>partially</i> covers;<br>X = <i>no coverage/ nothing maps</i> ” | COMMENTS |
|---------------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|----------|
| NBT: Number and Operations in Base 10 | Understand place value.                                                                       | 2.NBT.A.4. Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.                                                                                                                                                                                                                                                                                                                                              | 40384 Concept, Language, and Notation for Congruent Geometric Figures<br>40385 Concept, Language, and Notation for Similar Geometric Figures<br>40386 Concept, Language, and Notation for Equivalent Geometric Figures<br>40009 Association of Symbol & Quantity 1, 10, 100, 1000 | Red metal inset material<br>Golden bead material<br>Decimal cards              | C                                                                                                                        |          |
|                                       | Use place value understanding and properties of operations to add and subtract                | 1.NBT.C.4. Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. | 40043 Static Addition (no carrying)<br>40044 Static addition (no carrying)<br>40045 Static Addition with recording<br>40046 Dynamic Addition (w/carrying)<br>40065 Concept of Static Subtraction with whole numbers<br>40066 Static Subtraction (no borrowing)                    | Large bead frame<br>Stamp game                                                 | C                                                                                                                        |          |
|                                       |                                                                                               | 1.NBT.C.5. Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.                                                                                                                                                                                                                                                                                                                                                                       | 40147 Further Investigation of Multiples Using Bead Bars (One-and Two-Digit Numbers<br>40149 Calculation of Multiples Using Table A and Table B Linear & Skip Counting)<br>40035 Linear and Skip counting                                                                         | Bead bars<br>Tables A & B<br>Pencil                                            | C                                                                                                                        |          |
|                                       |                                                                                               | 1.NBT.C.6. Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.                                                                                                                                                 | 40047 Dynamic Addition (w/carrying)<br>40071 Dynamic Subtraction (w/borrowing)<br>40049 Dynamic Addition (w/carrying)<br>40073 Dynamic Subtraction (w/borrowing)                                                                                                                  | Golden beads & decimal cards<br>Large bead frame<br>Stamp game                 | C                                                                                                                        |          |
|                                       |                                                                                               | 2.NBT.B.5. Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.                                                                                                                                                                                                                                                                                                                                        | 40047 Dynamic Addition(w/carrying)<br>40071 Dynamic Subtraction (w/borrowing)                                                                                                                                                                                                     | Large bead frame                                                               | C                                                                                                                        |          |
|                                       |                                                                                               | 2.NBT.B.6. Add up to four two-digit numbers using strategies based on place value and properties of operations.                                                                                                                                                                                                                                                                                                                                                                                                   | 40047 Dynamic Addition (w/carrying)<br>40053Introduce/Consolidate Algorithm                                                                                                                                                                                                       | Large bead frame<br>Stamp game w/paper<br>Pencil                               | C                                                                                                                        |          |
|                                       |                                                                                               | 2.NBT.B.7. Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three- digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.                                                    | 40047 Dynamic Addition (w/carrying)<br>40071 Dynamic Subtraction (w/borrowing)<br>40053 Introduce/Consolidate Algorithm                                                                                                                                                           | Large bead frame<br>Stamp game w/paper<br>Pencil                               | C                                                                                                                        |          |
|                                       |                                                                                               | 2.NBT.B.8. Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.                                                                                                                                                                                                                                                                                                                                                                                         | 40047 Dynamic Addition(w/carrying)<br>40071 Dynamic Subtraction (w/borrowing)                                                                                                                                                                                                     | Large bead frame                                                               | C                                                                                                                        |          |
|                                       |                                                                                               | 2.NBT.B.9. Explain why addition and subtraction strategies work, using place value and the properties of operations.                                                                                                                                                                                                                                                                                                                                                                                              | 40056 Commutative Law of Addition<br>40057 Associative Property of Addition<br>40079 Subtraction Word Problems                                                                                                                                                                    | Bead bar material<br>Pencil/paper                                              | C                                                                                                                        |          |
|                                       | Use place value understanding and properties of operations to perform multi-digit arithmetic. | 3.NBT.A.1. Use place value understanding to round whole numbers to the nearest 10 or 100.                                                                                                                                                                                                                                                                                                                                                                                                                         | 40020 Expanded Notation/Decomposing numbers                                                                                                                                                                                                                                       | Small bead frame<br>Large bead frame<br>Sbf & lbf paper                        | C                                                                                                                        |          |
|                                       |                                                                                               | 3.NBT.A.2. Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.                                                                                                                                                                                                                                                                                                                        | 40047 Dynamic Addition (w/carrying)<br>40071 Dynamic Subtraction (w/borrowing)<br>40053 Introduce/Consolidate Algorithm                                                                                                                                                           | Stamp game w/paper<br>Large bead frame<br>Pencil                               | C                                                                                                                        |          |
|                                       |                                                                                               | 3.NBT.A.3. Multiply one-digit whole numbers by multiples of 10 in the range 10–90 (e.g., 9 x 80, 5 x 60) using strategies based on place value and properties of operations.                                                                                                                                                                                                                                                                                                                                      | 40088 concept of simple multiplication (facts)<br>40089 Build the Decanomial w/Bead Bars                                                                                                                                                                                          | Bead bars                                                                      | C                                                                                                                        |          |
|                                       |                                                                                               | 4.NBT.B.4. Fluently add and subtract multi-digit whole numbers using the standard algorithm.                                                                                                                                                                                                                                                                                                                                                                                                                      | 40053 Introduce/Consolidate Algorithm                                                                                                                                                                                                                                             | Large bead frame<br>Stamp game with paper                                      | C                                                                                                                        |          |
|                                       |                                                                                               | 4.NBT.B.5. Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.                                                                                                                                                                                                               | 40115 Multiplication by a One-Digit Multiplier                                                                                                                                                                                                                                    | Large bead frame<br>W/paper<br>Pencil                                          | C                                                                                                                        |          |
|                                       |                                                                                               | 4.NBT.B.6. Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.                                                                                                                                                                | 40127 Geometric Form Multiplication<br>40442 Concept of Measuring a Surface with Unit Squares                                                                                                                                                                                     | Graph paper<br>Colored pencils<br>Ruler<br>Yellow area material (w/grid lines) | C                                                                                                                        |          |

| CCSS Domain                           | CCSS Cluster Objectives                                                                                                                                                 | CCSS Standards                                                                                                                                                                                                                                                                                                                                                                                                       | Relevant A.M.I. Activities                                                                                                                                                                                                                                                                                                                                                                                                                                         | Resources / Materials                                                                                                                                  | “Completeness<br>C = completely covers;<br>P = partially covers;<br>X = no coverage/ nothing maps” | Comments |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|----------|
| NBT: Number and Operations in Base 10 | Generalize place value understanding for multi-digit whole numbers. (Grade 4 expectations in this domain are limited to whole numbers less than or equal to 1,000,000.) | 4.NBT.A.1. Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. For example, recognize that 700 = 10 by applying concepts of place value and division.                                                                                                                                                                              | 40127 Geometric Form of Multiplication                                                                                                                                                                                                                                                                                                                                                                                                                             | Graph paper<br>Colored pencils<br>Ruler                                                                                                                | C                                                                                                  |          |
|                                       |                                                                                                                                                                         | 4.NBT.A.2. Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.                                                                                                                                                         | 40020 Expanded Notation/Decomposing numbers<br>40384 Concept, Language, and Notation for Congruent Geometric Figures<br>40385 Concept, Language, and Notation for Similar Geometric Figures<br>40386 Concept, Language, and Notation for Equivalent Geometric Figures<br>40009 Association of Symbol & Quantity 1, 10, 100, 1000                                                                                                                                   | Sbf/lbf<br>Sbf/lbf paper<br>Pencil<br>Red metal inset material                                                                                         | C                                                                                                  |          |
|                                       |                                                                                                                                                                         | 4.NBT.A.3. Use place value understanding to round multi-digit whole numbers to any place.                                                                                                                                                                                                                                                                                                                            | 40020 Expanded Notation/Decomposing numbers                                                                                                                                                                                                                                                                                                                                                                                                                        | Sbf/lbf<br>Sbf/lbf paper<br>Pencil                                                                                                                     | C                                                                                                  |          |
|                                       | Understand the place value system.                                                                                                                                      | 5.NBT.A.1. Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.                                                                                                                                                                                                              | 40197 Decimals: Quantity and Language<br>40198 Decimals: Symbol<br>40199 Decimals: Formation and Reading<br>40127 Geometric Form of Multiplication                                                                                                                                                                                                                                                                                                                 | Decimal cubes and beads<br>Label strip for decimal board<br>Decimal board (yellow board) & cubes/beads<br>Graph paper<br>Colored pencils<br>Ruler      | C                                                                                                  |          |
|                                       |                                                                                                                                                                         | 5.NBT.A.2. Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.                                                                                                                                 | 40111 Multiplication by a Multi-Digit Multiplier (Using All Facts, Recording Problem and Final Product)<br>40197 Decimals: Quantity and Language<br>40198 Decimals: Symbol<br>40199Decimals: Formation and Reading                                                                                                                                                                                                                                                 | Decimal cubes and beads<br>Label strip for decimal board<br>Decimal board (yellow board) & cubes/beads<br>Checkerboard<br>Bead bars<br>Paper<br>Pencil | C                                                                                                  |          |
|                                       |                                                                                                                                                                         | 5.NBT.A.3. Read, write, and compare decimals to thousandths. a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 x 100 + 4 x 10 + 7 x 1 + 3 x (1/10) + 9 x (1/100) + 2 x (1/1000). b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.           | 40197 Decimals: Quantity and Language<br>40198 Decimals: Symbol<br>40199 Decimals: Formation and Reading                                                                                                                                                                                                                                                                                                                                                           | Decimal cubes and beads<br>Label strip for decimal board<br>Decimal board (yellow board) & cubes/beads                                                 | C                                                                                                  |          |
|                                       | Perform operations with multi-digit whole numbers and with decimals to hundredths.                                                                                      | 5.NBT.A.4. Use place value understanding to round decimals to any place.                                                                                                                                                                                                                                                                                                                                             | 40197 Decimals: Quantity and Language<br>40198 Decimals: Symbol<br>40199 Decimals: Formation and Reading                                                                                                                                                                                                                                                                                                                                                           | Decimal cubes and beads<br>Label strip for decimal board<br>Decimal board (yellow board) & cubes/beads                                                 | C                                                                                                  |          |
|                                       |                                                                                                                                                                         | 5.NBT.B.5. Fluently multiply multi-digit whole numbers using the standard algorithm.                                                                                                                                                                                                                                                                                                                                 | 40129 Consolidate Multiplication Fact memorization<br>40130 Traditional Multiplication Algorithm                                                                                                                                                                                                                                                                                                                                                                   | Paper/pencil                                                                                                                                           | C                                                                                                  |          |
|                                       |                                                                                                                                                                         | 5.NBT.B.6. Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.                                                                 | 40135 Division by a Multi-Digit Divisor<br>40136 Recording Intermediate Remainders, Quotient, Final Remainder<br>40137 Recording What has been used, Intermediate Remainders, Quotient, Final Remainder<br>40112 Multiplication by a Multi-Digit Multiplier (Using Facts, Recording Problem, Partial Products, and Final Product)<br>40127 Geometric Form of Multiplication                                                                                        | Racks & tubes materials<br>Paper/pencil<br>Checkerboard<br>Bead bars<br>No. Tickets, paper<br>Graph paper<br>Colored pencils<br>Ruler                  | C                                                                                                  |          |
|                                       |                                                                                                                                                                         | 5.NBT.B.7. Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.                                                                                                            | 40201 Addition and Subtraction using the Decimal Board<br>40203 Multiplication by a Unit Multiplier<br>40206 Multiplication by a Fraction Using the Decimal Checkerboard<br>40207 Category Multiplication in the Decimal System (Whole and Decimal Numbers, Using Felt Squares)<br>40208 Multiplication of a Fraction by a Fraction Using the Decimal Board<br>40211 Division by a Mixed Number or by a Decimal Number<br>40212 Algorithm for Division of Decimals | Decimal board (yellow board) & cubes/beads<br>Felt squares for decimal checkerboard<br>Decimal checkerboard<br>Beads<br>Numbers<br>Paper<br>Pencil     | C                                                                                                  |          |
| MD: Measurement and Data              | Describe and compare measurable attributes.                                                                                                                             | Kindergarten                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                        |                                                                                                    |          |
|                                       | Classify objects and count the number of objects in each category.                                                                                                      | Kindergarten                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                        |                                                                                                    |          |
|                                       | Measure lengths indirectly and by iterating length units.                                                                                                               | Kindergarten                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                        |                                                                                                    |          |
|                                       |                                                                                                                                                                         | 1.MD.A.1. Order three objects by length; compare the lengths of two objects indirectly by using a third object.                                                                                                                                                                                                                                                                                                      | 40361 Concept of Measurement: non-standard unit of measurement for length<br>40442 Concept of measuring a surface with unit squares                                                                                                                                                                                                                                                                                                                                | Objects from environment<br>Yellow area material                                                                                                       | C                                                                                                  |          |
|                                       |                                                                                                                                                                         | 1.MD.A.2. Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps. | 40361 Concept of Measurement: non-standard unit of measurement for length<br>40442 Concept of measuring a surface with unit squares                                                                                                                                                                                                                                                                                                                                | Objects from environment<br>Yellow area material                                                                                                       | C                                                                                                  |          |

| CCSS DOMAIN              | CCSS CLUSTER OBJECTIVES                         | CCSS STANDARDS                                                                                                                                                                                                                                                                                                                                                                                                        | RELEVANT A.M.I. ACTIVITIES                                                                                                                                                                    | RESOURCES / MATERIALS                                                                  | “COMPLETENESS<br><i>C = completely covers;</i><br><i>P = partially covers;</i><br><i>X = no coverage/ nothing maps”</i> | COMMENTS                                                                                                                                    |
|--------------------------|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| MD: Measurement and Data | Tell and write time.                            | 1.MD.B.3. Tell and write time in hours and half-hours using analog and digital clocks.                                                                                                                                                                                                                                                                                                                                | In Geography album: Time Measurement – My Day                                                                                                                                                 |                                                                                        | C                                                                                                                       |                                                                                                                                             |
|                          | Represent and interpret data.                   | 1.MD.C.4. Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.                                                                                                                                                                              | 40340 Introduce Graphing (interpreting & constructing)                                                                                                                                        | Graph examples<br>Paper<br>Pencils                                                     | C                                                                                                                       |                                                                                                                                             |
|                          |                                                 | 2.MD.D.9. Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.                                                                                                                                            | 40361 Concept of Measurement: non-standard unit of measurement for length<br>40442 Concept of measuring a surface with unit squares<br>40340 Introduce Graphing (interpreting & constructing) | Objects from environment<br>Yellow area material<br>Graph examples<br>Paper<br>Pencils | C                                                                                                                       |                                                                                                                                             |
|                          |                                                 | 2.MD.D.10. Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put- together, take-apart, and compare problems4 using information presented in a bar graph.                                                                                                                                                                                | 40340 Introduce Graphing (interpreting & constructing)                                                                                                                                        | Graph examples<br>Paper<br>Pencils                                                     | C                                                                                                                       |                                                                                                                                             |
|                          |                                                 | 3.MD.B.3. Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.                                                                                      | 40340 Introduce Graphing (interpreting & constructing)                                                                                                                                        | Graph examples<br>Paper<br>Pencils                                                     | C                                                                                                                       |                                                                                                                                             |
|                          |                                                 | 3.MD.B.4. Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units— whole numbers, halves, or quarters.                                                                                                                                                              | 40362 Concept of Measurement Standard Unit for Measure                                                                                                                                        | Measuring tools                                                                        | C                                                                                                                       |                                                                                                                                             |
|                          |                                                 | 4.MD.B.4. Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.                                                   | 40173 Fractions: Quantity and Language<br>40174 Fractions: Symbol and Notation, further language<br>40175 Fractions: Other Representations                                                    | Red metal insets<br>Fraction insets and labels                                         | C                                                                                                                       |                                                                                                                                             |
|                          |                                                 | 5.MD.B.2. Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally. | 40173 Fractions: Quantity and Language<br>40174 Fractions: Symbol and Notation, further language<br>40175 Fractions: Other Representations<br>40374 Liquid measurements: Standard and Metric  | Red metal insets<br>Fraction insets and labels                                         | C                                                                                                                       |                                                                                                                                             |
|                          | Measure and estimate lengths in standard units. | 2.MD.A.1. Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.                                                                                                                                                                                                                                                                     | 40362 Concept of Measurement: Standard Unit for Measure                                                                                                                                       | Measuring tools                                                                        | C                                                                                                                       |                                                                                                                                             |
|                          |                                                 | 2.MD.A.2. Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.                                                                                                                                                                                                                           | 40362 Concept of Measurement: Standard Unit for Measure<br>40361 Concept of Measurement: Non-Standard Unit of Measure                                                                         | Measuring tools<br>Objects in the environment                                          | C                                                                                                                       |                                                                                                                                             |
|                          |                                                 | 2.MD.A.3. Estimate lengths using units of inches, feet, centimeters, and meters.                                                                                                                                                                                                                                                                                                                                      | 40362 Concept of Measurement: Standard Unit for Measure<br>40361 Concept of Measurement: Non-Standard Unit of Measure                                                                         |                                                                                        | C                                                                                                                       | Using measuring tools, the children can play a game of “Guess And Measure”, estimating a link and then measuring to see how close they got. |
|                          |                                                 | 2.MD.A.4. Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.                                                                                                                                                                                                                                                                       | 40362 Concept of Measurement: Standard Unit for Measure<br>40361 Concept of Measurement: Non-Standard Unit of Measure                                                                         | Objects in the environment                                                             | C                                                                                                                       |                                                                                                                                             |
|                          | Relate addition and subtraction to length.      | 2.MD.B.5. Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.                                                                                                                                                        | 40054/40055 Addition Word Problems, problem solving                                                                                                                                           | Golden beads<br>Bead bars<br>Word problems involving length                            | C                                                                                                                       |                                                                                                                                             |
|                          |                                                 | 2.MD.B.6. Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram.                                                                                                                                                                               | 40291 Introduction to Signed Numbers                                                                                                                                                          | Elementary/negative snake game                                                         | P                                                                                                                       | Information in the lesson Introduction to Signed Numbers can be adapted to present only the positive whole numbers.                         |
|                          | Work with time and money.                       | 2.MD.C.7. Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                               | In geography album: time measurement – my day                                          | C                                                                                                                       |                                                                                                                                             |
|                          |                                                 | 2.MD.C.8. Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using \$ and ¢ symbols appropriately. Example: If you have 2 dimes and 3 pennies, how many cents do you have?                                                                                                                                                                                                            | 40054/40055 Addition Word Problems, problem solving                                                                                                                                           | Golden beads<br>Bead bars<br>Word problems involving money                             | C                                                                                                                       |                                                                                                                                             |

| CCSS DOMAIN              | CCSS CLUSTER OBJECTIVES                                                                                                       | CCSS STANDARDS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | RELEVANT A.M.I. ACTIVITIES                                                                                                                                                                                                | RESOURCES / MATERIALS                                                                                                                          | “COMPLETENESS<br>C = <i>completely</i> covers;<br>P = <i>partially</i> covers;<br>X = <i>no coverage/ nothing maps</i> ” | COMMENTS                                                                                                                                                                                                                                                   |
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| MD: Measurement and Data | Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.              | 3.MD.A.1 Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 40054/40055 Addition Word Problems, problem solving                                                                                                                                                                       | Golden beads<br>Bead bars<br>Word problems involving time                                                                                      | C                                                                                                                        |                                                                                                                                                                                                                                                            |
|                          |                                                                                                                               | 3.MD.A.2. Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 40370 Volume<br>40371 Weight<br>40372 Area<br>40374 Liquid measurements: Standard and Metric                                                                                                                              | Objects in the environment<br>Pan balance<br>Measuring cups, beakers, graduated cylinders, etc.                                                | C                                                                                                                        |                                                                                                                                                                                                                                                            |
|                          | Geometric measurement: understand concepts of area and relate area to multiplication and to addition.                         | 3.MD.C.5. Recognize area as an attribute of plane figures and understand concepts of area measurement. a. A square with side length 1 unit, called “a unit square,” is said to have “one square unit” of area, and can be used to measure area. b. A plane figure which can be covered without gaps or overlaps by n unit squares is said to have an area of n square units.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 40442 Measuring Surface w/Unit Sqs 40443 Transforming Surface to Rectangle to Measure Area                                                                                                                                | Yellow area material (w/grid lines)<br>Yellow area material, rectangle                                                                         | C                                                                                                                        |                                                                                                                                                                                                                                                            |
|                          |                                                                                                                               | 3.MD.C.6. Measure areas by counting unit squares (square cm, square m, square in, square ft., and improvised units).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 40442 Measuring Surface w/Unit Sqs                                                                                                                                                                                        | Yellow area material (w/grid lines)                                                                                                            | C                                                                                                                        |                                                                                                                                                                                                                                                            |
|                          |                                                                                                                               | 3.MD.C.7. Relate area to the operations of multiplication and addition. a. Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths. b. Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning. c. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and b + c is the sum of a x b and a x c. Use area models to represent the distributive property in mathematical reasoning. d. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems. | 40444 Identifying b x h<br>40446 Formula for Area of Rectangle<br>40447-40448 Formula for Parallelogram and Triangle<br>40450-40455 Area of Triangle, Rhombus, Trapezoid, Decagon and Regular Polygons like Pentagons     | Yellow area material<br>Yellow area material, paper/pencil<br>Yellow area material, paper/pencil<br>Red metal equivalence insets/iron material | C                                                                                                                        | Mapped AMI activities also cover deriving formulas for the area of parallelograms and triangles, and explores areas of rhombus, trapezoid, decagons and regular polygons like pentagons. Word problems extend this work and provide real-world experience. |
|                          | Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures. | 3.MD.D.8. Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 40416 Parts of a Regular Polygon<br>40442 Measuring Surface w/Unit Sqs<br>40443 Transforming Surface to Rec                                                                                                               | Box of geometry sticks<br>Yellow area material (w/grid lines)<br>Yellow area material, rectangle                                               | P                                                                                                                        | Mapped AMI activities introduce concept of perimeter but do not specifically address problem-solving with perimeter.                                                                                                                                       |
|                          | Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.                     | 4.MD.A.1. Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb., oz.; l, ml; hr., min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two- column table. For example, know that 1 ft. is 12 times as long as 1 in. Express the length of a 4 ft. snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...                                                                                                                                                                                                                                                                                                                                                                                                                          | 40361 Non-standard Unit for Length<br>40362 Standard Unit for Length<br>40363 Intro to Customary English Syst<br>40365 Intro to Metric System<br>40366-40368 Metric Syst Conversions                                      | Objects from the environment<br>Measuring tools<br>Measuring tools<br>Decimal board & handmade cards<br>Card material                          | P                                                                                                                        | Creation of conversion table not directly noted in lessons here.                                                                                                                                                                                           |
|                          |                                                                                                                               | 4.MD.A.2. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 40349 Preliminary Run a Race<br>40350-40352 Solving Dist, Time, Speed<br>40340-40341 Intro to/Types of Graphs<br>40354-40358 Solving for Interest, Rate, Principle, Time<br>40370-40373 Volume, Weight, Area, Temperature | Group of children<br>Gold beads & word problem labels<br>Graph examples, paper/pencils<br>Golden beads & word problem labels                   | C                                                                                                                        |                                                                                                                                                                                                                                                            |
|                          |                                                                                                                               | 4.MD.A.3. Apply the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 40334 Trans Verbal Probs to Equations<br>40337 Algebraic Word Problems<br>40331-40332 Solving for One Unknown                                                                                                             | Paper/pencil<br>Paper/pencil<br>Bead bars, number/operations tickets                                                                           | C                                                                                                                        |                                                                                                                                                                                                                                                            |
|                          |                                                                                                                               | 4.MD.C.5. Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a “one-degree angle,” and can be used to measure angles. b. An angle that turns through n one-degree angles is said to have an angle measure of n degrees.                                                                                                                                                                                                                                                                                                                                                      | 40403 Types of Angles<br>40404 Parts of an Angle                                                                                                                                                                          | Box of geometry sticks, right angle tool<br>Box of geometry sticks                                                                             | C                                                                                                                        |                                                                                                                                                                                                                                                            |
|                          | Geometric measurement: understand concepts of angle and measure angles.                                                       | 4.MD.C.6. Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 40408 Measurement of Angle Degrees<br>40409 Measurement of Angle Degrees                                                                                                                                                  | Montessori protractor<br>Standard protractor                                                                                                   | C                                                                                                                        |                                                                                                                                                                                                                                                            |
|                          |                                                                                                                               | 4.MD.C.7. Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 40408 Measurement of Angle Degrees<br>40409 Measurement of Angle Degrees<br>40405 Pairs of Angles<br>40406 Angles Cut by a Transversal                                                                                    | Montessori protractor<br>Standard protractor<br>Box of geometry sticks<br>Box of geometry sticks                                               | C                                                                                                                        | Mapped AMI activities go beyond standard to cover various types of angles created by transversals.                                                                                                                                                         |

| CCSS DOMAIN              | CCSS CLUSTER OBJECTIVES                                                                                                 | CCSS STANDARDS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | RELEVANT A.M.I. ACTIVITIES                                                                                                                                                                                                                                                               | RESOURCES / MATERIALS                                                                   | “COMPLETENESS<br><i>C = completely covers;</i><br><i>P = partially covers;</i><br><i>X = no coverage/ nothing maps”</i> | COMMENTS                                                                                                                                     |
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| MD: Measurement and Data | Convert like measurement units within a given measurement system.                                                       | 5.MD.A.1. Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 40367 Conversions Small to Large Unit<br>40368 Conversions Large to Small Unit                                                                                                                                                                                                           |                                                                                         | C                                                                                                                       |                                                                                                                                              |
|                          | Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.               | 5.MD.C.3. Recognize volume as an attribute of solid figures and understand concepts of volume measurement. a. A cube with side length 1 unit, called a “unit cube,” is said to have “one cubic unit” of volume, and can be used to measure volume. b. A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 40466 Concept of Volume                                                                                                                                                                                                                                                                  | 2Cm and 1cm white cube material                                                         | C                                                                                                                       |                                                                                                                                              |
|                          |                                                                                                                         | 5.MD.C.4. Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft., and improvised units.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 40466 Concept of Volume                                                                                                                                                                                                                                                                  | 2Cm and 1cm white cube material                                                         | C                                                                                                                       |                                                                                                                                              |
|                          |                                                                                                                         | 5.MD.C.5. Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication. a. Apply the formulas $V=L \times W \times H$ and $V=B \times H$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems. b. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems. | 40467 Volume of Right Prism<br>40468 Right Prisms w/Non-Rec Bases                                                                                                                                                                                                                        | Rectangular prism, volume material, a 2cm cube<br>Solid and divided prism material      | C                                                                                                                       | Mapped AMI activities also cover Volume of Square Pyramid, Solids of Rotation, Volume of a Cylinder, Volume of a Cone and Volume of a Sphere |
| G: Geometry              | Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres). | Kindergarten                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                          |                                                                                         |                                                                                                                         |                                                                                                                                              |
|                          | Analyze, compare, create, and compose shapes.                                                                           | Kindergarten                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                          |                                                                                         |                                                                                                                         |                                                                                                                                              |
|                          | Reason with shapes and their attributes.                                                                                | 1.G.A.1. Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 40390 Introduction to the Material<br>40391 Activity One<br>40392 Activity Two<br>40393 Activity Three<br>40394 Activity Four<br>40412 Types of Polygons, Named by the Number of Sides                                                                                                   | Geometry nomenclature material<br>Box of geometry sticks<br>Right angle tool            | C                                                                                                                       |                                                                                                                                              |
|                          |                                                                                                                         | 1.G.A.2. Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 40479 Metal Inset Techniques<br>40480 Designing Using the Metal Insets 40481<br>Techniques Using a Straight-Edge or Ruler<br>40482 Techniques Using a Compass<br>40483 Designing Geometric Figures/ Designing with a<br>Straight-Edge and Compass                                        | Metal insets<br>Ruler<br>Compass<br>Geometry tools<br>Straws/string<br>Geometric solids | C                                                                                                                       |                                                                                                                                              |
|                          |                                                                                                                         | 1.G.A.3. Partition circles and rectangles into two and four equal shares, describe the shares using the words halves, fourths, and quarters, and use the phrases half of, fourth of, and quarter of. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 40173 Fractions Quantity and Language<br>40174 Fractions Symbol, Notation, Further Language<br>40174 Fractions Symbol, Notation, Further Language<br>40176 Equivalence Sensorial                                                                                                         | Red metal fraction insets<br>Labels                                                     | C                                                                                                                       |                                                                                                                                              |
|                          |                                                                                                                         | 2.G.A.1. Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. (Sizes are compared directly or visually, not compared by measuring.) Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 40390 Introduction to the Geometry Nomenclature<br>Material<br>40391 Activity One<br>40392 Activity Two<br>40393 Activity Three<br>40394 Activity Four<br>40412 Types of Polygons, Named by the Number of Sides<br>40415 Regular and Irregular Polygons<br>40424 Types of Quadrilaterals | Geometry nomenclature material<br>Box of geometry sticks<br>Right angle tool            | C                                                                                                                       |                                                                                                                                              |
|                          |                                                                                                                         | 2.G.A.2. Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 40442 Concept of Measuring a Surface with Unit Squares                                                                                                                                                                                                                                   | Yellow area material                                                                    | C                                                                                                                       |                                                                                                                                              |
|                          |                                                                                                                         | 2.G.A.3. Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words halves, thirds, half of, a third of, etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 40173 Fractions Quantity and Language<br>40174 Fractions Symbol, Notation, Further Language<br>40175 Fractions Other Representations<br>40176 Equivalence Sensorial                                                                                                                      | Red metal fraction insets                                                               | C                                                                                                                       |                                                                                                                                              |
|                          |                                                                                                                         | 3.G.A.1. Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 40424 Types of Quadrilaterals<br>40425 Parts of a Quadrilateral<br>40426 Family Tree of Quadrilaterals                                                                                                                                                                                   | Box of geometry sticks<br>Right angle tool                                              | C                                                                                                                       |                                                                                                                                              |

| CCSS DOMAIN                          | CCSS CLUSTER OBJECTIVES                                                                                                                                                                                                      | CCSS STANDARDS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | RELEVANT A.M.I. ACTIVITIES                                                                                                                                                                                         | RESOURCES / MATERIALS                                                                           | “COMPLETENESS<br><i>C = completely covers;</i><br><i>P = partially covers;</i><br><i>X = no coverage/ nothing maps”</i> | COMMENTS                                                                                                                                                               |
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| G: Geometry                          |                                                                                                                                                                                                                              | 3.G.A.2. Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.                                                                                                                                                                                                                                                                                                                                                                                        | 40173 Fractions Quantity and Language<br>40174 Fractions Symbol, Notation, Further Language<br>40175 Fractions Other Representations<br>40176 Equivalence Sensorial                                                | Red metal fraction insets<br>Labels                                                             | C                                                                                                                       |                                                                                                                                                                        |
|                                      | Draw and identify lines and angles, and classify shapes by properties of their lines and angles.                                                                                                                             | 4.G.A.1. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 40397 Types of Lines<br>40398 Parts of a Straight Line<br>40499 Positions of a Straight Line<br>40400 Positions of Two Straight Lines                                                                              | “String<br>Scissors<br>Box of geometry sticks                                                   | C                                                                                                                       |                                                                                                                                                                        |
|                                      |                                                                                                                                                                                                                              | 4.G.A.2. Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.                                                                                                                                                                                                                                                                                                                                                                                               | 40499 Positions of a Straight Line<br>40400 Positions of Two Straight Lines<br>40403 Types of Angles<br>40404 Parts of an Angle<br>40420 Types of Triangles According to Angles                                    | Box of geometry sticks<br>Right angle tool                                                      | C                                                                                                                       |                                                                                                                                                                        |
|                                      |                                                                                                                                                                                                                              | 4.G.A.3. Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.                                                                                                                                                                                                                                                                                                                                                                                                             | 40387 Further Investigation of Congruent, Similar, and Equivalent Figures Using Constructive Triangles                                                                                                             | Constructive triangles                                                                          | P                                                                                                                       | Children who have worked with the constructive triangles will have discovered the concept themselves; the teacher will need to provide the language “line of symmetry” |
|                                      | Graph points on the coordinate plane to solve real-world and mathematical problems.                                                                                                                                          | 5.G.A.1. Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate). | 40340 Introduce Graphing (Interpreting & Constructing Graphs)<br>40341 Types of Graphs                                                                                                                             | Graph paper<br>Graph examples                                                                   | P                                                                                                                       |                                                                                                                                                                        |
|                                      |                                                                                                                                                                                                                              | 5.G.A.2. Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. Classify two-dimensional figures into categories based on their properties.                                                                                                                                                                                                                                                                                                                                                              | 40340 Introduce Graphing (Interpreting & Constructing Graphs)<br>40341 Types of Graphs                                                                                                                             | Graph paper<br>Graph examples                                                                   | C                                                                                                                       |                                                                                                                                                                        |
|                                      | Classify two-dimensional figures into categories based on their properties.                                                                                                                                                  | 5.G.B.3. Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.                                                                                                                                                                                                                                                                                                                                                                               | 40390 Introduction to the Geometry Nomenclature Material<br>40426 Family Tree of Quadrilaterals                                                                                                                    | Geometry nomenclature material                                                                  | C                                                                                                                       |                                                                                                                                                                        |
|                                      |                                                                                                                                                                                                                              | 5.G.B.4. Classify two-dimensional figures in a hierarchy based on properties.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 40391 Introduction to the Geometry Nomenclature Material<br>40422 Types of Triangles According to Sides and Angles<br>40426 Family Tree of Quadrilaterals                                                          | Geometry nomenclature material<br>Box of sticks                                                 | C                                                                                                                       | On Standardized Tests, the question often asks students to classify figures into a chart based on properties.                                                          |
|                                      | Solve real-world and mathematical problems involving area, surface area, and volume.                                                                                                                                         | 6.G.A.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.                                                                                                                                                                                                                                                                                                                                                                          | 40446-48 Deriving the formula for rectangles, parallelograms and three kinds of triangles<br>40450-55 Formulas with metal insets of equivalent figures-triangles, rhombus, trapezoid, decagon and regular polygons | Yellow material for area, iron insets for equivalence                                           | C                                                                                                                       | Word problems and hands-on building projects within the classroom extend these concepts and provide real-world experience.                                             |
|                                      |                                                                                                                                                                                                                              | 6.G.A.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 $V = l w h$ and $V = b h$ to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.                                                                                                                                                                                    | 40466 Concept of volume<br>40467 Volume of a right prism                                                                                                                                                           | 1 & 2 Cm volume cubes, whole and divided geometric solids, hollow solids                        | C                                                                                                                       | Much more work is done with a variety of figures including hexagonal, triangular solids and pyramids in lessons 40468-40469.                                           |
|                                      |                                                                                                                                                                                                                              | 6.G.A.3. Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate. Apply these techniques in the context of solving real-world and mathematical problems.                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                    |                                                                                                 | X                                                                                                                       |                                                                                                                                                                        |
|                                      |                                                                                                                                                                                                                              | 6.G.A.4. Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.                                                                                                                                                                                                                                                                                                                                                                                               | 40476 Total and Lateral Area                                                                                                                                                                                       | Geometric solids & paper                                                                        | C                                                                                                                       |                                                                                                                                                                        |
| NF: Number and Operations--Fractions | “(Grade 3 expectations in this domain are limited to fractions with denominators 2, 3, 4, 6, and 8.)<br>(Grade 4 expectations in this domain are limited to fractions with denominators 2, 3, 4, 5, 6, 8, 10, 12, and 100.)” |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                    |                                                                                                 |                                                                                                                         | AMI starts much earlier, e.g., K, 1, 2                                                                                                                                 |
|                                      | Develop understanding of fractions as numbers                                                                                                                                                                                | 3.NF.A.1. Understand a fraction $\frac{1}{b}$ as the quantity formed by 1 part when a whole is partitioned into $b$ equal parts; understand a fraction $\frac{a}{b}$ as the quantity formed by $a$ parts of size $\frac{1}{b}$ .                                                                                                                                                                                                                                                                                                                                                                                                              | 40173 Fractions: Quantity and Language<br>40174 Fractions: Symbol, Notation, Further Language<br>40175 Fractions: Other Representations                                                                            | Red metal fraction insets and labels<br>Divided squares and triangles<br>Constructive triangles | C                                                                                                                       |                                                                                                                                                                        |

| CCSS DOMAIN                          | CCSS CLUSTER OBJECTIVES                                                                                               | CCSS STANDARDS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | RELEVANT A.M.I. ACTIVITIES                                                                                          | RESOURCES / MATERIALS                                                                                                      | “COMPLETENESS<br><i>C = completely covers;</i><br><i>P = partially covers;</i><br><i>X = no coverage/ nothing maps”</i> | COMMENTS                                                                                                                                                                                                                        |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NF: Number and Operations--Fractions | Develop understanding of fractions as numbers                                                                         | 3.NF.A.2. Understand a fraction as a number on the number line; represent fractions on a number line diagram. a. Represent a fraction $1/b$ on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into $b$ equal parts. Recognize that each part has size $1/b$ and that the endpoint of the part based at 0 locates the number $1/b$ on the number line. b. Represent a fraction $a/b$ on a number line diagram by marking off a lengths $1/b$ from 0. Recognize that the resulting interval has size $a/b$ and that its endpoint locates the number $a/b$ on the number line.                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                     |                                                                                                                            | X                                                                                                                       | Concepts of fractions on number line are not covered, although the same concepts are developed in the context of divided polygons in the Fraction Insets<br>AMI lesson not numbered: “Fractions as Parts of a Set” (HMTI, 2013) |
|                                      |                                                                                                                       | 3.NF.A.3. Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line. b. Recognize and generate simple equivalent fractions, e.g., $1/2 = 2/4$ , $4/6 = 2/3$ . Explain why the fractions are equivalent, e.g., by using a visual fraction model. c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Examples: Express 3 in the form $3 = 3/1$ ; recognize that $6/1 = 6$ ; locate $4/4$ and 1 at the same point of a number line diagram. d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols $>$ , $=$ , or $<$ , and justify the conclusions, e.g., by using a visual fraction model.                                           | 40176 Equivalence: Sensorial                                                                                        | Red fraction insets and labels<br>Box of fraction pieces<br>Fraction charts 3, 4, 5, & 11                                  | P                                                                                                                       | AMI lesson not numbered: “Nomenclature for Equivalence” (HMTI, 2013) completes equivalence table                                                                                                                                |
|                                      | Extend understanding of fraction equivalence and ordering.                                                            | 4.NF.A.1. Explain why a fraction $a/b$ is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 40176 Equivalence: Sensorial                                                                                        | Red fraction insets and labels<br>Divided squares and triangles<br>Box of fraction pieces<br>Fraction charts 3, 4, 5, & 11 | P                                                                                                                       | AMI work starts earlier, e.g. 1-2; this is an outcome of “repeated effortful practice” of the students                                                                                                                          |
|                                      |                                                                                                                       | 4.NF.A.2. Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $1/2$ . Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$ , $=$ , or $<$ , and justify the conclusions, e.g., by using a visual fraction model.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 40176 Equivalence: Sensorial                                                                                        | Red fraction insets and labels<br>Box of fraction pieces<br>Fraction charts 3, 4, 5, & 11                                  | P                                                                                                                       |                                                                                                                                                                                                                                 |
|                                      | Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers. | 4.NFB.3. Understand a fraction $a/b$ with $a > 1$ as a sum of fractions $1/b$ . a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. Examples: $3/8 = 1/8 + 1/8 + 1/8$ ; $3/8 = 1/8 + 2/8$ ; $2 \frac{1}{8} = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$ . c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction. d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.                                                                                | 40178 Simple Addition (Denominators Common, Reduction)<br>40179 Simple Subtraction (Denominators Common, Reduction) | Fraction insets and paper tickets                                                                                          | C                                                                                                                       |                                                                                                                                                                                                                                 |
|                                      |                                                                                                                       | 4.NFB.4. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number. a. Understand a fraction $a/b$ as a multiple of $1/b$ . For example, use a visual fraction model to represent $5/4$ as the product $5 \times (1/4)$ , recording the conclusion by the equation $5/4 = 5 \times (1/4)$ . b. Understand a multiple of $a/b$ as a multiple of $1/b$ , and use this understanding to multiply a fraction by a whole number. For example, use a visual fraction model to express $3 \times (2/5)$ as $6 \times (1/5)$ , recognizing this product as $6/5$ . (In general, $n \times (a/b) = (n \times a)/b$ .) c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. For example, if each person at a party will eat $3/8$ of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie? | 40180 Simple Multiplication (by Single-Digit Whole Number, Reduction)                                               | Fraction insets and paper tickets                                                                                          | C                                                                                                                       | Related lessons might be: 40319 Ratio can be Expressed as a Fraction, 40320 Ratios are Equal if They are Equivalent Fractions                                                                                                   |

| CCSS DOMAIN                          | CCSS CLUSTER OBJECTIVES                                                                                   | CCSS STANDARDS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | RELEVANT A.M.I. ACTIVITIES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | RESOURCES / MATERIALS                                                                                                     | “COMPLETENESS<br><i>C = completely covers;</i><br><i>P = partially covers;</i><br><i>X = no coverage/ nothing maps”</i> | COMMENTS                                                                                                                                                                                                      |
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| NF: Number and Operations--Fractions | Use equivalent fractions as a strategy to add and subtract fractions.                                     | 5.NF.A.1. Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, $2/3 + 5/4 = 8/12 + 15/12 = 23/12$ . (In general, $a/b + c/d = (ad + bc)/bd$ .)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 40183 Addition/Subtraction: Uncommon Denominators<br>40188 Addition/Subtraction: Finding a Common Denominator Using Transparencies<br>40189 Addition/Subtraction: Finding a Common Denominator by Multiplying the Denominators<br>40190 Addition/Subtraction: Known Denominator, Finding the Numerators by Raising or Reducing a Fraction<br>40191 Addition/Subtraction: Finding the Least Common Denominator (LCD)<br>40193 Addition/Subtraction - Finding a Common Denominator Using Graph Paper<br>40194 Raising/Reducing a Fraction Arithmetically | Fraction insets and paper tickets<br>Box of fraction pieces<br>Transparencies prepared with fraction lines<br>Graph paper | C                                                                                                                       |                                                                                                                                                                                                               |
|                                      |                                                                                                           | 5.NF.A.2. Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. For example, recognize an incorrect result $2/5 + 1/2 = 3/7$ , by observing that $3/7 < 1/2$ .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 40193 Applications with Fractions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                           | P                                                                                                                       | This is an outcome of “repeated effortful practice” of the child, however it would be helpful to have some reliable sample problems                                                                           |
|                                      | Apply and extend previous understandings of multiplication and division to multiply and divide fractions. | 5.NF.B.3. Interpret a fraction as division of the numerator by the denominator ( $a/b = a \div b$ ). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. For example, interpret $3/4$ as the result of dividing 3 by 4, noting that $3/4$ multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size $3/4$ . If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 40181 Simple Division (by Single-Digit Whole Number, Reduction)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Fraction insets and paper tickets<br>Large skittles                                                                       | C                                                                                                                       |                                                                                                                                                                                                               |
|                                      |                                                                                                           | 5.NF.B.4. Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. a. Interpret the product $(a/b) \times q$ as a parts of a partition of $q$ into $b$ equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$ . For example, use a visual fraction model to show $(2/3) \times 4 = 8/3$ , and create a story context for this equation. Do the same with $(2/3) \times (4/5) = 8/15$ . (In general, $(a/b) \times (c/d) = ac/bd$ .) b. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 40180 Simple Multiplication (by Single-Digit Whole Number, Reduction)<br>40184 Multiplication by a Fraction Less than One                                                                                                                                                                                                                                                                                                                                                                                                                              | Fraction insets<br>Paper tickets<br>Box of fraction pieces                                                                | P                                                                                                                       | “AMI lesson not numbered: “”Multiplication Using Graph Paper”” (HMTI, 2013)<br>AMI does not directly map multiplication of fractions to area, except loosely in using graph paper to find common denominator” |
|                                      |                                                                                                           | 5.NF.B.5. Interpret multiplication as scaling (resizing), by: a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying $a/b$ by 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 40184 Multiplication by a Fraction Less than One<br>40180 Simple Multiplication (by Single-Digit Whole Number, Reduction)                                                                                                                                                                                                                                                                                                                                                                                                                              | Fraction insets<br>paper tickets<br>box of fraction pieces                                                                | C                                                                                                                       | This is an outcome of repeated practice of working problems. If the child does not come to this realization a separate discussion may occur guiding the child through the materials.                          |
|                                      |                                                                                                           | 5.NF.B.6. Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 40192 Abstraction of the Rules for Operations with Fractions<br>40193 Applications with Fractions                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                           | C                                                                                                                       | This is an outcome of “repeated effortful practice” of the child, however it would be helpful to have some reliable sample problems                                                                           |
|                                      |                                                                                                           | 5.NF.B.7. Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. (1Students able to multiply fractions in general can develop strategies to divide fractions in general, by reasoning about the relationship between multiplication and division. But division of a fraction by a fraction is not a requirement at this grade.) a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. For example, create a story context for $(1/3) \div 4$ , and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $(1/3) \div 4 = 1/12$ because $(1/12) \times 4 = 1/3$ . b. Interpret division of a whole number by a unit fraction, and compute such quotients. For example, create a story context for $4 \div (1/5)$ , and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that $4 \div (1/5) = 20$ because $20 \times (1/5) = 4$ . b. Solve real world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. For example, how much chocolate will each person get if 3 people share $1/2$ lb. of chocolate equally? How many $1/3$ -cup servings are in 2 cups of raisins? | 40185 Division by a Fraction Less than One (Measurement/Group)<br>40186 Division by a Fraction Less than One (Partitive / Sharing)”                                                                                                                                                                                                                                                                                                                                                                                                                    | Fraction insets and paper tickets<br>Large skittles<br>Pencil/paper                                                       | C                                                                                                                       |                                                                                                                                                                                                               |

| CCSS DOMAIN                                | CCSS CLUSTER OBJECTIVES                                                                                   | CCSS STANDARDS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | RELEVANT A.M.I. ACTIVITIES                                                                                                                                                                                                     | RESOURCES / MATERIALS                                                                                  | “COMPLETENESS<br>C = <i>completely covers</i> ;<br>P = <i>partially covers</i> ;<br>X = <i>no coverage/ nothing maps</i> ” | COMMENTS                                                                                       |
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| NF: Number and Operations--Fractions       | Understand decimal notation for fractions, and compare decimal fractions.                                 | 4.NF.C.5. Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.4 For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 40197 Decimals: Quantity and Language<br>40198 Decimals: Symbol<br>40199 Decimals: Formation and Reading<br>40201 Addition and Subtraction Using the Decimal Board<br>40202 Algorithm for Addition and Subtraction of Decimals | Decimal cubes and beads<br>Label strip for decimal board<br>Decimal board (yellow board) & cubes/beads | C                                                                                                                          |                                                                                                |
|                                            |                                                                                                           | 4.NF.C.6. Use decimal notation for fractions with denominators 10 or 100. For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 40214 Concept, Language, and Notation of Percentage<br>40215 Conversion of Fraction Insets to Percentage using the Centesimal Frame<br>40219 Conversion of Common to Decimal Fractions (and vice versa)                        | Centesimal frame<br>Red fraction insets and centesimal frame<br>Pencil/paper                           | C                                                                                                                          |                                                                                                |
|                                            |                                                                                                           | 4.NF.C.7. Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 40218 Rounding of Decimal Fractions                                                                                                                                                                                            | Centesimal frame<br>Graph paper                                                                        | P                                                                                                                          | AMI doesn't directly teach number line for fractions                                           |
| (RP) Ratios and Proportional Relationships | Understand ratio concepts and use ratio reasoning to solve problems.                                      | 6.R.P.A.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.”                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 40318 Concept, Language, and Notation for Ratio<br>40319 Ratio can be expressed as a fraction                                                                                                                                  | Objects from the classroom, paper and pencil                                                           | C                                                                                                                          |                                                                                                |
|                                            |                                                                                                           | 6.R.P.A.2. Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship. For example, “This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar.” “We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger.”1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 40321 Problem solving using Ratio                                                                                                                                                                                              | Objects from the classroom, paper and pencil                                                           | P                                                                                                                          |                                                                                                |
|                                            |                                                                                                           | 6.R.P.A.3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. a. Make tables of equivalent ratios relating quantities with whole- number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. b. Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed? c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent. d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities. | 40321 Problem solving using Ratio<br>40320 Ratios are equal if they are equivalent fractions<br>40350-40352 Solving for Distance / Time / Speed                                                                                | Pegboard and pegs, paper and pencil<br>Paper/pencil, objects from the environment                      | P                                                                                                                          | Teacher should introduce the term “rate” when presenting these lessons                         |
| (NS) The Number System                     | Apply and extend previous understandings of multiplication and division to divide fractions by fractions. | 6.NS.A.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. For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb. of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi? Compute fluently with multi-digit numbers and find common factors and multiples.                                                                                                                                                                                          | 40185 Division by a fraction less than one (Measurement/ Group)<br>40186 Division by a fraction less than one (partitive/ sharing)<br>40192 Abstraction of the Rules for Operations with Fractions                             | Fraction insets and paper tickets<br>Fraction insets, paper tickets, large skittles                    | C                                                                                                                          | Provide word problems that meet the needs for this standard                                    |
|                                            | Compute fluently with multi-digit numbers and find common factors and multiples.                          | 6.NS.B.2. Fluently divide multi-digit numbers using the standard algorithm.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 40142 Traditional Algorithm                                                                                                                                                                                                    | Pencil/paper                                                                                           | C                                                                                                                          |                                                                                                |
|                                            |                                                                                                           | 6.NS.B.3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 40209 Algorithm For Multiplication of Decimals<br>40202 Algorithm for Addition and Subtraction of Decimals<br>40212 Algorithm for Division of Decimals                                                                         | Pencil/paper                                                                                           | C                                                                                                                          |                                                                                                |
|                                            |                                                                                                           | 6.NS.B.4. Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor. For example, express 36 + 8 as 4 (9 + 2).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 40096 Distributive Law of Multiplication<br>40153 Concept, Language, and Notation for LCM<br>40160 Concept, Language, and Notation for Greatest Common Factor (GCF)                                                            | Bead bars, cards, parentheses, envelopes, bead bars.<br>Pencil and paper<br>Pegboard                   | P                                                                                                                          | Finalize the abstraction by practicing the specific examples that are featured in the standard |
|                                            | Apply and extend previous understandings of numbers to the system of rational numbers.                    | 6.NS.C.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.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 40291 Introduction to Signed Numbers<br>40296 Word Problems Using Signed Numbers                                                                                                                                               |                                                                                                        | C                                                                                                                          |                                                                                                |

| CCSS DOMAIN                    | CCSS CLUSTER OBJECTIVES                                                                | CCSS STANDARDS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | RELEVANT A.M.I. ACTIVITIES                                                                                                                                                                                                                                                                                                                                         | RESOURCES / MATERIALS                                                                                                                                                                                           | “COMPLETENESS<br><i>C = completely covers;</i><br><i>P = partially covers;</i><br><i>X = no coverage/ nothing maps”</i> | COMMENTS                                                                 |
|--------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| (NS) The Number System         | Apply and extend previous understandings of numbers to the system of rational numbers. | 6.NS.C.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. a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., $-(-3) = 3$ , and that 0 is its own opposite. b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                 | X                                                                                                                       |                                                                          |
|                                |                                                                                        | 6.NS.C.7. Understand ordering and absolute value of rational numbers. a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. For example, interpret $-3 > -7$ as a statement that $-3$ is located to the right of $-7$ on a number line oriented from left to right. b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. For example, write $-3^{\circ}\text{C} > -7^{\circ}\text{C}$ to express the fact that $-3^{\circ}\text{C}$ is warmer than $-7^{\circ}\text{C}$ . c. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. For example, for an account balance of $-30$ dollars, write $ -30  = 30$ to describe the size of the debt in dollars. d. Distinguish comparisons of absolute value from statements about order. For example, recognize that an account balance less than $-30$ dollars represents a debt greater than 30 dollars. | 40291 Introduction to Signed Numbers<br>40296 Word Problems Using Signed Numbers                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                 | P                                                                                                                       | Absolute value portions not covered.                                     |
|                                |                                                                                        | 6.NS.C.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.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                 | X                                                                                                                       |                                                                          |
| (EE) Expressions and Equations | Apply and extend previous understandings of arithmetic to algebraic expressions.       | 6.EE.A.1. Write and evaluate numerical expressions involving whole-number exponents.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 40231 Operations with Numbers Written as Squares and Cubes<br>Squaring: Arithmetic Passages 40135, 40236, 40237, 40238, 40238, 40239, 40240, 40241<br>Cubing: Arithmetic Passages 40248, 40249, 40250, 40251, 40251, 40252, 40253<br>40306 Operations with Numbers Written in Exponential Notation<br>40307 Operations: Numbers Written in Expanded Power Notation | Bead squares and cubes, paper tickets, paper and pencil.<br>Gold squares, rubber bands, tickets, golden beads, pegboard and pegs, guide squares, paper and pencil.<br>Wooden cubing material/ paper and pencil. | C                                                                                                                       |                                                                          |
|                                |                                                                                        | 6.EE.A.2. Write, read, and evaluate expressions in which letters stand for numbers. a. Write expressions that record operations with numbers and with letters standing for numbers. For example, express the calculation “Subtract y from 5” as $5 - y$ . b. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. For example, describe the expression $2(8 + 7)$ as a product of two factors; view $(8 + 7)$ as both a single entity and a sum of two terms. c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole- number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). For example, use the formulas $V = s^3$ and $A = 6s^2$ to find the volume and surface area of a cube with sides of length $s = \frac{1}{2}$ .                                          | 40243 Squaring a Binomial, Algebraic<br>40244 Squaring a Trinomial, Algebraic<br>40255 Cubing a Binomial, Algebraic<br>40256 Cubing a Trinomial, Algebraic<br>40329 Concept of an Equation and Balancing an Equation Using the Laws of Equivalence<br>40330 Order of Operations                                                                                    | Gold bead squares, rubber bands, bi cube lid, tri cube lid.                                                                                                                                                     | C                                                                                                                       |                                                                          |
|                                |                                                                                        | 6.EE.A.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 $3y$ .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Distributive Law of Multiplication 40096, 40097, 40098, 40099, 40100, 40101, 40102, 40103 (especially 40100 Passage to More Symbolic Representations on Paper)                                                                                                                                                                                                     | Bead bars, cards, parentheses, envelopes, golden beads, decimal cards, pencil and paper.                                                                                                                        | C                                                                                                                       |                                                                          |
|                                |                                                                                        | 6.EE.A.4. Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). For example, the expressions $y + y + y$ and $3y$ are equivalent because they name the same number regardless of which number y stands for.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 40243 Squaring a Binomial, Algebraic<br>40244 Squaring a Trinomial, Algebraic<br>40255 Cubing a Binomial, Algebraic<br>40256 Cubing a Trinomial, Algebraic<br>40329 Concept of an Equation and Balancing an Equation Using the Laws of Equivalence<br>40330 Order of Operations<br>Introduction to Algebra 40329, 40330, 40331, 40332                              | Gold bead squares, rubber bands, bi cube lid, tri cube lid.<br>Paper and pencil<br>Bead bars                                                                                                                    | C                                                                                                                       | May need to fill in with some lessons on writing equivalent expressions. |

| CCSS DOMAIN                     | CCSS CLUSTER OBJECTIVES                                                                       | CCSS STANDARDS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | RELEVANT A.M.I. ACTIVITIES                                                                                                             | RESOURCES / MATERIALS                                                             | “COMPLETENESS<br><i>C = completely covers;</i><br><i>P = partially covers;</i><br><i>X = no coverage/ nothing maps”</i> | COMMENTS                                                                                                                                            |
|---------------------------------|-----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| (EE) Expressions and Equations  | Reason about and solve one-variable equations and inequalities.                               | 6.EE.B.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.                                                                                                                                                                                                                                                                                                                                                                                                                 | Introduction to Algebra 40329, 40330, 40331, 40332                                                                                     | Paper, pencil, and ruler.                                                         | C                                                                                                                       | Introduce use of a number line and bar figures. Idea of a pan balance in relation to balancing an equation. Venn Diagrams. Equation vs. inequality. |
|                                 |                                                                                               | 6.EE.B.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.                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Introduction to Algebra 40329, 40330, 40331, 40332<br>40337 Algebraic Word Problems                                                    | Paper, pencil, and ruler.<br>word problems.                                       | Prepared<br>C                                                                                                           | Need to introduce the use of tables. Previous knowledge of addition, subtraction, multiplication, and division.                                     |
|                                 |                                                                                               | 6.EE.B.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.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 40337 Algebraic Word Problems                                                                                                          | Pencil and paper, and prepared problems.                                          | C                                                                                                                       | Bar models.<br>Word problems would need to be specific for these situations.                                                                        |
|                                 |                                                                                               | 6.EE.B.8. Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.                                                                                                                                                                                                                                                                                                                                                                                                   | 40337 Algebraic Word Problems                                                                                                          | Pencil and paper, and prepared problems.                                          | P                                                                                                                       | Word problems would need to be written specifically for these.                                                                                      |
|                                 | Represent and analyze quantitative relationships between dependent and independent variables. | 6.EE.C.9. Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation $d = 65t$ to represent the relationship between distance and time.                                                                           | 40340 Introduce Graphing<br>40341 Types of Graphs<br>Word Problems Solving for Distance, Time, and Speed<br>40349, 40350, 40351, 40352 | Graph examples, paper and pencil, ruler.<br>Golden beads and word problem labels. | P                                                                                                                       | Word problems would need to be written specifically for these.                                                                                      |
| (SP) Statistics and Probability | Develop understanding of statistical variability.                                             | 6.SPA.1. Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. For example, “How old am I?” is not a statistical question, but “How old are the students in my school?” is a statistical question because one anticipates variability in students’ ages.                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                        |                                                                                   | X                                                                                                                       |                                                                                                                                                     |
|                                 |                                                                                               | 6.SPA.2. Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                        |                                                                                   | X                                                                                                                       |                                                                                                                                                     |
|                                 |                                                                                               | 6.SPA.3. Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                        |                                                                                   | X                                                                                                                       |                                                                                                                                                     |
|                                 | Summarize and describe distributions.                                                         | 6.SPB.4. Display numerical data in plots on a number line, including dot plots, histograms, and box plots.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 40341 Types of Graphs                                                                                                                  |                                                                                   | P                                                                                                                       |                                                                                                                                                     |
|                                 |                                                                                               | 6.SPB.5. Summarize numerical data sets in relation to their context, such as by: a. Reporting the number of observations. b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. c. 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. d. 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. |                                                                                                                                        |                                                                                   | P                                                                                                                       | Parts (A) and (B) are practiced during science experiments and field work. Parts (see) and (D) are not covered.                                     |