

## Concepts to Mathematical Tools to References Middle List

**Algebra/patterns** – algebra tiles, calculators/graphing calculators, base-ten blocks, candy/food, pattern blocks, computers/Internet/software/spreadsheets, geometric solids/polyhedra/nets, games/puzzles/toys, hundreds chart/math tables/number lines/10x10 grid/circle chart, capacity containers, money, paper/origami/stencil patterns/graph paper, color tiles, rulers/tape measures/trundle wheels/calipers, books/journals/newspapers/portfolios, video technology/multi-media, attribute blocks, tangrams, cubes/Unifix cubes, chemical test kits, thermometers, clocks/stopwatches/calenders, astrolabes, geometric shapes, egg cartons, Cuisenaire rods, dice/number cubes

**Algorithms** – computers/Internet/software/spreadsheets, games/puzzles/toys, math tables/number lines/100s chart/10x10 grid/circle chart, geometric shapes, algebra tiles, calculators/graphing calculators, cubes/Unifix cubes

**Angles** – protractors, compasses, geoboards, mirrors/mirrors/reflective material, rulers/tape measures/trundle wheels/calipers, tangrams, pattern blocks, candy/food, video technology/multi-media, games/puzzles/toys, computers/Internet/software/spreadsheets, geometric shapes, calculators/graphing calculators, geometric solids/polyhedra/nets

**Area/surface area** – geoboards, color tiles, base-ten blocks, cubes/Unifix cubes, tangrams, pattern blocks, rulers/tape measures/trundle wheels/calipers, fraction models/circles, thermometers, computers/Internet/software/spreadsheets, books/journals/newspapers/portfolios, video technology/multi-media, clocks/stopwatches/calenders, astrolabe, chemical test kits, candy/food, calculators/graphing calculators, protractors, paper/origami/stencil patterns/graph paper, geometric shapes, geometric solids/polyhedra/nets

**Classification/sorting/making sets** – attribute blocks, cubes/Unifix cubes, pattern blocks, tangrams, counters, Cuisenaire rods, geometric solids/polyhedra/nets, money, base-ten blocks, geoboards, fraction models/circles, color tiles, games/puzzles/toys, candy/food, protractors, calculators/graphing calculators, rulers/tape measures/trundle wheels/calipers

**Coordinate geometry** – geoboards, computers/Internet/software/spreadsheets, base-ten blocks, Cuisenaire rods, fraction models/circles

**Constructions** – compasses, protractors, rulers/tape measures/trundle wheels/calipers, mirrors/mirrors/reflective material

**Counting/skip-counting/one-to-one correspondence** – cubes/Unifix cubes, counters, Cuisenaire rods, spinners, dice/number cubes, money, calculators/graphing calculators, math tables/100s chart/10x10 grid/circle chart, geometric solids/polyhedra/nets, attribute blocks, color tiles, games/puzzles/toys, clocks/stopwatches/calenders, rulers/straightedges/tape measures/meter sticks/trundle wheels/calipers, capacity containers, books/journals/newspapers/portfolios

**Data collection/management/graphing/interpretation/statistics** – counters, attribute blocks, balance scale/weights/scales, books/journals/newspapers/portfolios/learning logs, base-ten blocks, capacity containers, computers/Internet/software/spreadsheets, money, candy/food, calculators/graphing calculators, protractors, rulers/tape measures/trundle wheels/calipers, paper/origami/stencil patterns/graph paper, magnifying glass, math tables/100s chart/10x10

grid/circle chart, cubes/Unifix cubes, clocks/stopwatches/calenders, astrolabe, video technology/multi-media, chemical test kits, money, capacity containers, games/puzzles/toys, thermometers, geometric solids/polyhedra/nets

**Decimals** – base-ten blocks, money, calculators/graphing calculators, dice/number cubes, spinners, candy/food, protractors, games/puzzles/toys, color tiles, rulers/tape measures/trundle wheels/calipers, Cuisenaire rods, clocks/stopwatches/calenders, paper/origami/stencil patterns/graph paper, computers/Internet/software/spreadsheets

**Dimensionality/3D/2D** – attribute blocks, calculators/graphing calculators, protractors, compasses, computers/Internet/software/spreadsheets, cubes/Unifix cubes, geometric shapes, geometric solids/polyhedra/nets, paper/origami/stencil patterns/graph paper, pattern blocks, candy/food, games/puzzles/toys, rulers/tape measures/trundle wheels/calipers

**Equality/equivalence/inequality/equations** – algebra tiles, calculators/graphing calculators, balance scale/weights/scales, color tiles, games/puzzles/toys, money, counters, cubes/Unifix cubes, Cuisenaire rods, fraction models/circles, math tables/100s chart/10x10 grid/circle chart, games/puzzles/toys, candy/food, capacity containers

**Estimation** – color tiles, geoboards, balance scale/weights/scales, capacity containers, astrolabe, rulers/tape measures/trundle wheels/calipers, Cuisenaire rods, dice/number cubes, thermometers, calculators/graphing calculators, games/puzzles/toys, candy/food, protractors, hundreds chart/math tables/100s chart/10x10 grid/circle chart, books/journals/newspapers/portfolios, computers/Internet/software/spreadsheets, clocks/stopwatches/calenders

**Factoring/factors** – computers/Internet/software/spreadsheets, algebra tiles, calculators/graphing calculators, attribute blocks

**Fractions** – fraction models/circles, pattern blocks, base-ten blocks, geoboards, protractors, egg cartons, clocks/stopwatches/calenders, color tiles, cubes/Unifix cubes, games/puzzles/toys, Cuisenaire rods, money, tangrams, calculators/graphing calculators, dice/number cubes, spinners, counters, math tables/100s chart/10x10 grid/circle chart, candy/food, rulers/tape measures/trundle wheels/calipers, books/journals/newspapers/portfolios, computers/Internet/software/spreadsheets, geometric solids/polyhedra/nets

**Functions** – calculators/graphing calculators, computers/Internet/software/spreadsheets, money, games/puzzles/toys, candy/food, cubes/Unifix cubes, capacity containers, protractors, attribute blocks, books/journals/newspapers/portfolios, rulers/tape measures/trundle wheels/calipers

**Geometry** – attribute blocks, calculators/graphing calculators, cubes/Unifix cubes, capacity containers, compasses, Cuisenaire rods, fraction models/circles, games/puzzles/toys, money, geoboards, geometric shapes, geometric solids/polyhedra/nets, mirrors/mirrors/reflective material, paper/origami/stencil patterns/graph paper, pattern blocks, protractors, video technology/multi-media, computers/Internet/software/spreadsheets, rulers/tape measures/trundle wheels/calipers, tangrams, candy/food, books/journals/newspapers/portfolios

**Integers** – counters, algebra tiles, thermometers, color tiles, calculators/graphing calculators, geometric solids/polyhedra/nets, rulers/straightedge/tape measures/meter sticks/trundle wheels calipers, candy/food

**Matrix algebra/Punnett square** – marbles

**Measurement/scale** – balance scale/weights/scales, rulers/tape measures/trundle wheels/calipers, capacity containers, thermometers, clocks/stopwatches/calenders, geometric shapes, compasses, protractors, tangrams geometric solids/polyhedra/nets, base-ten blocks, color tiles, barometer, computers/Internet/software/spreadsheets, calculators/graphing calculators, candy/food, video technology/multi-media, paper/origami/stencil patterns/graph paper, hundreds chart/math tables/number lines/10x10 grid/circle chart, books/journals/newspapers/portfolios, rulers/tape measures/trundle wheels/calipers, chemical test kits, astrolabe, games/puzzles/toys, cubes/Unifix cubes, money

**Mental math** – games/puzzles/toys, dice/number cubes, spinners, candy/food, money, geoboards, calculators/graphing calculators,

**Money management** – money, calculators/graphing calculators, video technology/multi-media, books/journals/newspapers/portfolios, computers/Internet/software/spreadsheets, rulers/tape measures/trundle wheels/calipers, games/puzzles/toys, protractors, compasses

**Number concepts/operations** – cubes/Unifix cubes, counters, spinners, dice/number cubes, calculators/graphing calculators, games/puzzles/toys, base-ten blocks, Cuisenaire rods, fraction models/circles, color tiles, money, paper/origami/stencil patterns/graph paper, astrolabes, capacity containers, balance scale/weights/scales, dice/number cubes, rulers/tape measures/trundle wheels/calipers, clocks/stopwatches/calenders, geometric solids/polyhedra/nets, hundreds chart/math tables/number lines/10x10 grid/circle chart, computers/Internet/software/spreadsheets, books/journals/newspapers/portfolios, candy/food, protractors, egg cartons, tangrams, pattern blocks, thermometers, video technology/multi-media, chemical test kits

**Perimeter/circumference** – geoboards, color tiles, tangrams, pattern blocks, rulers/tape measures/trundle wheels/calipers, base-ten blocks, cubes/Unifix cubes, fraction models/circles, hundreds charts/math tables/number lines/10x10 grid/circle chart, calculators/graphing calculators, books/journals/newspapers/portfolios, computers/Internet/software/spreadsheets, compasses, paper/origami/stencil patterns/graph paper

**Permutations/combinations** – computers/Internet/software/spreadsheets, calculators/graphing calculators, books/journals/newspapers/portfolios/learning logs

**Place value** – base-ten blocks, Cuisenaire rods, cubes/Unifix cubes, counters

**Probability/chance** – spinners, dice/number cubes, fraction models/circles, money, color tiles, cubes/Unifix cubes, counters, games/puzzles/toys, computers/Internet/software/spreadsheets, candy/food, calculators/graphing calculators, protractors, video technology/multi-media, marbles, paper/origami/stencil patterns/graph paper, hundreds chart/math tables/number lines/10x10 grid/circle chart, clocks/stopwatches/calenders, books/journals/newspapers/portfolios, attribute blocks, magnifying glass, geometric shapes, rulers/tape measures/trundle wheels/calipers

**Problem solving/thinking skills** – hundreds chart/math tables/number lines/10x10 grid/circle chart, calculators/graphing calculators, computers/Internet/software/spreadsheets, video technology/multi-media, paper/origami/stencil patterns/graph paper, egg cartons, rulers/tape measures/trundle wheels/calipers, games/puzzles/toys, clocks/stopwatches/calenders, candy/food, dice/number cubes, money, capacity containers, algebra tiles, color tiles, thermometers, counters, geometric solids/polyhedra/nets, protractors, books/journals/newspapers/portfolios, magnifying

glass, geometric shapes, geoboards, cubes/Unifix cubes, spinners, base-ten blocks, pattern blocks, tangrams, miras/mirrors/reflective material, Cuisenaire rods, fraction models/circles,

**Proofs/theorems** – geoboards, geometric shapes, calculators/graphing calculators, computers/Internet/software/spreadsheets, compasses, rulers/tape measures/trundle wheels/calipers, paper/origami/stencil patterns/graph paper, dice/number cubes, games/puzzles/toys, graduated cylinder

**Pythagorean theorem** – geoboards, cubes/Unifix cubes, hundreds chart/math tables/number lines/10x10 grid/circle chart, capacity containers, dice/number cubes, candy/food, marbles, calculators/graphing calculators, geometric shapes, computers/Internet/software/spreadsheets, paper/origami/stencil patterns/graph paper, rulers/tape measures/trundle wheels/calipers

**Quantity** – counters, cubes/Unifix cubes, color tiles, games/puzzles/toys, geometric shapes, geometric solids/polyhedra/nets, money, dice/number cubes, pattern blocks, calculators/graphing calculators, computers/Internet/software/spreadsheets

**Ratio/proportion/percent** – color tiles, cubes/Unifix cubes, Cuisenaire rods, tangrams, pattern blocks, counters, base-ten blocks, candy/food, calculators/graphing calculators, compasses, dice/number cubes, computers/Internet/software/spreadsheets, protractors, games/puzzles/toys, paper/origami/stencil patterns/graph paper, rulers/tape measures/trundle wheels/calipers, clocks/stopwatches/calenders, books/journals/newspapers/portfolios, hundreds chart/math tables/number lines/10x10 grid/circle chart, video technology/multi-media

**Rational/irrational numbers** – computers/Internet/software/spreadsheets, calculators/graphing calculators, Cuisenaire rods, clocks/stopwatches/calenders, rulers/tape measures/trundle wheels/calipers, geometric solids/polyhedra/nets, candy/food, games/puzzles/toys

**Reasoning** – attribute blocks, Cuisenaire rods, geometric shapes, pattern blocks, tangrams, dice/number cubes, spinners, geoboards, math tables/100s chart/10x10 grid/circle chart, money, calculators/graphing calculators, games/puzzles/toys, egg cartons, dice/number cubes, counters, computers/Internet/software/spreadsheets, clocks/stopwatches/calenders, candy/food, protractors, books/journals/newspapers/portfolios, cubes/Unifix cubes, geometric solids/polyhedra/nets, paper/origami/stencil patterns/graph paper

**Relationships/connections** – pattern blocks, base-ten blocks, geoboards, capacity containers, clocks/stopwatches/calenders, color tiles, cubes/Unifix cubes, Cuisenaire rods, money, tangrams, calculators/graphing calculators, dice/number cubes, spinners, counters, algebra tiles, balance scale/weights/scales, games/puzzles/toys, fraction models/circles, algebra tiles, attribute blocks, geometric solids/polyhedra/nets, computers/Internet/software/spreadsheets, candy/food, thermometers, video technology/multi-media, paper/origami/stencil patterns/graph paper, egg cartons, geometric shapes, protractors, rulers/tape measures/trundle wheels/calipers, compasses, books/journals/newspapers/portfolios, chemical test kits

**Similarity/congruence** – geoboards, miras/mirrors/reflective material, games/puzzles/toys, color tiles, geometric solids/polyhedra/nets, computers/Internet/software/spreadsheets, rulers/tape measures/trundle wheels/calipers, attribute blocks, pattern blocks, tangrams

**Spatial visualization** – tangrams, pattern blocks, geoboards, geometric solids/polyhedra/nets, cubes/Unifix cubes, color tiles, games/puzzles/toys, calculators/graphing calculators, rulers/tape measures/trundle wheels/calipers

**Spreadsheets** – computers/Internet/software/spreadsheets, calculators/graphing calculators, money, protractors, compasses

**Symmetry** – geoboards, pattern blocks, tangrams, mira, cubes/Unifix cubes, attribute blocks, calculators/graphing calculators

**Tessellations/tiling** – pattern blocks, attribute blocks, games/puzzles/toys, color tiles, geometric shapes

**Transformational geometry** – geoboards, cubes/Unifix cubes, miras/mirrors/reflective material, pattern blocks, tangrams, games/puzzles/toys, color tiles

**Volume** – capacity containers, cubes/Unifix cubes, geometric solids/polyhedra/nets, rulers/tape measures/trundle wheels/calipers, thermometers, computers/Internet/software/spreadsheets, compasses, candy/food, books/journals/newspapers/portfolios, astrolabe, chemical test kits, clocks/stopwatches/calenders, video technology/multi-media, calculators/graphing calculators, geometric shapes, protractors, paper/origami/stencil patterns/graph paper

**Weight/mass** – balance scale/weights/scales, calculators/graphing calculators, counters computers/Internet/software/spreadsheets, geometric solids/polyhedra/nets