

Basic Manipulative Materials

From: www.coe.uth.edu/math/resources/man.html

The commercially available manipulative materials listed below are basic to a developmentally-based mathematics program. The quantities listed are for a classroom of 20 students (for other class sizes, adjust the quantities accordingly). These quantities give the teacher and students ready access to materials for whole class activities as well as allow for the establishment of a series of learning stations so that students may use the materials as they proceed at their own pace.

Kindergarten:

Pattern Blocks (5 tubs)
Unifix Cubes (1000 cubes)
Primer Balance (1)
Color Cubes (2 sets)

Additional materials such as Legos, Lincoln Logs, and other building materials, plus beansticks and set boards.

Grade 1:

Pattern Blocks (5 tubs)
Unifix Cubes (1000 cubes)
Tangrams (bag of 20 sets)
Primer Balance (1)
Color Cubes (2 sets)
Attribute Blocks by ESS (6 – 8 sets)

Additional building materials, beansticks and set boards.

Grade 2:

Pattern Blocks (5 tubs)
Multilinks (1000 cubes)
Tangrams (bag of 20 sets)
Geoboards (20)
Primer Balance (1)
Color Tiles (3 sets)
Attribute Blocks by ESS (6 – 8 sets)
Powers of Ten or Base Ten Blocks (1 classroom set with lines)

Grade 3:

Pattern Blocks (5 tubs)
Unifix Cubes (1000 cubes)
Tangrams (bag of 20 sets)
Geoboards (20)
Primer Balance (1)
Color Tiles (3 sets)
Attribute Blocks by ESS (6 – 8 sets)
Powers of Ten or Base Ten Blocks (1 classroom set with lines)

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At the intermediate grades it would be ideal to have all the manipulative materials available in every classroom. If this is not possible, each grade level, as listed below, could share an adequate set. At these grade levels, it would also be beneficial to have a classroom set of Fraction Bars or the Fraction Factory as well as a classroom set of Decimal Squares.

Grade 4:

Pattern Blocks (5 tubs)
Tangrams (25 sets)
Geoboards (25)
Color Tiles (3 sets)
Attribute Logic Blocks (1 set for every 2 students)
Base Ten Blocks (2 intermediate classroom sets)
Cuisenaire Rods (12 trays of 74 rods)
Primary Balance
Metric Weight Set for the Primer Balance
Metric Beaker Set for Volume

Grades 5 and 6:

Pattern Blocks
Tangrams (25 sets)
Geoboards (25)
Color Tiles (3 sets)
Attribute Logic Blocks (1 set for every 2 students)
Base Ten Blocks (2 intermediate classroom sets)
Cuisenaire Rods (12 trays of 74 rods)
Primary Balance
Metric Weight Set for the Primer Balance
Metric Beaker Set for Volume
Calculators (classroom set)

Grades 7 and 8:

Tangrams (25 sets)
Geoboards (25)
Color Tiles (3 sets)
Cuisenaire Rods (12 trays of 74 rods)
Calculators (classroom set)

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CONCEPTS TO MANIPULATIVES

The following is a list of some of the manipulatives that can be effectively used to teach the given concept.

Concepts	Manipulatives
Angles	Protractors, compasses, geoboards, mirrors, rulers, tangrams, pattern blocks
Area	Geoboards, color tiles, base-ten blocks, decimal squares, cubes, tangrams, pattern blocks, rulers, fraction models
Classification, sorting	Attribute blocks, cubes, pattern blocks, tangrams, 2-color counters, Cuisenaire Rods, dominoes, geometric solids, money, numeral cards, base-ten materials, polyhedra models, geoboards, decimal squares, fraction models
Coordinate geometry	Geoboards
Constructions	Compasses, protractors, rulers, mirrors
Counting	Cubes, 2-color counters, color tiles, Cuisenaire rods, dominoes, numeral cards, spinners, 10-frames, number cubes, money, calculators
Decimals	Decimal squares, base-10 blocks, money, calculators, number cubes, numeral cards, spinners.
Equations/inequalities Equality/inequality Equivalence	Algebra tiles, math balance, calculators, 10 frames, balance scale, color tiles, dominoes, money, numeral cards, 2-color counters, cubes, Cuisenaire rods, decimal squares, fraction models
Estimate	Color tiles, geoboards, balance scale, capacity containers, rulers, Cuisenaire rods, calculators
Factoring	Algebra tiles
Fact strategies	10 frames, 2-color counters, dominoes, cubes, numeral cards, spinners, number cubes, money, math balance, calculators

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Concepts	Manipulatives
Fractions	Fraction models, pattern blocks, base-ten materials, geoboards, clocks, color tiles, cubes, Cuisenaire rods, money, tangrams, calculators, number cubes, spinner, 2-color counters, decimal squares, number cards
Integers	2-color counters, algebra tiles, thermometers, color tiles
Logical reasoning	Attribute blocks, Cuisenaire rods, dominoes, pattern blocks, tangrams, number cubes, spinners, geoboards
Measurement	Balance scale, math balance, rulers, capacity containers, thermometers, clocks, geometric solids, base-ten materials, color tiles
Mental math	Ten-frames, dominoes, number cubes, spinners
Money	Money
Number concepts	Cubes, 2-color counters, spinners, number cubes, calculators, dominoes, numeral cards, base-ten materials, Cuisenaire rods, fraction models, decimal squares, color tiles, 10-frames, money
Odd, even, prime, composite numbers	Color tiles, cubes, Cuisenaire rods, numeral cards, 2-color counters
Patterns	Pattern blocks, attribute blocks, tangrams, calculators, cubes, color tiles, Cuisenaire rods, dominoes, numeral cards, 10-frames
Percent	Base-10 materials, decimal squares, 10 frames, Cuisenaire rods, math balance, cubes, 2-color counters
Perimeter/Circumference	Geoboards, color tiles, tangrams, pattern blocks, rulers, base-ten materials, cubes, fraction circles, decimal squares
Place value	Base-10 materials, decimal squares, 10 frames, Cuisenaire rods, math balance, cubes, 2-color counters
Polynomials	Algebra tiles, base-10 materials
Probability	Spinners, number cubes, fraction models, money, color tiles, cubes, 2-color counters
Pythagorean Theorem	Geoboards

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Concepts	Manipulatives
Ratio/proportion	Color tiles, cubes, Cuisenaire rods, tangrams, pattern blocks, 2-color counters
Similarity/congruence	Geoboards, attribute blocks, pattern blocks, tangrams, mirrors
Size/color/shape	Attribute blocks, cubes, color tiles, geoboards, geometric solids, pattern blocks, tangrams, polyhedra models
Spatial visualization	Tangrams, pattern blocks, geoboards, geometric solids, polyhedra models, cubes, color tiles
Surface area	Color tiles, cubes
Symmetry	Geoboards, pattern blocks, tangrams, mirrors, cubes, attribute blocks
Tessellations	Pattern blocks, attribute blocks
Transformational geometry, translations, rotations, and reflections	Geoboards, cubes, mirrors, pattern blocks, tangrams
Volume	Capacity containers, cubes, geometric solids, rulers
Whole numbers	Base-ten materials, balance scales, number cubes, spinners, color tiles, cubes, math balance, money, numeral cards, dominoes, rulers, calculators, 10-frames, Cuisenaire rods, clocks, 2-color counters

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MANIPULATIVES TO CONCEPTS

The following is a listing of some of the manipulatives that can be used in teaching the given concepts.

Manipulative	Concepts
Algebra tiles	Integers, equations, inequalities, polynomials, similar terms, factoring, estimation
Attribute blocks	Sorting; classification; investigation of size, shape, color; logical reasoning; sequencing; patterns; symmetry; similarity; congruence; thinking skills; geometry; organization of data
Balance Scale	Weight, mass, equality, inequality, equations, operations using whole numbers, estimation, measurement
Base-10 blocks	Place value, operations with whole numbers, decimals, decimal-fractional-percent equivalencies, comparing, ordering, classification, sorting, number concepts, square and cubic numbers, area, perimeter, metric measurement, polynomials
Calculators	Problems with large numbers, problem solving, interdisciplinary problems, real-life problems, patterns, counting, number concepts, estimation, equality and inequality, fact strategies, operations using whole numbers, decimals and fractions
Capacity containers	Measurement, capacity, volume, estimation
Clocks	Time, multiplication, fractions, modular arithmetic, measurement
Color tiles	Color, shape, patterns, estimations, counting, number concepts, equality and inequality, operations using whole numbers and fractions, probability, measurement, area, perimeter, surface area, even and odd numbers, ratio, proportion, percent, integers, square and cubic numbers, spatial visualization
Compasses	Constructions, angle measurement
Cubes	Number concepts, counting, place value, fact strategies-especially turnaround facts, classification, sorting, colors, patterns, square and cubic numbers, equality, inequalities, averages, ratio, proportion, percent, symmetry, spatial visualization, area, perimeter, volume, surface area, transformational geometry, operations using whole numbers and fractions, even and odd numbers, prime and composite numbers, probability.

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Manipulative	Concepts
Cuisenaire rods	Classification, sorting, ordering, counting, number concepts, comparisons, fractions, ratio, proportion, place value, patterns, even and odd numbers, prime and composite numbers, logical reasoning, estimation, operations using whole numbers
Decimal squares	Decimals, place value, comparing, ordering operations, classification, sorting, number concepts, equality, inequality, percent, perimeter, area
Dominoes	Counting, number concepts, fact strategies, classification, sorting, patterns, logical reasoning, equality, inequality, mental math, operations using whole numbers
Fraction models	Fractions: meaning, recognition, classification, sorting, comparing and ordering. Number concepts, equivalence, operations, perimeter, area, percent and probability
Geoboards	Size, shape, counting, area, perimeter, circumference, symmetry, fractions, coordinate geometry, slopes, angles, Pythagorean Theorem, estimation, percent, similarity, congruence, rotations, reflections, translations, classifications, sorting, square numbers, polygons, spatial visualization, logical reasoning
Geometric solids	Shape, size, relationships between area and volume, volume classification, sorting, measurement, spatial visualization
Math balance Invicta, number	Equality, inequality, operations using whole numbers, open sentences, equations, place value, fact strategies, measurement, logical reasoning
Mirrors	Symmetry, similarity, congruence, reflections, rotations, translations, angles, parallel and perpendicular lines, constructions
Money	Money, change, comparisons, counting, classification, sorting, equality, inequality, operations using whole numbers, decimals, fractions, probability, fact strategies, number concepts
Number cubes	Counting, number concepts, fact strategies, mental math, operations using whole numbers, fractions, decimals, probability, generation of problems, logical reasoning
Numeral cards	Counting, classification, sorting, comparisons, equality, inequality, order, fact strategies, number concepts, operations using whole numbers, fractions, decimals, logical reasoning, patterns, odd and even numbers, prime and composite numbers

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Manipulative	Concepts
Pattern blocks	Patterns, one-to-one correspondence, sorting, classification, size, shape, color, geometric relationships, symmetry, similarity, congruence, area, perimeter, reflections, rotations, translations, problem solving, logical reasoning, fractions, spatial visualization, tessellations, angles, ratio, proportions
Polyhedra models	Shape, size, classification, sorting, polyhedra, spatial visualization
Protractors	Construction, angle measurement
Rulers Tape measures	Measurement, area, perimeter, constructions, estimation, operations using whole numbers, volume
Spinners	Counting, number concepts, operations using whole numbers, decimals, fractions, fact strategies, mental math, logical reasoning, probability, generation of problems
Tangrams	Geometric concepts, spatial visualization, logical reasoning, fractions, similarity, congruence, area, perimeter, ratio, proportion, angles, classification, sorting, patterns, symmetry, reflections, translations, rotations
Ten-frames	Fact strategies, mental math, number concepts, counting, equality, inequality, place value, patterns, operations using whole numbers
Thermometers	Temperature, integers, measurement
Two-color counters	Counting, comparing, sorting, classification, number concepts, fact strategies, even and odd numbers, equality, inequality, operations, ratio, proportions, probability, integers