AFTERSCHOOL ACHIEVERS: MATH CLUB

correlated to

NCTM Standards

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EDUCATION GROUP

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Afterschool Achievers: Math Club © 2002
correlated to
NCTM Standards
Kindergarten

Number and Operations Standard

NCTM Standard	Afterschool Achievers: Math Club, Kindergarten
Understand numbers, ways of representing numbers, relationships among numbers, and number systems • count with understanding and recognize "how many" in sets of objects;	**Instructor's Guide:** 2, 4, 5, 7, 9, 10, 12, 14, 17, 19, 22, 24, 27, 29, 30, 34, 35, 39, 44, 49, 54, 55, 59, 60, 68, 69, 72, 74, 77, 79, 80, 81, 84, 85, 89, 94, 99, 104, 105, 109, 110, 114, 119, 124, 129, 130, 134, 135, 139, 144, 149, 154, 155, 159, 164
• use multiple models to develop initial understandings of place value and the base-ten number system;	**Instructor's Guide:** 2, 4, 5, 7, 9, 10, 12, 14, 17, 19, 22, 24, 27, 29, 30, 34, 35, 39, 44, 49, 54, 55, 59, 60, 68, 69, 72, 74, 77, 79, 80, 81, 84, 85, 89, 94, 98, 99, 103, 104, 105, 108, 109, 110, 112, 114, 117, 118, 119, 124, 129, 130, 134, 135, 139, 144, 149, 154, 155, 159, 164
• develop understanding of the relative position and magnitude of whole numbers and of ordinal and cardinal numbers and their connections;	**Instructor's Guide:** 42, 69, 95, 125, 163
• develop a sense of whole numbers and represent and use them in flexible ways, including relating, composing, and decomposing numbers;	**Instructor's Guide:** 10, 38, 48, 58, 60, 62, 67, 68, 82, 85, 88, 98, 103, 104, 108, 109, 110, 112, 114, 118, 119, 124, 127, 129, 134, 135, 139, 144, 149, 154, 159, 162, 164, 169, 174, 179
• connect number words and numerals to the quantities they represent, using various physical models and representations;	**Instructor's Guide:** 32, 62, 64, 69, 74, 79, 84, 89, 94, 99
Understand meanings of operations and how they relate to one another • understand various meanings of addition and subtraction of whole numbers and the relationship between the two operations;	**Instructor's Guide:** 10, 38, 48, 58, 60, 62, 67, 68, 82, 85, 88, 98, 103, 104, 108, 109, 110, 112, 114, 118, 119, 124, 127, 129, 134, 135, 139, 142, 144, 149, 154, 159, 160, 162, 164, 169, 174, 179
• understand the effects of adding and subtracting whole numbers;	**Instructor's Guide:** 10, 38, 48, 58, 60, 62, 67, 68, 82, 85, 88, 98, 103, 104, 108, 109, 110, 112, 114, 118, 119, 124, 127, 129, 134, 135, 139, 142, 144, 149, 154, 159, 160, 162, 164, 169, 174, 179
Compute fluently and make reasonable estimates • develop and use strategies for whole-number computations, with a focus on addition and subtraction;	**Instructor's Guide:** 10, 38, 48, 58, 60, 62, 67, 68, 82, 85, 88, 98, 103, 104, 108, 109, 110, 112, 114, 118, 119, 124, 127, 129, 134, 135, 139, 142, 144, 149, 154, 159, 160, 162, 164, 169, 174, 179

NCTM Standard	Afterschool Achievers: Math Club, Kindergarten
• develop fluency with basic number combinations for addition and subtraction;	**Instructor's Guide:** 10, 38, 48, 58, 60, 62, 67, 68, 82, 85, 88, 98, 103, 104, 108, 109, 110, 112, 114, 118, 119, 124, 127, 129, 134, 135, 139, 142, 144, 149, 154, 159, 160, 162, 164, 169, 174, 179
• use a variety of methods and tools to compute, including objects, mental computation, estimation, paper and pencil, and calculators	**Instructor's Guide:** 10, 38, 48, 58, 60, 62, 67, 68, 82, 85, 88, 98, 103, 104, 108, 109, 110, 112, 114, 118, 119, 124, 127, 129, 134, 135, 139, 142, 144, 149, 154, 159, 160, 162, 164, 169, 174, 179

Algebra Standard

NCTM Standard	Afterschool Achievers: Math Club, Kindergarten
Understand patterns, relations, and functions • sort, classify, and order objects by size, number, and other properties;	**Instructor's Guide:** 1, 3, 6, 8, 11, 13, 16, 18, 21, 25, 26, 28, 31, 33, 36, 40, 41, 46, 51, 52, 56, 61, 66, 71, 76, 81, 83, 86, 91, 92, 96, 101, 102, 106, 111, 116, 123, 138, 147, 153, 168
• recognize, describe, and extend patterns such as sequences of sounds and shapes or simple numeric patterns and translate from one representation to another;	**Instructor's Guide:** 50, 57, 72, 75, 97, 100, 121, 126, 131, 136, 141, 146, 151, 156, 157, 161, 166, 167, 171, 175, 176
• analyze how both repeating and growing patterns are generated.	**Instructor's Guide:** 50, 57, 72, 75, 97, 100, 121, 126, 131, 136, 141, 146, 151, 156, 157, 161, 166, 167, 171, 175, 176
Represent and analyze mathematical situations and structure using algebraic symbols • use concrete, pictorial, and verbal representations to develop an understanding of invented and conventional symbolic notations.	**Instructor's Guide:** 127, 142, 144, 149, 154, 159, 160, 162, 164, 169, 174, 179
Use mathematical models to represent and understand quantitative relationships • model situations that involve the addition and subtraction of whole numbers, using objects, pictures, and symbols.	**Instructor's Guide:** 10, 38, 48, 58, 60, 62, 67, 68, 82, 85, 88, 98, 103, 104, 108, 109, 110, 112, 114, 118, 119, 124, 127, 129, 134, 135, 139, 142, 144, 149, 154, 159, 160, 162, 164, 169, 174, 179

Geometry Standard

NCTM Standard	Afterschool Achievers: Math Club, Kindergarten
Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships • recognize, name, build draw, compare, and sort two- and three-dimensional shapes;	**Instructor's Guide:** 1, 3, 6, 8, 11, 13, 16, 18, 20, 21, 23, 25, 26, 28, 31, 33, 36, 41, 45, 46, 51, 52, 53, 56, 61, 63, 66, 70, 71, 73, 76, 78, 81, 83, 86, 87, 91, 96, 101, 102, 106, 111, 113, 116, 120, 123, 133, 137, 138, 145, 147, 148, 153, 168, 170, 172, 178
• describe attributes and parts of two- and three-dimensional shapes;	**Instructor's Guide:** 1, 3, 6, 8, 11, 13, 16, 18, 21, 25, 26, 28, 31, 33, 36, 40, 41, 46, 51, 52, 56, 61, 66, 71, 76, 81, 83, 86, 91, 92, 96, 101, 102, 106, 111, 116, 123, 138, 147, 153, 168
Specify locations and describe spatial relationships using coordinate geometry and other representational systems • describe, name, and interpret relative positions in space and apply ideas about relative position;	**Instructor's Guide:** 42, 69, 95, 125
• describe, name, and interpret direction and distance in navigating space and apply ideas about direction and distance;	**Instructor's Guide:** 42, 69, 95, 125
• find and name locations with simple relationships such as "near to" and in coordinate systems such as maps.	**Instructor's Guide:** 42, 69, 95, 125
Use visualizations, spatial reasoning, and geometric modeling to solve problems • create mental images of geometric shapes using spatial memory and spatial visualization;	**Instructor's Guide:** 1, 3, 6, 8, 11, 13, 16, 18, 20, 21, 23, 25, 26, 28, 31, 33, 36, 41, 45, 46, 51, 52, 53, 56, 61, 63, 66, 70, 71, 73, 76, 78, 81, 83, 86, 87, 91, 96, 101, 102, 106, 111, 113, 116, 120, 123, 133, 137, 138, 145, 147, 148, 153, 168, 170, 172, 178
• recognize and represent shapes from different perspectives;	**Instructor's Guide:** 1, 3, 6, 8, 11, 13, 16, 18, 20, 21, 23, 25, 26, 28, 31, 33, 36, 41, 45, 46, 51, 52, 53, 56, 61, 63, 66, 70, 71, 73, 76, 78, 81, 83, 86, 87, 91, 96, 101, 102, 106, 111, 113, 116, 120, 123, 133, 137, 138, 145, 147, 148, 153, 168, 170, 172, 178
• recognize geometric shapes and structures in the environment and specify their location.	**Instructor's Guide:** 1, 3, 6, 8, 11, 13, 16, 18, 20, 21, 23, 25, 26, 28, 31, 33, 36, 41, 45, 46, 51, 52, 53, 56, 61, 63, 66, 70, 71, 73, 76, 78, 81, 83, 86, 87, 91, 96, 101, 102, 106, 111, 113, 116, 120, 123, 133, 137, 138, 145, 147, 148, 153, 168, 170, 172, 178

Measurement Standard

NCTM Standard	Afterschool Achievers: Math Club, Kindergarten
Understand measurable attributes of objects and the units, systems, and processes of measurement • recognize the attributes of length, volume, weight, area, and time;	**Instructor's Guide:** 15, 40, 43, 47, 65, 90, 92, 115, 132, 140, 165, 180
• compare and order objects according to these attributes;	**Instructor's Guide:** 15, 40, 47, 65, 90, 92, 180
• understand how to measure using nonstandard and standard units;	**Instructor's Guide:** 15, 40, 47, 65, 90, 92, 180
• select an appropriate unit and tool for the attribute being measured.	**Instructor's Guide:** 15, 40, 47, 65, 90, 92, 180
Apply appropriate techniques, tools, and formulas to determine measurements • measure with multiple copies of units of the same size, such as paper clips laid end to end;	**Instructor's Guide:** 132
• use repetition of a single unit to measure something larger than the unit, for instance, measuring the length of a room with a single meterstick;	**Instructor's Guide:** 132
• use tools to measure;	**Instructor's Guide:** 43
• develop common referents for measures to make comparisons and estimates.	**Instructor's Guide:** 15, 40, 47, 65, 90, 92, 180

Data Analysis and Probability Standard

NCTM Standard	Afterschool Achievers: Math Club, Kindergarten
Formulate questions that can be addressed with data and collect, organize and display relevant data to answer them • pose questions and gather data about themselves and their surroundings;	**Instructor's Guide:** 93
• sort and classify objects according to their attributes and organize data about the objects;	**Instructor's Guide:** 1, 3, 6, 8, 11, 13, 16, 18, 21, 25, 26, 28, 31, 33, 36, 40, 41, 46, 51, 52, 56, 61, 66, 71, 76, 81, 83, 86, 91, 92, 96, 101, 102, 106, 111, 116, 123, 138, 147, 153, 168
• represent data using concrete objects, pictures, and graphs.	**Instructor's Guide:** 93

NCTM Standard	Afterschool Achievers: Math Club, Kindergarten
Select and use appropriate statistical methods to analyze data • describe parts of the data and the set of data as a whole to determine what the data show.	**Instructor's Guide:** 93

Problem Solving Standard

NCTM Standard	Afterschool Achievers: Math Club, Kindergarten
• build new mathematical knowledge through problem solving	**Instructor's Guide:** 1-180
• solve problems that arise in mathematics and in other contexts	**Instructor's Guide:** 1-180
• apply and adapt a variety of appropriate strategies to solve problems	**Instructor's Guide:** 1-180
• monitor and reflect on the process of mathematical problem solving	**Instructor's Guide:** 1-180

Reasoning and Proof Standard

NCTM Standard	Afterschool Achievers: Math Club, Kindergarten
• recognize reasoning and proof as fundamental aspects of mathematics	**Instructor's Guide:** 1-180
• make and investigate mathematical conjectures	**Instructor's Guide:** 18, 20, 23, 28, 30, 33, 37, 38, 41, 43, 51, 52, 53, 56, 58, 61, 63, 64, 66, 69, 73, 74, 75, 76, 78, 79, 85, 86, 89, 121, 126, 136, 157, 171
• develop and evaluate mathematical arguments and proofs	**Instructor's Guide:** 18, 20, 23, 28, 30, 33, 37, 38, 41, 43, 51, 52, 53, 56, 58, 61, 63, 64, 66, 69, 73, 74, 75, 76, 78, 79, 85, 86, 89, 121, 126, 136, 157, 171
• select and use various types of reasoning and methods of proof	**Instructor's Guide:** 18, 20, 23, 28, 30, 33, 37, 38, 41, 43, 51, 52, 53, 56, 58, 61, 63, 64, 66, 69, 73, 74, 75, 76, 78, 79, 85, 86, 89, 121, 126, 136, 157, 171

Communication Standard

NCTM Standard	Afterschool Achievers: Math Club, Kindergarten
• organize and consolidate their mathematical thinking through communication	**Instructor's Guide:** 1, 3, 6, 8, 11, 13, 16, 18, 21, 25, 26, 28, 31, 33, 36, 40, 41, 46, 51, 52, 56, 61, 66, 71, 76, 81, 83, 86, 91, 92, 96, 101, 102, 106, 111, 116, 123, 138, 147, 153, 168
• communicate their mathematical thinking coherently and clearly to peers, teachers, and others	**Instructor's Guide:** 1, 3, 6, 8, 11, 13, 16, 18, 21, 25, 26, 28, 31, 33, 36, 40, 41, 46, 51, 52, 56, 61, 66, 71, 76, 81, 83, 86, 91, 92, 96, 101, 102, 106, 111, 116, 123, 138, 147, 153, 168
• analyze and evaluate the mathematical thinking and strategies of others	**Instructor's Guide:** 1, 3, 6, 8, 11, 13, 16, 18, 21, 25, 26, 28, 31, 33, 36, 40, 41, 46, 51, 52, 56, 61, 66, 71, 76, 81, 83, 86, 91, 92, 96, 101, 102, 106, 111, 116, 123, 138, 147, 153, 168
• use the language of mathematics to express mathematical ideas precisely	**Instructor's Guide:** 1, 3, 6, 8, 11, 13, 16, 18, 21, 25, 26, 28, 31, 33, 36, 40, 41, 42, 46, 51, 52, 56, 61, 66, 71, 76, 81, 83, 86, 91, 92, 95, 96, 101, 102, 106, 111, 116, 123, 125, 138, 147, 153, 168

Connections Standard

NCTM Standard	Afterschool Achievers: Math Club, Kindergarten
• recognize and use connections among mathematical ideas	**Instructor's Guide:** 1-180
• understand how mathematical ideas interconnect and build on one another to produce a coherent whole	**Instructor's Guide:** 1-180
• recognize and apply mathematics in contexts outside of mathematics	**Instructor's Guide:** 11, 13, 20, 23, 30, 35, 42, 48, 53, 60, 78, 81, 85, 113, 115, 116, 120, 125, 135, 163, 170

Representation Standard

NCTM Standard	Afterschool Achievers: Math Club, Kindergarten
• create and use representations to organize, record, and communicate mathematical ideas	**Instructor's Guide:** 10, 60, 65, 67, 85, 93, 110, 135, 144, 149, 154, 159, 160, 164, 169, 174, 177, 179
• select, apply, and translate among mathematical representations to solve problems	**Instructor's Guide:** 10, 60, 65, 67, 85, 93, 110, 135, 144, 149, 154, 159, 160, 164, 169, 174, 177, 179
• use representations to model and interpret physical, social, and mathematical phenomena	**Instructor's Guide:** 10, 60, 65, 67, 85, 93, 110, 135, 144, 149, 154, 159, 160, 164, 169, 174, 177, 179

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correlated to
NCTM Standards
Grade 1

Number and Operations Standard

NCTM Standard	Afterschool Achievers: Math Club, Grade 1
Understand numbers, ways of representing numbers, relationships among numbers, and number systems • count with understanding and recognize "how many" in sets of objects;	**Instructor's Guide:** 2, 4, 5, 7, 14, 19, 22, 17, 25, 32, 44, 52, 65, 67, 78, 85, 89, 93, 96, 102, 108, 112, 119, 121, 123, 124, 125, 136, 138, 141, 145, 146, 149, 151, 157, 195, 201, 208
• use multiple models to develop initial understandings of place value and the base-ten number system;	**Instructor's Guide:** 2, 4, 14, 17, 19, 22, 28, 34, 37, 49, 64, 65, 67, 78, 83, 84, 85, 86, 97, 102, 112, 123, 124, 125, 126, 136, 138, 141, 145, 146, 151, 155, 156, 157, 161, 165, 168, 172, 176, 193, 201
• develop understanding of the relative position and magnitude of whole numbers and of ordinal and cardinal numbers and their connections;	**Instructor's Guide:** 14, 27, 45, 67, 82, 85, 97, 105, 120, 123, 126, 161, 165, 176, 198, 209, 211
• develop a sense of whole numbers and represent and use them in flexible ways, including relating, composing, and decomposing numbers;	**Instructor's Guide:** 9, 17, 44, 65, 68, 97, 108, 120, 123, 156, 165, 168, 198
• connect number words and numerals to the quantities they represent, using various physical models and representations;	**Instructor's Guide:** 5, 9, 29, 37, 113, 165, 168, 181-191, 195-196, 199, 201, 208
• understand and represent commonly used fractions, such as _, _, and _.	**Instructor's Guide:** 117, 118, 173, 202
Understand meanings of operations and how they relate to one another • understand various meanings of addition and subtraction of whole numbers and the relationship between the two operations;	**Instructor's Guide:** 10, 62, 122, 154, 164, 166, 177
• understand the effects of adding and subtracting whole numbers;	**Instructor's Guide:** 10, 24, 30, 50, 69, 70, 72, 74, 79, 84, 86, 89, 90, 91, 92, 93, 96, 99, 104, 107, 108, 109, 110, 119, 122, 124, 129, 130, 134, 137, 139, 142, 144, 149, 150, 151, 152, 154, 155, 159, 162, 164, 166, 167, 169, 170, 174, 177, 179, 193-194, 198, 200, 203, 206, 209, 210, 212

NCTM Standard	Afterschool Achievers: Math Club, Grade 1
Compute fluently and make reasonable estimates • develop and use strategies for whole-number computations, with a focus on addition and subtraction;	**Instructor's Guide:** 10, 24, 54, 59, 62, 69, 70, 72, 74, 79, 86, 89, 90, 91, 92, 93, 96, 99, 104, 107, 109, 110, 119, 122, 124, 129, 130, 134, 137, 139, 142, 144, 149, 150, 151, 152, 154, 155, 159, 162, 164, 166, 167, 169, 170, 174, 177, 179, 193-194, 198, 200, 203, 206, 209, 210, 212
• develop fluency with basic number combinations for addition and subtraction;	**Instructor's Guide:** 24, 50, 54, 59, 62, 69, 72, 74, 78, 79, 84, 86, 89, 90, 91, 92, 93, 96, 99, 104, 107, 108, 109, 110, 119, 122, 124, 129, 130, 134, 137, 139, 142, 144, 149, 150, 151, 152, 154, 155, 159, 162, 164, 166, 167, 169, 170, 174, 177, 179, 193-194, 203, 206, 209, 210, 212
• use a variety of methods and tools to compute, including objects, mental computation, estimation, paper and pencil, and calculators	**Instructor's Guide:** 54, 70, 77, 79, 93, 99, 104, 108, 109, 114, 119, 122, 124, 128, 129, 130, 134, 137, 139, 142, 144, 149, 150, 151, 152, 154, 155, 159, 162, 164, 166, 167, 169, 170, 174, 177, 179, 193-194, 200, 203, 206, 209, 210, 212

A l g e b r a S t a n d a r d

NCTM Standard	Afterschool Achievers: Math Club, Grade 1
Understand patterns, relations, and functions • sort, classify, and order objects by size, number, and other properties;	**Instructor's Guide:** 1, 6, 21, 64, 71, 73, 75, 76, 96, 113, 116, 151
• recognize, describe, and extend patterns such as sequences of sounds and shapes or simple numeric patterns and translate from one representation to another;	**Instructor's Guide:** 11, 16, 26, 31, 36, 41, 46, 51, 56, 61, 66, 71, 76, 81, 96, 101, 106, 131, 151, 171
• analyze how both repeating and growing patterns are generated.	**Instructor's Guide:** 11, 16, 31, 36, 41, 46, 51, 56, 61, 66, 71, 81, 101, 106, 111, 131
Represent and analyze mathematical situations and structure using algebraic symbols • illustrate general principles and properties of operations, such as commutativity, using specific numbers;	**Instructor's Guide:** 54, 69, 74, 84, 86, 91, 99, 104, 119, 129, 134, 144, 154, 159, 174, 177, 179
• use concrete, pictorial, and verbal representations to develop an understanding of invented and conventional symbolic notations.	**Instructor's Guide:** 10, 37, 54, 64, 69, 70, 72, 79, 81, 84, 89, 90, 94, 99, 104, 109, 124, 129, 134, 139, 144, 149, 154, 159, 162, 169, 174, 179
Use mathematical models to represent and understand quantitative relationships • model situations that involve the addition and subtraction of whole numbers, using objects, pictures, and symbols.	**Instructor's Guide:** 19, 24, 30, 50, 59, 69, 72, 74, 89, 104, 119, 156, 164, 169

NCTM Standard	Afterschool Achievers: Math Club, Grade 1
Analyze change in various contexts • describe qualitative change, such as a student's growing taller;	**Instructor's Guide:** 90
• describe quantitative change, such as a student's growing two inches in one year.	**Instructor's Guide:** 90

Geometry Standard

NCTM Standard	Afterschool Achievers: Math Club, Grade 1
Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships • recognize, name, build, draw, compare, and sort two- and three-dimensional shapes;	**Instructor's Guide:** 3, 8, 12, 13, 18, 21, 23, 48, 53, 58, 60, 63, 80, 87, 100, 120, 132, 140, 153, 158, 160, 180, 197, 205
• describe attributes and parts of two- and three-dimensional shapes.	**Instructor's Guide:** 3, 8, 12, 13, 18, 23, 26, 48, 53, 58, 60, 63, 80, 100, 120, 132, 140, 153, 158, 160, 180
Specify locations and describe spatial relationships using coordinate geometry and other representational systems • describe, name, and interpret relative positions in space and apply ideas about relative position;	**Instructor's Guide:** 20, 40
• describe, name, and interpret direction and distance in navigating space and apply ideas about direction and distance;	**Instructor's Guide:** 20, 40
• find and name locations with simple relationships such as "near to" and in coordinate systems such as maps.	**Instructor's Guide:** 20, 40
Use visualizations, spatial reasoning, and geometric modeling to solve problems • create mental images of geometric shapes using spatial memory and spatial visualization;	**Instructor's Guide:** 3, 8, 12, 13, 18, 21, 23, 53, 58, 60, 63, 80, 100, 120, 132, 140, 153, 158, 160, 180
• recognize and represent shapes from different perspectives;	**Instructor's Guide:** 3, 8, 13, 18, 21, 23, 153
• relate ideas in geometry to ideas in number and measurement;	**Instructor's Guide:** 12, 13, 18, 21, 23, 53, 58, 60, 63, 80, 87, 100, 120, 132, 140, 153, 158, 160
• recognize geometric shapes and structures in the environment and specify their location.	**Instructor's Guide:** 12, 53, 58, 63, 87, 132, 140, 158, 205

Measurement Standard

NCTM Standard	Afterschool Achievers: Math Club, Grade 1
Understand measurable attributes of objects and the units, systems, and processes of measurement • recognize the attributes of length, volume, weight, area, and time;	**Instructor's Guide:** 6, 15, 33, 35, 38, 42, 43, 47, 55, 57, 93, 95, 98, 103, 115, 127, 133, 135, 143, 147, 148, 175, 178, 192, 204, 207
• compare and order objects according to these attributes;	**Instructor's Guide:** 15, 37, 55, 93, 95, 115
• understand how to measure using nonstandard and standard units;	**Instructor's Guide:** 133
• select an appropriate unit and tool for the attribute being measured.	**Instructor's Guide:** 55, 88, 103, 127, 133, 143, 178, 204
Apply appropriate techniques, tools, and formulas to determine measurements • measure with multiple copies of units of the same size, such as paper clips laid end to end;	**Instructor's Guide:** 133
• use repetition of a single unit to measure something larger than the unit, for instance, measuring the length of a room with a single meterstick;	**Instructor's Guide:** 133
• use tools to measure;	**Instructor's Guide:** 133, 204
• develop common referents for measures to make comparisons and estimates.	**Instructor's Guide:** 38, 133, 178, 204

Data Analysis and Probability Standard

NCTM Standard	Afterschool Achievers: Math Club, Grade 1
Formulate questions that can be addressed with data and collect, organize and display relevant data to answer them • pose questions and gather data about themselves and their surroundings;	**Instructor's Guide:** 163
• sort and classify objects according to their attributes and organize data about the objects;	**Instructor's Guide:** 1, 6, 11, 12, 16, 21, 26, 31, 36, 41, 46, 51, 56, 61, 66, 71, 76, 81, 90, 96, 101, 102, 106, 111, 116, 121, 126, 136
• represent data using concrete objects, pictures, and graphs.	**Instructor's Guide:** 1-180

NCTM Standard	Afterschool Achievers: Math Club, Grade 1
Select and use appropriate statistical methods to analyze data • describe parts of the data and the set of data as a whole to determine what the data show.	**Instructor's Guide:** 163

Problem Solving Standard

NCTM Standard	Afterschool Achievers: Math Club, Grade 1
• build new mathematical knowledge through problem solving	**Instructor's Guide:** 1-180
• solve problems that arise in mathematics and in other contexts	**Instructor's Guide:** 1-180
• apply and adapt a variety of appropriate strategies to solve problems	**Instructor's Guide:** 1-180
• monitor and reflect on the process of mathematical problem solving	**Instructor's Guide:** 1-180

Reasoning and Proof Standard

NCTM Standard	Afterschool Achievers: Math Club, Grade 1
• recognize reasoning and proof as fundamental aspects of mathematics	**Instructor's Guide:** 1-180
• make and investigate mathematical conjectures	**Instructor's Guide:** 5, 10, 15, 20, 25 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 105, 110, 115, 120, 125, 130, 135, 140, 145, 150, 155, 160, 165, 170, 175, 180
• develop and evaluate mathematical arguments and proofs	**Instructor's Guide:** 5, 10, 15, 20, 25 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 105, 110, 115, 120, 125, 130, 135, 140, 145, 150, 155, 160, 165, 170, 175, 180
• select and use various types of reasoning and methods of proof	**Instructor's Guide:** 137, 151, 158, 166, 167, 178

Communication Standard

NCTM Standard	Afterschool Achievers: Math Club, Grade 1
• organize and consolidate their mathematical thinking through communication	**Instructor's Guide:** 5, 7, 10, 12, 15, 17, 20, 22, 25 27, 30, 32, 34, 35, 37, 40, 42, 45, 47, 50, 52, 55, 57, 60, 62, 65, 67, 70, 72, 75, 77, 80, 82, 85, 87, 90, 92, 95, 97, 100, 102, 104, 105, 107, 110, 112, 115, 117, 118, 120, 122, 123, 125, 127, 128, 130, 131, 132, 134, 135, 140, 142, 144, 145, 147, 148, 150, 152, 155, 157, 159, 160, 162, 165, 167, 170, 172, 174, 175, 177, 178, 180

NCTM Standard	Afterschool Achievers: Math Club, Grade 1
• communicate their mathematical thinking coherently and clearly to peers, teachers, and others	**Instructor's Guide:** 5, 10, 15, 20, 25 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 105, 110, 115, 120, 125, 130, 135, 140, 145, 150, 155, 160, 165, 170, 175, 180
• analyze and evaluate the mathematical thinking and strategies of others	**Instructor's Guide:** 5, 10, 15, 20, 25 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 105, 110, 115, 120, 125, 130, 135, 140, 145, 150, 155, 160, 165, 170, 175, 180
• use the language of mathematics to express mathematical ideas precisely	**Instructor's Guide:** 7, 10, 14, 24, 27, 30, 34, 37, 42, 49, 50, 52, 54, 59, 62, 64, 69, 72, 73, 74, 79, 83, 84, 86, 89, 91, 92, 94, 99, 102, 104, 107, 108, 109, 110, 112, 114, 117, 119, 122, 123, 124, 129, 130, 133, 134, 137, 138, 139, 142, 144, 149, 150, 154, 159, 162, 163, 164, 165, 166, 167, 169, 170, 172, 173, 174, 177, 179, 193-194, 195, 198, 200-203, 206, 209-210, 212

Connections Standard

NCTM Standard	Afterschool Achievers: Math Club, Grade 1
• recognize and use connections among mathematical ideas	**Instructor's Guide:** 1-180
• understand how mathematical ideas interconnect and build on one another to produce a coherent whole	**Instructor's Guide:** 1-180
• recognize and apply mathematics in contexts outside of mathematics	**Instructor's Guide:** 48, 88, 108, 120, 127, 133, 163, 173, 178

Representation Standard

NCTM Standard	Afterschool Achievers: Math Club, Grade 1
• create and use representations to organize, record, and communicate mathematical ideas	**Instructor's Guide:** 3, 4, 11, 42, 48, 53, 54, 58, 59, 63, 69, 89, 103, 114, 153, 158, 162
• select, apply, and translate among mathematical representations to solve problems	**Instructor's Guide:** 7, 27, 52, 62, 112, 123, 138
• use representations to model and interpret physical, social, and mathematical phenomena	**Instructor's Guide:** 163

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Grade 2

N u m b e r a n d O p e r a t i o n s S t a n d a r d

NCTM Standard	Afterschool Achievers: Math Club, Grade 2
Understand numbers, ways of representing numbers, relationships among numbers, and number systems • count with understanding and recognize "how many" in sets of objects;	**Instructor's Guide:** 2, 17, 18, 24, 26, 31, 72, 81, 86, 111, 151
• use multiple models to develop initial understandings of place value and the base-ten number system;	**Instructor's Guide:** 40, 60, 90, 122, 123
• develop understanding of the relative position and magnitude of whole numbers and of ordinal and cardinal numbers and their connections;	**Instructor's Guide:** 51, 102, 180
• develop a sense of whole numbers and represent and use them in flexible ways, including relating, composing, and decomposing numbers;	**Instructor's Guide:** 5, 92, 107, 147, 181, 182
• connect number words and numerals to the quantities they represent, using various physical models and representations;	**Instructor's Guide:** 2
• understand and represent commonly used fractions, such as _, _, and _.	**Instructor's Guide:** 48, 57, 80, 97, 138
Understand meanings of operations and how they relate to one another • understand various meanings of addition and subtraction of whole numbers and the relationship between the two operations;	**Instructor's Guide:** 4, 5, 9, 12, 14, 19, 22, 27, 29, 33, 42, 49, 54, 79, 84, 89, 94, 99, 102, 104, 107, 109, 114
• understand the effects of adding and subtracting whole numbers;	**Instructor's Guide:** 4, 9, 12, 14, 19, 22, 27, 29, 33, 42, 49, 54, 79, 84, 89, 94, 99, 102, 104, 107, 109, 114
• understand situations that entail multiplication and division, such as equal groupings of objects and sharing equally.	**Instructor's Guide:** 73, 112, 113, 124, 128, 135, 136, 139, 141, 165, 170, 174, 178, 179
Compute fluently and make reasonable estimates • develop and use strategies for whole-number computations, with a focus on addition and subtraction;	**Instructor's Guide:** 25, 70, 155, 161

NCTM Standard	Afterschool Achievers: Math Club, Grade 2
• develop fluency with basic number combinations for addition and subtraction;	**Instructor's Guide:** 4, 5, 9, 12, 14, 19, 22, 27, 29, 33, 42, 49, 54, 79, 84, 89, 94, 99, 102, 104, 107, 109, 114
• use a variety of methods and tools to compute, including objects, mental computation, estimation, paper and pencil, and calculators.	**Instructor's Guide:** 25, 70, 155, 161

A l g e b r a S t a n d a r d

NCTM Standard	Afterschool Achievers: Math Club, Grade 2
Understand patterns, relations, and functions • sort, classify, and order objects by size, number, and other properties;	**Instructor's Guide:** 50, 148, 160
• recognize, describe, and extend patterns such as sequences of sounds and shapes or simple numeric patterns and translate from one representation to another;	**Instructor's Guide:** 6, 11, 21, 41, 51, 56, 66, 91, 126, 131, 171
• analyze how both repeating and growing patterns are generated.	**Instructor's Guide:** 6, 11, 21, 41, 51, 56, 66, 91, 126, 131, 171
Represent and analyze mathematical situations and structure using algebraic symbols • illustrate general principles and properties of operations, such as commutativity, using specific numbers;	**Instructor's Guide:** 86, 110, 111, 112, 124, 435, 136, 139, 165, 179
• use concrete, pictorial, and verbal representations to develop an understanding of invented and conventional symbolic notations.	**Instructor's Guide:** 10, 55, 62, 95
Use mathematical models to represent and understand quantitative relationships • model situations that involve the addition and subtraction of whole numbers, using objects, pictures, and symbols.	**Instructor's Guide:** 10, 55, 62, 95

Geometry Standard

NCTM Standard	Afterschool Achievers: Math Club, Grade 2
Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships • recognize, name, build draw, compare, and sort two- and three-dimensional shapes;	**Instructor's Guide:** 3, 13, 23, 35, 38, 50, 52, 63, 88, 98, 125, 133, 163, 173
• describe attributes and parts of two- and three-dimensional shapes;	**Instructor's Guide:** 115, 130
• investigate and predict the results of putting together and taking apart two- and three-dimensional shapes.	**Instructor's Guide:** 115
Specify locations and describe spatial relationships using coordinate geometry and other representational systems • describe, name, and interpret relative positions in space and apply ideas about relative position;	**Instructor's Guide:** 121, 150, 156, 158
• describe, name, and interpret direction and distance in navigating space and apply ideas about direction and distance;	**Instructor's Guide:** 121, 150, 156
• find and name locations with simple relationships such as "near to" and in coordinate systems such as maps.	**Instructor's Guide:** 121, 150, 156
Apply transformations and use symmetry to analyze mathematical situations • recognize and apply slides, flips, and turns;	**Instructor's Guide:** 130
• recognize and create shapes that have symmetry.	**Instructor's Guide:** 153
Use visualizations, spatial reasoning, and geometric modeling to solve problems • create mental images of geometric shapes using spatial memory and spatial visualization;	**Instructor's Guide:** 105, 115, 125, 188, 209
• recognize and represent shapes from different perspectives;	**Instructor's Guide:** 115, 130
• relate ideas in geometry to ideas in number and measurement;	**Instructor's Guide:** 53, 68, 105
• recognize geometric shapes and structures in the environment and specify their location.	**Instructor's Guide:** 115, 125, 188, 209

Measurement Standard

NCTM Standard	Afterschool Achievers: Math Club, Grade 2
Understand measurable attributes of objects and the units, systems, and processes of measurement • recognize the attributes of length, volume, weight, area, and time;	**Instructor's Guide:** 7, 20, 28, 30, 47, 58, 82, 83, 108, 150, 168
• compare and order objects according to these attributes;	**Instructor's Guide:** 7, 58, 85, 108, 148
• understand how to measure using nonstandard and standard units;	**Instructor's Guide:** 7, 30, 53
• select an appropriate unit and tool for the attribute being measured.	**Instructor's Guide:** 150, 168
Apply appropriate techniques, tools, and formulas to determine measurements • measure with multiple copies of units of the same size, such as paper clips laid end to end;	**Instructor's Guide:** 7, 8, 28, 43
• use repetition of a single unit to measure something larger than the unit, for instance, measuring the length of a room with a single meterstick;	**Instructor's Guide:** 7, 53
• use tools to measure;	**Instructor's Guide:** 7, 30
• develop common referents for measures to make comparisons and estimates.	**Instructor's Guide:** 7, 8, 28, 43

Data Analysis and Probability Standard

NCTM Standard	Afterschool Achievers: Math Club, Grade 2
Formulate questions that can be addressed with data and collect, organize and display relevant data to answer them • pose questions and gather data about themselves and their surroundings;	**Instructor's Guide:** 25, 70, 155, 161
• sort and classify objects according to their attributes and organize data about the objects;	**Instructor's Guide:** 25, 70, 155, 161
• represent data using concrete objects, pictures, and graphs.	**Instructor's Guide:** 25, 70
Select and use appropriate statistical methods to analyze data • describe parts of the data and the set of data as a whole to determine what the data show.	**Instructor's Guide:** 25, 70, 155, 161

Problem Solving Standard

NCTM Standard	Afterschool Achievers: Math Club, Grade 2
• build new mathematical knowledge through problem solving	**Instructor's Guide:** 1-180
• solve problems that arise in mathematics and in other contexts	**Instructor's Guide:** 1-180
• apply and adapt a variety of appropriate strategies to solve problems	**Instructor's Guide:** 1-180
• monitor and reflect on the process of mathematical problem solving	**Instructor's Guide:** 1-180

Reasoning and Proof Standard

NCTM Standard	Afterschool Achievers: Math Club, Grade 2
• recognize reasoning and proof as fundamental aspects of mathematics	**Instructor's Guide:** 1-180
• make and investigate mathematical conjectures	**Instructor's Guide:** 50, 61, 91, 126, 131, 151
• develop and evaluate mathematical arguments and proofs	**Instructor's Guide:** 61, 151
• select and use various types of reasoning and methods of proof	**Instructor's Guide:** 1-180

Communication Standard

NCTM Standard	Afterschool Achievers: Math Club, Grade 2
• organize and consolidate their mathematical thinking through communication	**Instructor's Guide:** 1-180
• communicate their mathematical thinking coherently and clearly to peers, teachers, and others	**Instructor's Guide:** 1-180
• analyze and evaluate the mathematical thinking and strategies of others	**Instructor's Guide:** 3, 5, 10, 15, 20, 25, 30, 35, 38, 40, 43, 45, 55, 60, 63, 65, 70, 75, 80, 85, 90, 95, 100, 105, 110, 115, 120, 125, 130, 135, 140, 145, 150, 155, 160, 165, 170, 175, 180
• use the language of mathematics to express mathematical ideas precisely	**Instructor's Guide:** 1-180

Connections Standard

NCTM Standard	Afterschool Achievers: Math Club, Grade 2
• recognize and use connections among mathematical ideas	**Instructor's Guide:** 86, 110, 111, 112, 124, 435, 136, 139, 165, 179
• understand how mathematical ideas interconnect and build on one another to produce a coherent whole	**Instructor's Guide:** 86, 110, 111, 112, 124, 435, 136, 139, 165, 179
• recognize and apply mathematics in contexts outside of mathematics	**Instructor's Guide:** 16, 32, 34, 47, 58, 59, 77, 82, 93, 100, 103, 108, 118, 119, 140, 144, 147, 159

Representation Standard

NCTM Standard	Afterschool Achievers: Math Club, Grade 2
• create and use representations to organize, record, and communicate mathematical ideas	**Instructor's Guide:** 25, 70, 155, 161
• select, apply, and translate among mathematical representations to solve problems	**Instructor's Guide:** 25, 70, 155, 161
• use representations to model and interpret physical, social, and mathematical phenomena	**Instructor's Guide:** 25, 70, 155, 161

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NCTM Standards
Grade 3

Number and Operations Standard

Expectations	Afterschool Achievers: Math Club, Grade 3
Understand numbers, ways of representing numbers, relationships among numbers, and number systems • understand the place-value structure of the base-ten number system and be able to represent and compare whole numbers and decimals;	**Instructor's Guide:** 5, 22, 35, 60, 103, 127, 153
• recognize equivalent representations for the same number and generate them by decomposing and composing numbers;	**Instructor's Guide:** 7, 8, 11, 13, 17, 19, 23, 24, 31, 33, 34, 47, 48, 53, 54, 56, 63, 64, 69, 77, 79, 84, 89, 91, 92, 97, 102, 113, 147, 148, 149, 154, 155, 159, 164, 166, 171, 174, 175, 179
• develop understanding of fractions as parts of unit wholes, as parts of a collection, as locations on number lines, and as divisions of whole numbers;	**Instructor's Guide:** 82, 83, 137, 145, 150
• use models, benchmarks, and equivalent forms to judge the size of fractions;	**Instructor's Guide:** 82, 83, 137, 145, 150
• recognize and generate equivalent forms of commonly used fractions, decimals, and percents;	**Instructor's Guide:** 82, 83, 145
• describe classes of numbers according to characteristics such as the nature of their factors.	**Instructor's Guide:** 18, 29, 76, 81, 115, 180
Understand meanings of operations and how they relate to one another • understand various meanings of multiplication and division;	**Instructor's Guide:** 21, 23, 47, 54, 55, 59, 62, 64, 69, 74, 77, 79, 84, 86, 89, 90, 91, 92, 97, 99, 101, 102, 119, 126, 131, 136, 138, 147, 149, 153, 154, 164, 169, 171, 173, 174, 179
• understand the effects of multiplying and dividing whole numbers;	**Instructor's Guide:** 54, 59, 119
• identify and use relationships between operations, such as division as the inverse of multiplication, to solve problems;	**Instructor's Guide:** 23, 55, 85, 90, 147, 171
• understand and use properties of operations, such as the distributivity of multiplication over addition.	**Instructor's Guide:** 53, 84

Expectations	Afterschool Achievers: Math Club, Grade 3
Compute fluently and make reasonable estimates • develop fluency with basic number combinations for multiplication and division and use these combinations to mentally compute related problems, such as 30 x 50;	**Instructor's Guide:** 171
• develop fluency in adding, subtracting, multiplying, and dividing whole numbers;	**Instructor's Guide:** 1, 2, 4, 6, 8, 9, 10, 11, 12, 14, 16, 19, 21, 23, 24, 26, 31, 33, 34, 36, 37, 39, 41, 46, 47, 49, 51, 53, 54, 55, 56, 59, 61, 62, 64, 66, 68, 69, 74, 77, 79, 84, 85, 86, 89, 90, 91, 92, 94, 97, 99, 101, 102, 119, 120, 124, 126, 131, 136, 137, 138, 144, 147, 149, 150, 153, 154, 164, 169, 170, 171, 173, 174, 179
• develop and use strategies to estimate the results of whole-number computations and to judge the reasonableness of such results;	**Instructor's Guide:** 40, 70, 75, 105, 155
• use visual models, benchmarks, and equivalent forms to add and subtract commonly used fractions and decimals;	**Instructor's Guide:** 82, 83, 137, 145, 150
• select appropriate methods and tools for computing with whole numbers from among mental computation, estimation, calculators, and paper and pencil according to the context and nature of the computation and use the selected method or tools.	**Instructor's Guide:** 1, 2, 4, 6, 7, 8, 9, 10, 11, 12, 14, 16, 19, 24, 26, 31, 33, 34, 36, 37, 39, 41, 46, 49, 51, 53, 56, 61, 66, 68, 85, 94, 144, 154, 164

A l g e b r a S t a n d a r d

Expectations	Afterschool Achievers: Math Club, Grade 3
Understand patterns, relations, and functions • describe, extend, and make generalizations about geometric and numeric patterns;	**Instructor's Guide:** 21, 47, 58, 67, 74, 76, 81, 86, 96, 98, 99, 101, 104, 106, 109, 114, 116, 118, 121, 126, 131, 136, 138, 153, 156, 169
• represent and analyze patterns and functions, using words, tables, and graphs;	**Instructor's Guide:** 21, 47, 58, 67, 74, 76, 81, 86, 96, 98, 99, 101, 104, 106, 109, 114, 116, 118, 121, 126, 131, 136, 138, 153, 156, 169
Represent and analyze mathematical situations and structures using algebraic symbols • identify such properties as commutativity, associativity, and distributivity and use them to compute with whole numbers;	**Instructor's Guide:** 9, 53, 54, 64, 119
• represent the idea of a variable as an unknown quantity using a letter or a symbol;	**Instructor's Guide:** 22
• express mathematical relationships using equations.	**Instructor's Guide:** 22, 47, 92

Expectations	Afterschool Achievers: Math Club, Grade 3
Use mathematical models to represent and understand quantitative relationships • model problem situations with objects and use representations such as graphs, tables, and equations to draw conclusions.	**Instructor's Guide:** 30, 55, 62, 70, 75, 90, 92, 112, 120, 170, 175

Geometry Standard

Expectations	Afterschool Achievers: Math Club, Grade 3
Analyze characteristics and properties of two- and three- dimensional geometric shapes and develop mathematical arguments about geometric relationships • identify, compare, and analyze attributes of two- and three-dimensional shapes and develop vocabulary to describe the attributes;	**Instructor's Guide:** 45, 65, 93, 108, 111, 135, 142, 176, 178
• classify two- and three-dimensional shapes according to their properties and develop definitions of classes of shapes such as triangles and pyramids;	**Instructor's Guide:** 45, 65, 93, 108, 111, 135, 142, 176, 178
• investigate, describe, and reason about the results of subdividing, combining, and transforming shapes;	**Instructor's Guide:** 111, 176
• make and test conjectures about geometric properties and relationships and develop logical arguments to justify conclusions.	**Instructor's Guide:** 28, 45, 57, 65, 67, 93, 108, 111, 116, 121, 135, 142, 156, 176, 178
Specify locations and describe spatial relationships using coordinate geometry and other representational systems • describe location and movement using common language and geometric vocabulary;	**Instructor's Guide:** 165
• make and use coordinate systems to specify locations and to describe paths.	**Instructor's Guide:** 165
Apply transformations and use symmetry to analyze mathematical situations • predict and describe the results of sliding, flipping, and turning two-dimensional shapes;	**Instructor's Guide:** 111, 176
• identify and describe line and rotational symmetry in two- and three-dimensional shapes and designs.	**Instructor's Guide:** 28, 57, 108
Use visualization, spatial reasoning, and geometric modeling to solve problems • build and draw geometric objects;	**Instructor's Guide:** 28, 45, 57, 65, 93, 108, 111, 135, 142, 176, 178

Expectations	Afterschool Achievers: Math Club, Grade 3
• create and describe mental images of objects, patterns, and paths;	**Instructor's Guide:** 15, 93, 135, 142, 178
• identify and build a three-dimensional object from two-dimensional representations of that object;	**Instructor's Guide:** 142, 178
• identify and draw a two-dimensional representation of a three-dimensional object;	**Instructor's Guide:** 142, 178
• use geometric models to solve problems in other areas of mathematics, such as number and measurement;	**Instructor's Guide:** 27, 100, 133, 156, 161
• recognize geometric ideas and relationships and apply them to other disciplines and to problems that arise in the classroom or in everyday life.	**Instructor's Guide:** 29, 59, 62, 91, 92, 107, 112, 143

Measurement Standard

Expectations	Afterschool Achievers: Math Club, Grade 3
Understand measurable attributes of objects and the units, systems, and processes of measurement • understand such attributes as length, area, weight, volume, and size of angle and select the appropriate type of unit for measuring each attribute;	**Instructor's Guide:** 13, 17, 30, 50, 63, 80, 110, 113, 128, 148, 155, 160, 166
• understand the need for measuring with standard units and become familiar with standard units in the customary and metric systems;	**Instructor's Guide:** 17, 30, 50, 63, 80, 110, 113, 128, 148, 155, 160, 166
• carry out simple unit conversions, such as from centimeters to meters, within a system of measurement;	**Instructor's Guide:** 13, 17, 30, 50, 63, 80, 100, 110, 113, 133, 148, 155, 156, 160, 161, 166
• understand that measurements are approximations and how differences in units affect precision;	**Instructor's Guide:** 13, 50, 80, 110, 155, 160
• explore what happens to measurements of a two-dimensional shape such as its perimeter and area when the shape is changed in some way	**Instructor's Guide:** 100, 133, 156, 161
Apply appropriate techniques, tools, and formulas to determine measurements • develop strategies for estimating the perimeters, areas, and volumes of irregular shapes;	**Instructor's Guide:** 100, 133, 156, 161
• select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature, and the size of angles;	**Instructor's Guide:** 17, 30, 50, 63, 80, 110, 113, 128, 148, 155, 160, 166

Expectations	Afterschool Achievers: Math Club, Grade 3
• select and use benchmarks to estimate measurements;	**Instructor's Guide:** 50, 80, 110, 155, 160
• develop, understand, and use formulas to find the area of rectangles and related triangles and parallelograms;	**Instructor's Guide:** 27, 133, 161

Data Analysis and Probability Standard

Expectations	Afterschool Achievers: Math Club, Grade 3
Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them • design investigations to address a question and consider how data-collection methods affect the nature of the data set;	**Instructor's Guide:** 25
• collect data using observations, surveys, and experiments;	**Instructor's Guide:** 25
• represent data using tables and graphs such as line plots, bar graphs, and line graphs;	**Instructor's Guide:** 25
Select and use appropriate statistical methods to analyze • describe the shape and important features of a set of data and compare related data sets, with an emphasis on how the data are distributed;	**Instructor's Guide:** 25
Develop and evaluate inferences and predictions that are based on data • propose and justify conclusions and predictions that are based on data and design studies to further investigate the conclusions or predictions.	**Instructor's Guide:** 116, 153, 156, 161

Problem Solving Standard

Expectations	Afterschool Achievers: Math Club, Grade 3
• build new mathematical knowledge through problem solving	**Instructor's Guide:** 1-180
• solve problems that arise in mathematics and in other contexts	**Instructor's Guide:** 1-180
• apply and adapt a variety of appropriate strategies to solve problems	**Instructor's Guide:** 1-180
• monitor and reflect on the process of mathematical problem solving	**Instructor's Guide:** 1-180

Reasoning and Proof Standard

Expectations	Afterschool Achievers: Math Club, Grade 3
• recognize reasoning and proof as fundamental aspects of mathematics	**Instructor's Guide:** 1-180
• make and investigate mathematical conjectures	**Instructor's Guide:** 28, 40, 67, 70, 75, 94, 105, 108, 110, 111, 116, 121, 135, 142, 155, 156, 176, 178
• develop and evaluate mathematical arguments and proofs	**Instructor's Guide:** 28, 40, 67, 70, 75, 94, 105, 108, 110, 111, 116, 121, 135, 142, 155, 156, 176, 178
• select and use various types of reasoning and methods of proof	**Instructor's Guide:** 28, 40, 67, 70, 75, 94, 105, 108, 110, 111, 116, 121, 135, 142, 155, 156, 176, 178

Communication Standard

Expectations	Afterschool Achievers: Math Club, Grade 3
• organize and consolidate their mathematical thinking through communication	**Instructor's Guide:** 25, 28, 45, 50, 57, 65, 67, 80, 93, 108, 110, 111, 116, 121, 135, 142, 155, 156, 160, 176, 178
• communicate their mathematical thinking coherently and clearly to peers, teachers, and others	**Instructor's Guide:** 25, 28, 45, 50, 57, 65, 67, 80, 93, 108, 110, 111, 116, 121, 135, 142, 155, 156, 160, 176, 178
• analyze and evaluate the mathematical thinking and strategies of others	**Instructor's Guide:** 25, 28, 45, 50, 57, 65, 67, 80, 93, 108, 110, 111, 116, 121, 135, 142, 155, 156, 160, 176, 178
• use the language of mathematics to express mathematical ideas precisely	**Instructor's Guide:** 25, 28, 45, 50, 57, 65, 67, 80, 93, 108, 110, 111, 116, 121, 135, 142, 155, 156, 160, 176, 178

Connections Standard

Expectations	Afterschool Achievers: Math Club, Grade 3
• recognize and use connections among mathematical ideas	**Instructor's Guide:** 1-180
• understand how mathematical ideas interconnect and build on one another to produce a coherent whole	**Instructor's Guide:** 1-180
• recognize and apply mathematics in contexts outside of mathematics	**Instructor's Guide:** 29, 59, 62, 91, 92, 107, 112, 143

Representation Standard

Expectations	Afterschool Achievers: Math Club, Grade 3
• create and use representations to organize, record, and communicate mathematical ideas	**Instructor's Guide:** 23, 25, 27, 28, 30, 35, 55, 61, 65, 66, 67, 71, 77, 82, 93, 97, 103, 107, 108, 115, 116, 120, 121, 123, 135, 137, 141, 143, 145, 146, 150, 151, 168
• select, apply, and translate among mathematical representations to solve problems	**Instructor's Guide:** 23, 25, 27, 28, 30, 35, 55, 61, 65, 66, 67, 71, 77, 82, 93, 97, 103, 107, 108, 115, 116, 120, 121, 123, 135, 137, 141, 143, 145, 146, 150, 151, 168
• use representations to model and interpret physical, social, and mathematical phenomena	**Instructor's Guide:** 23, 25, 27, 28, 30, 35, 55, 61, 65, 66, 67, 71, 77, 82, 93, 97, 103, 107, 108, 115, 116, 120, 121, 123, 135, 137, 141, 143, 145, 146, 150, 151, 168

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Grade 4

Number and Operations Standard

Expectations	Afterschool Achievers: Math Club, Grade 4
Understand numbers, ways of representing numbers, relationships among numbers, and number systems • understand the place-value structure of the base-ten number system and be able to represent and compare whole numbers and decimals;	**Instructor's Guide:** 12, 27, 95, 103, 112, 133, 143, 147, 175
• recognize equivalent representations for the same number and generate them by decomposing and composing numbers;	**Instructor's Guide:** 27, 107, 112, 113, 133, 144, 145, 147, 150
• develop understanding of fractions as parts of unit wholes, as parts of a collection, as locations on number lines, and as divisions of whole numbers;	**Instructor's Guide:** 82, 107, 113, 133, 144, 145, 147, 150, 154
• use models, benchmarks, and equivalent forms to judge the size of fractions;	**Instructor's Guide:** 113, 133, 144, 145, 150
• recognize and generate equivalent forms of commonly used fractions, decimals, and percents;	**Instructor's Guide:** 133, 145, 150
• describe classes of numbers according to characteristics such as the nature of their factors.	**Instructor's Guide:** 13, 20, 37, 45, 48, 66, 68, 70, 71, 76, 78, 81, 86, 92, 101, 106, 111, 116, 118, 121, 126, 131, 138, 148, 162, 168
Understand meanings of operations and how they relate to one another • understand various meanings of multiplication and division;	**Instructor's Guide:** 2, 19, 24, 29, 34, 39, 40, 44, 49, 54, 59, 64, 69, 74, 75, 78, 79, 118, 125, 138, 159
• understand the effects of multiplying and dividing whole numbers;	**Instructor's Guide:** 2, 19, 24, 29, 34, 39, 40, 44, 49, 54, 59, 64, 69, 74, 75, 78, 79, 118, 125, 138, 159
• identify and use relationships between operations, such as division as the inverse of multiplication, to solve problems;	**Instructor's Guide:** 50, 67, 90, 115
• understand and use properties of operations, such as the distributivity of multiplication over addition.	**Instructor's Guide:** 115

Expectations	Afterschool Achievers: Math Club, Grade 4
Compute fluently and make reasonable estimates • develop fluency with basic number combinations for multiplication and division and use these combinations to mentally compute related problems, such as 30 x 50;	**Instructor's Guide:** 58, 115, 122, 124, 129, 134, 139
• develop fluency in adding, subtracting, multiplying, and dividing whole numbers;	**Instructor's Guide:** 4, 6, 9, 14, 19, 23, 24, 29, 34, 39, 41, 43, 46, 48, 49, 54, 59, 61, 64, 65, 66, 69, 71, 74, 76, 77, 78, 79, 81, 84, 86, 93, 96, 97, 101, 118, 119, 124, 129, 134, 138, 139, 141, 142, 146, 151, 156, 159, 161, 164, 166, 170, 171, 176
• develop and use strategies to estimate the results of whole-number computations and to judge the reasonableness of such results;	**Instructor's Guide:** 25,100, 122, 129, 134, 177
• develop and use strategies to estimate computations involving fractions and decimals in situations relevant to students' experience;	**Instructor's Guide:** 25, 100, 122, 124, 129, 134, 139, 177
• use visual models, benchmarks, and equivalent forms to add and subtract commonly used fractions and decimals;	**Instructor's Guide:** 155, 160, 165
• select appropriate methods and tools for computing with whole numbers from among mental computation, estimation, calculators, and paper and pencil according to the context and nature of the computation and use the selected method or tools.	**Instructor's Guide:** 4, 6, 9, 14, 19, 24, 25, 29, 34, 36, 41, 46, 48, 49, 54, 59, 61, 64, 66, 69, 71, 74, 76, 78, 79, 81, 84, 86, 93, 96, 97, 117, 118, 124, 129, 134, 138, 139, 141, 142, 146, 151, 156, 159, 161, 164, 166, 170, 171, 176

A l g e b r a S t a n d a r d

Expectations	Afterschool Achievers: Math Club, Grade 4
Understand patterns, relations, and functions • describe, extend, and make generalizations about geometric and numeric patterns;	**Instructor's Guide:** 7, 31, 36, 41, 45, 46, 48, 51, 56, 61, 65, 66, 71, 77, 78, 91, 96, 116, 131, 136
• represent and analyze patterns and functions, using words, tables, and graphs.	**Instructor's Guide:** 7, 31, 36, 41, 45, 46, 48, 51, 56, 61, 65, 66, 71, 77, 78, 91, 96, 116, 131, 136
Represent and analyze mathematical situations and structures using algebraic symbols • identify such properties as commutativity, associativity, and distributivity and use them to compute with whole numbers;	**Instructor's Guide:** 50, 57, 67, 90, 115,157
• represent the idea of a variable as an unknown quantity using a letter or a symbol;	**Instructor's Guide:** 40, 152, 167, 172
• express mathematical relationships using equations.	**Instructor's Guide:** 4, 9, 14, 40, 59, 64, 69, 74, 79, 84, 90, 96, 102, 140, 146, 151, 152, 156, 161, 165, 166, 167, 170, 171, 172, 176

Expectations	Afterschool Achievers: Math Club, Grade 4
Use mathematical models to represent and understand quantitative relationships • model problem situations with objects and use representations such as graphs, tables, and equations to draw conclusions.	**Instructor's Guide:** 31, 83, 91, 140
Analyze change in various contexts • investigate how a change in one variable relates to a change in a second variable.	**Instructor's Guide:** 140

Geometry Standard

Expectations	Afterschool Achievers: Math Club, Grade 4
Analyze characteristics and properties of two- and three- dimensional geometric shapes and develop mathematical arguments about geometric relationships • identify, compare, and analyze attributes of two- and three-dimensional shapes and develop vocabulary to describe the attributes;	**Instructor's Guide:** 3, 28, 60, 110, 137, 158
• classify two- and three-dimensional shapes according to their properties and develop definitions of classes of shapes such as triangles and pyramids;	**Instructor's Guide:** 3, 28, 60, 110, 137, 158
• investigate, describe, and reason about the results of subdividing, combining, and transforming shapes;	**Instructor's Guide:** 163
• explore congruence and similarity;	**Instructor's Guide:** 63, 110, 158, 163
• make and test conjectures about geometric properties and relationships and develop logical arguments to justify conclusions.	**Instructor's Guide:** 3, 28, 42, 51, 60, 63, 85, 110, 137, 153, 158, 163
Specify locations and describe spatial relationships using coordinate geometry and other representational systems • describe location and movement using common language and geometric vocabulary.	**Instructor's Guide**: 2, 17, 47, 52
Apply transformations and use symmetry to analyze mathematical situations • predict and describe the results of sliding, flipping, and turning two-dimensional shapes;	**Instructor's Guide:** 163
• describe a motion or a series of motions that will show that two shapes are congruent;	**Instructor's Guide:** 163

Expectations	Afterschool Achievers: Math Club, Grade 4
• identify and describe line and rotational symmetry in two- and three-dimensional shapes and designs.	**Instructor's Guide:** 63
Use visualization, spatial reasoning, and geometric modeling to solve problems • build and draw geometric objects;	**Instructor's Guide:** 3, 28, 53, 60, 63, 88, 110, 137, 158
• create and describe mental images of objects, patterns, and paths;	**Instructor's Guide:** 3, 28, 158
• identify and build a three-dimensional object from two-dimensional representations of that object;	**Instructor's Guide:** 28, 60
• identify and draw a two-dimensional representation of a three-dimensional object;	**Instructor's Guide:** 3, 28, 53, 60, 63, 88, 110, 137, 158
• use geometric models to solve problems in other areas of mathematics, such as number and measurement.	**Instructor's Guide:** 10, 30, 33, 35, 53, 55, 73, 88, 137

Measurement Standard

Expectations	Afterschool Achievers: Math Club, Grade 4
Understand measurable attributes of objects and the units, systems, and processes of measurement • understand such attributes as length, area, weight, volume, and size of angle and select the appropriate type of unit for measuring each attribute;	**Instructor's Guide:** 10, 30, 33, 35, 53, 55, 73, 88, 137
• understand the need for measuring with standard units and become familiar with standard units in the customary and metric systems.	**Instructor's Guide:** 5, 8, 10, 30, 35, 53, 55, 88, 137
Apply appropriate techniques, tools, and formulas to determine measurements • select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature, and the size of angles;	**Instructor's Guide:** 5, 8, 10, 30, 33, 35, 53, 55, 73, 82, 88, 132, 137
• select and use benchmarks to estimate measurements;	**Instructor's Guide:** 5, 30, 55
• develop, understand, and use formulas to find the area of rectangles and related triangles and parallelograms.	**Instructor's Guide:** 10, 35, 53, 88, 137

Data Analysis and Probability Standard

Expectations	Afterschool Achievers: Math Club, Grade 4
Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them • collect data using observations, surveys, and experiments;	**Instructor's Guide:** 31, 83, 91, 140
• represent data using tables and graphs such as line plots, bar graphs, and line graphs;	**Instructor's Guide:** 31, 83, 91, 140
Develop and evaluate inferences and predictions that are based on data • propose and justify conclusions and predictions that are based on data and design studies to further investigate the conclusions or predictions.	**Instructor's Guide:** 31, 83, 91, 140

Problem Solving Standard

Expectations	Afterschool Achievers: Math Club, Grade 4
• build new mathematical knowledge through problem solving	**Instructor's Guide:** 1-180
• solve problems that arise in mathematics and in other contests	**Instructor's Guide:** 1-180
• apply and adapt a variety of appropriate strategies to solve problems	**Instructor's Guide:** 1-180
• monitor and reflect on the process of mathematical problem solving	**Instructor's Guide:** 1-180

Reasoning and Proof Standard

Expectations	Afterschool Achievers: Math Club, Grade 4
• recognize reasoning and proof as fundamental aspects of mathematics	**Instructor's Guide:** 1-180
• make and investigate mathematical conjectures	**Instructor's Guide:** 3**,** 5, 28, 30, 55, 60, 63, 85, 110, 137, 153, 158, 163
• develop and evaluate mathematical arguments and proofs	**Instructor's Guide:** 3**,** 5, 28, 30, 55, 60, 63, 85, 110, 137, 153, 158, 163
• select and use various types of reasoning and methods of proof	**Instructor's Guide:** 3**,** 5, 28, 30, 55, 60, 63, 85, 110, 137, 153, 158, 163

Communication Standard

Expectations	Afterschool Achievers: Math Club, Grade 4
• organize and consolidate their mathematical thinking through communication	**Instructor's Guide:** 5, 30, 55, 60, 63, 85, 110
• communicate their mathematical thinking coherently and clearly to peers, teachers, and others	**Instructor's Guide:** 5, 30, 55, 60, 63, 85, 110
• analyze and evaluate the mathematical thinking and strategies of others	**Instructor's Guide:** 5, 30, 55, 60, 63, 85, 110
• use the language of mathematics to express mathematical ideas precisely	**Instructor's Guide:** 2**,** 5, 17, 30, 42, 47, 52, 55, 60, 63, 85, 110

Connections Standard

Expectations	Afterschool Achievers: Math Club, Grade 4
• recognize and use connections among mathematical ideas	**Instructor's Guide:** 1-180
• understand how mathematical ideas interconnect and build on one another to produce a coherent whole	**Instructor's Guide:** 1-180
• recognize and apply mathematics in contexts outside of mathematics	**Instructor's Guide:** 5, 30, 55, 80, 109, 114, 123, 127, 130

Representation Standard

Expectations	Afterschool Achievers: Math Club, Grade 4
• create and use representations to organize, record, and communicate mathematical ideas	**Instructor's Guide:** 31, 83, 91, 140
• select, apply, and translate among mathematical representations to solve problems	**Instructor's Guide:** 31, 83, 91, 140
• use representations to model and interpret physical, social, and mathematical phenomena	**Instructor's Guide:** 31, 83, 91, 140

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Number and Operations Standard

Expectations	Afterschool Achievers: Math Club, Grade 5
Understand numbers, ways of representing numbers, relationships among numbers, and number systems • understand the place-value structure of the base-ten number system and be able to represent and compare whole numbers and decimals;	**Instructor's Guide:** 54, 77, 104, 129, 134, 148, 152, 157, 172, 174, 179
• recognize equivalent representations for the same number and generate them by decomposing and composing numbers;	**Instructor's Guide:** 27, 28, 49, 58, 87, 145, 150, 178
• develop understanding of fractions as parts of unit wholes, as parts of a collection, as locations on number lines, and as divisions of whole numbers;	**Instructor's Guide:** 27, 28, 49, 58, 87, 145, 150, 178
• use models, benchmarks, and equivalent forms to judge the size of fractions;	**Instructor's Guide:** 27, 28, 49, 58, 65, 81, 87, 89, 91, 144, 150, 178
• recognize and generate equivalent forms of commonly used fractions, decimals, and percents;	**Instructor's Guide:** 27, 28, 49, 58, 65, 87, 88, 91, 145, 150, 178
• describe classes of numbers according to characteristics such as the nature of their factors.	**Instructor's Guide:** 7, 14, 18, 26, 31, 36, 37, 41, 67, 70, 99, 120, 168, 180
Understand meanings of operations and how they relate to one another • understand various meanings of multiplication and division;	**Instructor's Guide:** 6, 7, 15, 16, 18, 21, 26, 31, 36, 37, 41, 62, 67, 70, 99, 120, 168, 180
• understand the effects of multiplying and dividing whole numbers;	**Instructor's Guide:** 7, 19, 24, 29, 34, 39, 42, 48, 50, 53, 59, 64, 69, 74, 75, 79, 82, 93, 97, 107, 114, 122, 124, 139, 164
• identify and use relationships between operations, such as division as the inverse of multiplication, to solve problems;	**Instructor's Guide:** 17, 40, 57, 81
• understand and use properties of operations, such as the distributivity of multiplication over addition.	**Instructor's Guide:** 7, 90, 162

Expectations	Afterschool Achievers: Math Club, Grade 5
Compute fluently and make reasonable estimates • develop fluency with basic number combinations for multiplication and division and use these combinations to mentally compute related problems, such as 30 x 50;	**Instructor's Guide:** 53, 68, 100, 147, 163
• develop fluency in adding, subtracting, multiplying, and dividing whole numbers;	**Instructor's Guide:** 2, 3, 4, 6, 7, 8, 9, 13, 14, 15, 17, 18, 19, 21, 24, 26, 27, 29, 32, 33, 34, 36, 37, 38, 39, 40, 41, 42, 47, 48, 50, 53, 54, 57, 59, 63, 64, 69, 73, 74, 75, 78, 79, 82, 83, 89, 93, 100, 104, 107, 112, 114, 117, 119, 122, 124, 125, 129, 133, 139, 144, 155, 160, 164, 169, 174
• develop and use strategies to estimate the results of whole-number computations and to judge the reasonableness of such results;	**Instructor's Guide:** 13, 25, 33, 53, 68, 74, 78, 79, 93, 100, 118, 147, 148, 163
• use visual models, benchmarks, and equivalent forms to add and subtract commonly used fractions and decimals;	**Instructor's Guide:** 47, 89, 125, 133, 144, 155, 160, 169
• select appropriate methods and tools for computing with whole numbers from among mental computation, estimation, calculators, and paper and pencil according to the context and nature of the computation and use the selected method or tools.	**Instructor's Guide:** 4, 6, 9, 13, 14, 15, 19, 24, 25, 29, 34, 39, 42, 50, 53, 59, 62, 64, 68, 69, 74, 75, 78, 79, 82, 93, 97, 100, 117, 118, 119, 122, 124, 147, 163, 165, 177

A l g e b r a S t a n d a r d

Expectations	Afterschool Achievers: Math Club, Grade 5
Understand patterns, relations, and functions • describe, extend, and make generalizations about geometric and numeric patterns;	**Instructor's Guide:** 1, 6, 11, 16, 18, 21, 45, 46, 48, 56, 65, 76, 114, 126, 131, 136, 141, 147, 149, 165
• represent and analyze patterns and functions, using words, tables, and graphs.	**Instructor's Guide:** 151, 156, 161, 166, 176
Represent and analyze mathematical situations and structures using algebraic symbols • identify such properties as commutativity, associativity, and distributivity and use them to compute with whole numbers;	**Instructor's Guide:** 7, 90
• represent the idea of a variable as an unknown quantity using a letter or a symbol;	**Instructor's Guide:** 17, 40, 56, 57, 81, 92
• express mathematical relationships using equations.	**Instructor's Guide:** 17, 51, 56, 76

Expectations	Afterschool Achievers: Math Club, Grade 5
Use mathematical models to represent and understand quantitative relationships • model problem situations with objects and use representations such as graphs, tables, and equations to draw conclusions.	**Instructor's Guide:** 1, 6, 11, 16, 18, 21, 45, 56, 76, 114, 131, 136, 141, 149, 151, 165, 171, 176
Analyze change in various contexts • investigate how a change in one variable relates to a change in a second variable;	**Instructor's Guide:** 151, 156, 171, 176
• identify and describe situations with constant or varying rates of change and compare them.	**Instructor's Guide:** 151, 156, 171, 176

Geometry Standard

Expectations	Afterschool Achievers: Math Club, Grade 5
Analyze characteristics and properties of two- and three- dimensional geometric shapes and develop mathematical arguments about geometric relationships • identify, compare, and analyze attributes of two- and three-dimensional shapes and develop vocabulary to describe the attributes;	**Instructor's Guide:** 22, 35, 102, 115, 138, 153
• classify two- and three-dimensional shapes according to their properties and develop definitions of classes of shapes such as triangles and pyramids;	**Instructor's Guide:** 110, 123, 129
• investigate, describe, and reason about the results of subdividing, combining, and transforming shapes;	**Instructor's Guide:** 146
• explore congruence and similarity;	**Instructor's Guide:** 35, 102, 110, 138, 153, 175
• make and test conjectures about geometric properties and relationships and develop logical arguments to justify conclusions.	**Instructor's Guide:** 3, 10, 22, 23, 35, 43, 60, 63, 83, 102, 103, 110, 115, 127, 138, 140, 146, 153
Specify locations and describe spatial relationships using coordinate geometry and other representational systems • describe location and movement using common language and geometric vocabulary;	**Instructor's Guide:** 12
• make and use coordinate systems to specify locations and to describe paths.	**Instructor's Guide:** 135, 156, 176
Apply transformations and use symmetry to analyze mathematical situations • predict and describe the results of sliding, flipping, and turning two-dimensional shapes;	**Instructor's Guide:** 146

Expectations	Afterschool Achievers: Math Club, Grade 5
• describe a motion or a series of motions that will show that two shapes are congruent.	**Instructor's Guide:** 35, 138, 153, 175
Use visualization, spatial reasoning, and geometric modeling to solve problems • build and draw geometric objects;	**Instructor's Guide:** 3, 10, 22, 23, 35, 43, 60, 63, 83, 102, 103, 110, 115, 127, 128, 138, 140, 146, 153
• create and describe mental images of objects, patterns, and paths;	**Instructor's Guide:** 10, 22, 51, 56, 76, 102, 128, 135, 138, 146, 151, 153, 156, 176
• identify and build a three-dimensional object from two-dimensional representations of that object;	**Instructor's Guide:** 60
• identify and draw a two-dimensional representation of a three-dimensional object;	**Instructor's Guide:** 60
• use geometric models to solve problems in other areas of mathematics, such as number and measurement;	**Instructor's Guide:** 23, 26, 56, 63, 65, 76, 83, 103, 127, 141, 146, 175
• recognize geometric ideas and relationships and apply them to other disciplines and to problems that arise in the classroom or in everyday life.	**Instructor's Guide:** 85

Measurement Standard

Expectations	Afterschool Achievers: Math Club, Grade 5
Understand measurable attributes of objects and the units, systems, and processes of measurement • understand such attributes as length, area, weight, volume, and size of angle and select the appropriate type of unit for measuring each attribute;	**Instructor's Guide:** 2, 5, 8, 30, 32, 38, 73, 80, 88, 91, 101, 106, 107, 116, 121, 123, 129, 137, 143, 158, 170
• understand the need for measuring with standard units and become familiar with standard units in the customary and metric systems.	**Instructor's Guide:** 2, 5, 8, 30, 73, 80, 81, 88, 107, 108, 110, 137, 158, 170
Apply appropriate techniques, tools, and formulas to determine measurements • select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature and the size of angles;	**Instructor's Guide:** 2, 5, 8, 30, 32, 55, 73, 80, 88, 91, 96, 101, 105, 106, 107, 116, 121, 123, 129, 130, 131137, 143, 158, 170, 175
• select and use benchmarks to estimate measurements;	**Instructor's Guide:** 102, 110, 123, 128, 140, 153
• develop, understand, and use formulas to find the area of rectangles and related triangles and parallelograms.	**Instructor's Guide:** 127, 141, 175

Data Analysis and Probability Standard

Expectations	Afterschool Achievers: Math Club, Grade 5
Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them • design investigations to address a question and consider how data-collection methods affect the nature of the data set;	**Instructor's Guide:** 151, 156, 161, 166
• collect data using observations, surveys, and experiments;	**Instructor's Guide:** 151, 156, 161, 166, 176
• represent data using tables and graphs such as line plots, bar graphs, and line graphs;	**Instructor's Guide:** 151, 156, 161, 166, 176
• recognize the differences in representing categorical and numerical data.	**Instructor's Guide:** 151, 156, 161, 166, 176
Select and use appropriate statistical methods to analyze data • describe the shape and important features of a set of data and compare related data sets, with an emphasis on how the data are distributed.	**Instructor's Guide:** 151, 156, 166, 176
Develop and evaluate inferences and predictions that are based on data • propose and justify conclusions and predictions that are based on data and design studies to further investigate the conclusions or predictions.	**Instructor's Guide:** 151, 156, 161, 166

Problem Solving Standard

Expectations	Afterschool Achievers: Math Club, Grade 5
• build new mathematical knowledge through problem solving	**Instructor's Guide:** 1-180
• solve problems that arise in mathematics and in other contexts	**Instructor's Guide:** 1-180
• apply and adapt a variety of appropriate strategies to solve problems	**Instructor's Guide:** 1-180
• monitor and reflect on the process of mathematical problem solving	**Instructor's Guide:** 1-180

Reasoning and Proof Standard

Expectations	Afterschool Achievers: Math Club, Grade 5
• recognize reasoning and proof as fundamental aspects of mathematics	**Instructor's Guide:** 1-180
• make and investigate mathematical conjectures	**Instructor's Guide:** 22, 23, 25, 26, 35, 46, 56, 60, 68, 76, 82, 100, 114, 116, 125, 126, 127, 158, 163, 165
• develop and evaluate mathematical arguments and proofs	**Instructor's Guide:** 22, 23, 25, 26, 35, 46, 56, 60, 68, 76, 82, 100, 114, 116, 125, 126, 127, 158, 163, 165
• select and use various types of reasoning and methods of proof	**Instructor's Guide:** 22, 23, 25, 26, 35, 46, 56, 60, 68, 76, 82, 100, 114, 116, 125, 126, 127, 158, 163, 165

Communication Standard

Expectations	Afterschool Achievers: Math Club, Grade 5
• organize and consolidate their mathematical thinking through communication	**Instructor's Guide:** 3, 10, 22, 23, 35, 43, 60, 63, 83, 102, 103, 110, 115, 127, 138, 140, 146, 153
• communicate their mathematical thinking coherently and clearly to peers, teachers, and others	**Instructor's Guide:** 3, 10, 22, 23, 35, 43, 60, 63, 83, 102, 103, 110, 115, 127, 138, 140, 146, 153
• analyze and evaluate the mathematical thinking and strategies of others	**Instructor's Guide:** 3, 10, 22, 23, 35, 43, 60, 63, 83, 102, 103, 110, 115, 127, 138, 140, 146, 153
• use the language of mathematics to express mathematical ideas precisely	**Instructor's Guide:** 3, 10, 22, 23, 35, 43, 60, 63, 83, 102, 103, 110, 115, 127, 138, 140, 146, 153

Connections Standard

Expectations	Afterschool Achievers: Math Club, Grade 5
• recognize and use connections among mathematical ideas	**Instructor's Guide:** 1-180
• understand how mathematical ideas interconnect and build on one another to produce a coherent whole	**Instructor's Guide:** 1-180
• recognize and apply mathematics in contexts outside of mathematics	**Instructor's Guide:** 5, 8, 42, 51, 61, 85, 98, 105, 109, 111, 113, 126, 130, 131, 132, 136, 151, 156, 158, 176

Representation Standard

Expectations	Afterschool Achievers: Math Club, Grade 5
• create and use representations to organize, record, and communicate mathematical ideas	**Instructor's Guide:** 1, 6, 11, 16, 18, 21, 45, 56, 76, 114, 131, 136, 141, 149, 151, 165, 171, 176
• select, apply, and translate among mathematical representations to solve problems	**Instructor's Guide:** 1, 6, 11, 16, 18, 21, 45, 56, 76, 114, 131, 136, 141, 149, 151, 165, 171, 176
• use representations to model and interpret physical, social, and mathematical phenomena	**Instructor's Guide:** 1, 6, 11, 16, 18, 21, 45, 56, 76, 114, 131, 136, 141, 149, 151, 165, 171, 176

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N u m b e r a n d O p e r a t i o n s S t a n d a r d

Expectations	Afterschool Achievers: Math Club, Grade 6
Understand numbers, ways of representing numbers, relationships among numbers, and number systems • work flexibly with fractions, decimals, and percents to solve problems;	**Instructor's Guide:** 7, 10, 20, 22, 29, 31, 32, 33, 37, 38, 40, 46, 48, 54, 57, 58, 60, 65, 69, 88, 89, 91, 92, 93, 100, 102, 103, 104, 105, 106, 110, 116, 120, 121, 125, 129, 131, 134, 136, 160, 172, 173, 174
• compare and order fractions, decimals and percents efficiently and find their approximate locations on a number line;	**Instructor's Guide:** 25, 46, 51, 116, 119, 121, 156, 166
• develop meaning for percents greater than 100 and less than 1;	**Instructor's Guide:** 125
• understand and use ratios and proportions to represent quantitative relationships;	**Instructor's Guide:** 120, 125, 131, 145
• develop an understanding of large numbers and recognize and appropriately use exponential, scientific and calculator notation;	**Instructor's Guide:** 1, 9, 26, 30, 44, 51, 59, 61, 62, 76, 104, 105, 106, 116, 151, 156, 157, 158
• use factors, multiples, prime factorization, and relatively prime numbers to solve problems;	**Instructor's Guide:** 1, 35, 36, 62, 63, 73
• develop meaning for integers and represent and compare quantities with them.	**Instructor's Guide:** 81, 139, 164
Understand meanings of operations and how they relate to one another • understand the meaning and effects of arithmetic operations with fraction, decimals, and integers;	**Instructor's Guide:** 99, 111, 120, 125, 131
• use the associative and commutative properties of addition and multiplication and the distributive property of multiplication over addition to simplify computations with integers, fractions, and decimals;	**Instructor's Guide:** 38, 50, 55, 57, 58, 75, 95, 141, 161, 166, 169
• identify and use relationships between operations, such as division as the inverse of multiplication, to solve problems;	**Instructor's Guide:** 16, 37, 38, 41, 56

Expectations	Afterschool Achievers: Math Club, Grade 6
• understand and use the inverse relationships of addition and subtraction, multiplication and division, and squaring and finding square roots to simplify computations and solve problems.	**Instructor's Guide:** 16, 37, 38, 41, 56
Compute fluently and make reasonable estimates • select appropriate methods and tools for computing with fractions and decimals from among mental computation, estimation, calculators or computers, and paper and pencil, depending on the situation, and apply the selected methods;	**Instructor's Guide:** 7, 10, 20, 22, 29, 31, 32, 33, 37, 38, 40, 46, 48, 54, 57, 58, 60, 65, 69, 88, 89, 91, 92, 93, 100, 102, 103, 104, 105, 106, 110, 116, 120, 121, 125, 129, 131, 134, 136, 160, 172, 173, 174
• develop and analyze algorithms for computing with fractions, decimals, and integers and develop fluency in their use;	**Instructor's Guide:** 20, 29, 40, 54, 102, 103, 121, 136, 160
• develop and use strategies to estimate the results of rational-number computations and judge the reasonableness of the results;	**Instructor's Guide:** 5, 65, 96, 130, 145, 159, 165
• develop, analyze, and explain methods for solving problems involving proportions, such as scaling and finding equivalent ratios.	**Instructor's Guide:** 100, 110

A l g e b r a S t a n d a r d

Expectations	Afterschool Achievers: Math Club, Grade 6
Understand patterns, relations, and functions • represent, analyze, and generalize a variety of patterns with tables, graphs, words, and, when possible, symbolic rules;	**Instructor's Guide:** 2, 3, 7, 8, 17, 18, 67, 68, 114, 149, 171
• relate and compare different forms of representation for a relationship;	**Instructor's Guide:** 133, 135, 140
• identify functions as linear or nonlinear and contrast their properties from tables, graphs, or equations.	**Instructor's Guide:** 114
Represent and analyze mathematical situations and structures using algebraic symbols • develop an initial understanding of different uses of variables;	**Instructor's Guide:** 13, 16, 18, 28, 37, 38, 41, 55, 56, 64, 67, 69, 75, 87, 88, 95, 98, 109, 146, 150, 171
• explore relationships between symbolic expressions and graphs of lines, paying particular attention to the meaning of intercept and slope;	**Instructor's Guide:** 114
• use symbolic algebra to represent situations and to solve problems, especially those that involve linear relationships;	**Instructor's Guide:** 1, 18, 96, 141, 157, 158, 161, 177, 178

Expectations	Afterschool Achievers: Math Club, Grade 6
• recognize and generate equivalent forms for simple algebraic expressions and solve linear equations.	**Instructor's Guide:** 37, 38, 55, 75, 95
Use mathematical models to represent and understand quantitative relationships • model and solve contextualizes problems using various representations, such as graphs, tables, and equations.	**Instructor's Guide:** 17, 18, 67, 122, 133, 135, 140, 175

Geometry Standard

Expectations	Afterschool Achievers: Math Club, Grade 6
Analyze characteristics and properties of two- and three- dimensional geometric shapes and develop mathematical arguments about geometric relationships • precisely describe, classify, and understand relationships among types of two- and three-dimensional objects, using their defining properties;	**Instructor's Guide:** 12, 27, 72, 79, 84, 90, 94, 101, 147, 148, 170, 180
• understand relationships among the angles, side lengths, perimeters, areas and volumes of similar objects;	**Instructor's Guide:** 19, 126, 176
• create and critique inductive and deductive arguments concerning geometric ideas and relationships, such as congruence, similarity, and the Pythagorean relationship.	**Instructor's Guide:** 4, 12, 87, 88, 149, 152, 153, 171
Apply transformations and use symmetry to analyze mathematical situations • describe sizes, positions, and orientations of shapes under informal transformations such as flips, turns, slides, and scaling;	**Instructor's Guide:** 52, 53, 58
• examine the congruence, similarity, and line or rotational symmetry of objects using transformations.	**Instructor's Guide:** 52, 53, 58
Use visualization, spatial reasoning, and geometric modeling to solve problems • draw geometric objects with specified properties, such as side length or angle measures;	**Instructor's Guide:** 147, 176, 179
• use two-dimensional representations of three-dimensional objects to visualize and solve problems such as those involving surface area and volume;	**Instructor's Guide:** 90
• use visual tools such as networks to represent and solve problems;	**Instructor's Guide:** 4, 19, 28, 87, 152, 153, 162, 163, 167, 168

Expectations	Afterschool Achievers: Math Club, Grade 6
• use geometric models to represent and explain numerical and algebraic relationships;	**Instructor's Guide:** 4, 19, 28, 87, 152, 153, 162, 163, 167, 168
• recognize and apply geometric ideas and relationships in areas outside the mathematics classroom, such as art, science, and everyday life.	**Instructor's Guide:** 99, 111, 120, 125, 131

Measurement Standard

Expectations	Afterschool Achievers: Math Club, Grade 6
Understand measurable attributes of objects and the units, systems, and processes of measurement • understand both metric and customary systems of measurement;	**Instructor's Guide:** 11, 24, 31, 86, 124, 134, 136, 142, 174
• understand relationships among units and convert from one unit to another within the same system;	**Instructor's Guide:** 11, 24, 31, 86, 124, 134, 136, 142, 174
• understand, select, and use units of appropriate size and type to measure angles, perimeter, area, surface area, and volume.	**Instructor's Guide:** 85, 88, 90, 94, 97, 98, 107, 108, 115, 126, 142, 143, 144, 147, 148, 155, 176, 180
Apply appropriate techniques, tools, and formulas to determine measurements • use common benchmarks to select appropriate methods for estimating measurements;	**Instructor's Guide:** 85, 87, 88, 97, 98, 107, 108, 115, 126, 142, 144, 176
• select and apply techniques and tools to accurately find length, area, volume, and angle measures to appropriate levels of precision;	**Instructor's Guide:** 11, 24, 31**,** 85, 87, 88, 97, 98, 107, 108, 115, 126, 136, 144, 174, 176
• develop and use formulas to determine the circumference of circles and the area of triangles, parallelograms, trapezoids, and circles and develop strategies to find the area of more complex shapes;	**Instructor's Guide:** 142, 143, 155, 176
• develop strategies to determine the surface areas and volumes of selected prisms, pyramids, and cylinders;	**Instructor's Guide:** 90, 170, 180
• solve problems involving scale factors, using ratio and proportion;	**Instructor's Guide:** 180
• solve simple problems involving rates and derived measurements for such attributes as velocity and density.	**Instructor's Guide:** 110

Data Analysis and Probability Standard

Expectations	Afterschool Achievers: Math Club, Grade 6
Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them • formulate questions, design studies, and collect data about a characteristic shared by two populations or different characteristics within one population;	**Instructor's Guide:** 122, 123, 127, 128, 132, 133, 135, 140
• select, create and use appropriate graphical representations of data, including histograms, box plots, and scatterplots.	**Instructor's Guide:** 133, 135, 140
Select and use appropriate statistical methods to analyze data • find, use, and interpret measures of center and spread, including mean and interquartile range;	**Instructor's Guide:** 91, 133, 135, 143
• discuss and understand the correspondence between data sets and their graphical representations, especially histograms, stem-and-leaf plots, box plots, and scatterplots.	**Instructor's Guide:** 133, 135, 140
Develop and evaluate inferences and predictions that are based on data • use observations about differences between two or more samples to make conjectures about the populations from which the samples were taken.	**Instructor's Guide:** 135, 140, 143
Understand and apply basic concepts of probability • understand and use appropriate terminology to describe complimentary and mutually exclusive events;	**Instructor's Guide:** 122, 127, 128, 133
• use proportionality and a basic understanding of probability to make and test conjectures about the results of experiments and simulations;	**Instructor's Guide:** 122, 127, 128, 133
• compute probabilities for simple compound events, using such methods as organized lists, tree diagrams, and area models.	**Instructor's Guide:** 122, 127, 128, 133

Problem Solving Standard

Expectations	Afterschool Achievers: Math Club, Grade 6
Build new mathematical knowledge through problem solving	**Instructor's Guide:** 1-180
Solve problems that arise in mathematics and in other contexts	**Instructor's Guide:** 1-180
Apply and adapt a variety of appropriate strategies to solve problems	**Instructor's Guide:** 1-180
Monitor and reflect on the process of mathematical problem solving	**Instructor's Guide:** 1-180

Reasoning and Proof Standard

Expectations	Afterschool Achievers: Math Club, Grade 6
Recognize reasoning and proof as fundamental aspects of mathematics	**Instructor's Guide:** 1-180
Make and investigate mathematical conjectures	**Instructor's Guide:** 63
Develop and evaluate mathematical arguments and proofs	**Instructor's Guide:** 4, 12, 87, 88, 92, 93, 149, 152, 153, 171
Select and use various types of reasoning and methods of proof	**Instructor's Guide:** 25, 65, 120, 125, 131, 135, 140, 143, 145

Communication Standard

Expectations	Afterschool Achievers: Math Club, Grade 6
Organize and consolidate their mathematical thinking through communication	**Instructor's Guide:** 4, 5, 6, 12, 15, 22, 32, 33, 37, 40, 43, 45, 48, 51, 52, 53, 70, 90, 92, 93, 122, 123, 127, 128, 135, 149, 168, 170, 171, 173
Communicate mathematical thinking coherently and clearly to peers, teachers, and others	**Instructor's Guide:** 4, 5, 6, 12, 15, 22, 32, 33, 37, 40, 43, 45, 48, 51, 52, 53, 70, 90, 92, 93, 122, 123, 127, 128, 135, 149, 168, 170, 171, 173
Analyze and evaluate the mathematical thinking and strategies of others	**Instructor's Guide:** 4, 5, 6, 12, 15, 22, 32, 33, 37, 40, 43, 45, 48, 51, 52, 53, 70, 90, 92, 93, 122, 123, 127, 128, 135, 149, 168, 170, 171, 173
Use the language of mathematics to express mathematical ideas precisely	**Instructor's Guide:** 4, 5, 6, 12, 15, 22, 32, 33, 37, 40, 43, 45, 48, 51, 52, 53, 70, 90, 92, 93, 122, 123, 127, 128, 135, 149, 168, 170, 171, 173

Connections Standard

Expectations	Afterschool Achievers: Math Club, Grade 6
Recognize and use connections among mathematical ideas	**Instructor's Guide:** 1-180
Understand how mathematical ideas interconnect and build on one another to produce a coherent whole	**Instructor's Guide:** 1-180
Recognize and apply mathematics in contexts outside of mathematics	**Instructor's Guide:** 99, 111, 120, 125, 131

Representation Standard

Expectations	Afterschool Achievers: Math Club, Grade 6
Create and use representations to organize, record, and communicate mathematical ideas	**Instructor's Guide:** 67, 79, 102, 103, 122, 128, 130, 133, 135, 140
Select, apply, and translate among mathematical representations to solve problems	**Instructor's Guide:** 67, 79, 102, 103, 122, 128, 130, 133, 135, 140
Use representations to model and interpret physical, social, and mathematical phenomena	**Instructor's Guide:** 67, 79, 102, 103, 122, 128, 130, 133, 135, 140

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correlated to
NCTM Standards
Grade 7

Number and Operations Standard

Expectations	Afterschool Achievers: Math Club, Grade 7
Understand numbers, ways of representing numbers, relationships among numbers, and number systems • work flexibly with fractions, decimals, and percents to solve problems;	**Instructor's Guide:** 10, 26, 27, 33, 44, 54, 59, 61, 76, 96, 99, 116, 175
• compare and order fractions, decimals and percents efficiently and find their approximate locations on a number line;	**Instructor's Guide:** 61, 76, 116, 119, 156
• develop meaning for percents greater than 100 and less than 1;	**Instructor's Guide:** 151
• understand and use ratios and proportions to represent quantitative relationships;	**Instructor's Guide:** 10, 77, 78, 104, 157, 162, 170, 177
• develop an understanding of large numbers and recognize and appropriately use exponential, scientific and calculator notation;	**Instructor's Guide:** 33, 175
• use factors, multiples, prime factorization, and relatively prime numbers to solve problems;	**Instructor's Guide:** 1, 9, 14, 36, 47, 48, 57, 66, 70, 74, 154
• develop meaning for integers and represent and compare quantities with them.	**Instructor's Guide:** 31, 34, 65, 67, 81
Understand meanings of operations and how they relate to one another • understand the meaning and effects of arithmetic operations with fraction, decimals, and integers;	**Instructor's Guide:** 20, 26, 27, 31, 34, 35, 44, 46, 54, 55, 65, 67, 76, 81, 92, 93, 95, 96, 106, 109, 110, 111, 116, 117, 121, 129, 140, 150, 160
• use the associative and commutative properties of addition and multiplication and the distributive property of multiplication over addition to simplify computations with integers, fractions, and decimals;	**Instructor's Guide:** 16, 44, 56, 64, 69, 71, 110, 124, 141, 144, 149, 161
• identify and use relationships between operations, such as division as the inverse of multiplication, to solve problems;	**Instructor's Guide:** 16, 44, 144

Expectations	Afterschool Achievers: Math Club, Grade 7
• understand and use the inverse relationships of addition and subtraction, multiplication and division, and squaring and finding square roots to simplify computations and solve problems.	**Instructor's Guide:** 14, 16, 32, 39, 44, 49, 52, 53, 60, 66, 97, 98, 112, 113, 118, 144
Compute fluently and make reasonable estimates • select appropriate methods and tools for computing with fractions and decimals from among mental computation, estimation, calculators or computers, and paper and pencil, depending on the situation, and apply the selected methods;	**Instructor's Guide:** 1, 14, 16, 20, 25, 32, 35, 39, 40, 41, 46, 48, 49, 55, 60, 64, 80, 82, 86, 92, 93, 95, 96, 105, 106, 109, 111, 112, 113,116, 121, 124, 127, 128, 129, 131, 136, 139, 150, 155, 157, 158, 159, 160, 177
• develop and analyze algorithms for computing with fractions, decimals, and integers and develop fluency in their use;	**Instructor's Guide:** 31, 34, 65, 81, 92, 93, 129
• develop and use strategies to estimate the results of rational-number computations and judge the reasonableness of the results;	**Instructor's Guide:** 10, 16, 20, 25, 35, 70, 78, 80, 92, 93, 104, 129, 150, 160, 170
• develop, analyze, and explain methods for solving problems involving proportions, such as scaling and finding equivalent ratios.	**Instructor's Guide:** 10, 104

A l g e b r a S t a n d a r d

Expectations	Afterschool Achievers: Math Club, Grade 7
Understand patterns, relations, and functions • represent, analyze, and generalize a variety of patterns with tables, graphs, words, and, when possible, symbolic rules;	**Instructor's Guide:** 7, 8, 12, 13, 18, 32, 33, 38, 48, 52, 53, 57, 74, 132, 147, 148, 163, 166, 167, 168, 173
• relate and compare different forms of representation for a relationship;	**Instructor's Guide:** 29, 67, 68, 72, 73, 82, 88, 155
• identify functions as linear or nonlinear and contrast their properties from tables, graphs, or equations.	**Instructor's Guide:** 29, 67, 68, 72, 73, 114, 132
Represent and analyze mathematical situations and structures using algebraic symbols • develop an initial understanding of different uses of variables;	**Instructor's Guide:** 5, 10, 13, 16, 24, 29, 36, 41, 56, 60, 63, 64, 67, 68, 71, 72, 73, 74, 83, 110, 114, 144, 146, 155
• explore relationships between symbolic expressions and graphs of lines, paying particular attention to the meaning of intercept and slope;	**Instructor's Guide:** 67, 68, 72, 73, 83
• use symbolic algebra to represent situations and to solve problems, especially those that involve linear relationships;	**Instructor's Guide:** 5, 10, 13, 16, 24, 29, 36, 41, 56, 60, 63, 64, 67, 68, 71, 72, 73, 74, 83, 88, 110, 114, 144, 146, 155

Expectations	Afterschool Achievers: Math Club, Grade 7
• recognize and generate equivalent forms for simple algebraic expressions and solve linear equations.	**Instructor's Guide:** 5, 10, 16, 56, 60, 68, 83, 114
Use mathematical models to represent and understand quantitative relationships • model and solve contextualizes problems using various representations, such as graphs, tables, and equations.	**Instructor's Guide:** 5, 13, 16, 29, 56, 60, 63, 67, 68, 72, 73, 74, 83, 88, 110, 114, 146
Analyze change in various contexts • use graphs to analyze the nature of changes in linear relationships.	**Instructor's Guide:** 67, 68, 72, 73, 82, 88, 155

Geometry Standard

Expectations	Afterschool Achievers: Math Club, Grade 7
Analyze characteristics and properties of two- and three- dimensional geometric shapes and develop mathematical arguments about geometric relationships • precisely describe, classify, and understand relationships among types of two- and three-dimensional objects, using their defining properties;	**Instructor's Guide:** 17, 21, 37, 38, 79, 89, 101, 152, 153, 157, 158, 169
• understand relationships among the angles, side lengths, perimeters, areas and volumes of similar objects;	**Instructor's Guide:** 74, 126, 171
• create and critique inductive and deductive arguments concerning geometric ideas and relationships, such as congruence, similarity, and the Pythagorean relationship.	**Instructor's Guide:** 17, 19, 24, 89, 112, 113, 117, 118, 132, 152, 153, 157, 158, 169
Specify locations and describe spatial relationships using coordinate geometry and other representational systems • use coordinate geometry to represent and examine the properties of geometric shapes;	**Instructor's Guide:** 114
• use coordinate geometry to examine special geometric shapes, such as regular polygons or those with pairs of parallel or perpendicular sides.	**Instructor's Guide:** 114
Apply transformations and use symmetry to analyze mathematical situations • describe sizes, positions, and orientations of shapes under informal transformations such as flips, turns, slides, and scaling;	**Instructor's Guide:** 7, 15, 42, 43, 164, 179

Expectations	Afterschool Achievers: Math Club, Grade 7
• examine the congruence, similarity, and line or rotational symmetry of objects using transformations.	**Instructor's Guide:** 77, 78, 89, 94, 101, 169, 170, 179
Use visualization, spatial reasoning, and geometric modeling to solve problems • draw geometric objects with specified properties, such as side length or angle measures;	**Instructor's Guide:** 92, 115, 145, 170
• use two-dimensional representations of three-dimensional objects to visualize and solve problems such as those involving surface area and volume;	**Instructor's Guide:** 24, 130, 145, 176
• use visual tools such as networks to represent and solve problems;	**Instructor's Guide:** 4, 12, 19, 24, 45, 50, 74, 87, 92, 93, 126, 130, 145, 171, 176, 180
• use geometric models to represent and explain numerical and algebraic relationships;	**Instructor's Guide:** 4, 7, 12, 15, 17, 18, 19, 24, 42, 45, 50, 53, 54, 74, 77, 87, 92, 93, 112, 126, 128, 130, 133, 145, 171, 176, 180
• recognize and apply geometric ideas and relationships in areas outside the mathematics classroom, such as art, science, and everyday life.	**Instructor's Guide:** 128

Measurement Standard

Expectations	Afterschool Achievers: Math Club, Grade 7
Understand measurable attributes of objects and the units, systems, and processes of measurement • understand both metric and customary systems of measurement;	**Instructor's Guide:** 11, 19, 82, 86, 134, 162, 163
• understand relationships among units and convert from one unit to another within the same system;	**Instructor's Guide:** 11, 19, 82, 86, 134, 162, 163
• understand, select, and use units of appropriate size and type to measure angles, perimeter, area, surface area, and volume.	**Instructor's Guide:** 4, 19, 24, 45, 50, 74, 77, 92, 93, 117, 126, 130, 145, 152, 153, 171, 176, 180
Apply appropriate techniques, tools, and formulas to determine measurements • select and apply techniques and tools to accurately find length, area, volume, and angle measures to appropriate levels of precision;	**Instructor's Guide:** 4, 24, 45, 50, 74, 77, 82, 87, 126, 145, 152, 163, 162, 163, 171
• develop and use formulas to determine the circumference of circles and the area of triangles, parallelograms, trapezoids, and circles and develop strategies to find the area of more complex shapes;	**Instructor's Guide:** 4, 12, 45, 50, 74, 92, 126, 171, 180

Expectations	Afterschool Achievers: Math Club, Grade 7
• develop strategies to determine the surface areas and volumes of selected prisms, pyramids, and cylinders;	**Instructor's Guide:** 24, 130, 145, 176
• solve problems involving scale factors, using ratio and proportion;	**Instructor's Guide:** 77, 170
• solve simple problems involving rates and derived measurements for such attributes as velocity and density.	**Instructor's Guide:** 102, 151

Data Analysis and Probability Standard

Expectations	Afterschool Achievers: Math Club, Grade 7
Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them • formulate questions, design studies, and collect data about a characteristic shared by two populations or different characteristics within one population;	**Instructor's Guide:** 2, 17, 82, 83, 90, 102, 103, 122, 123, 125, 135, 140, 165
• select, create and use appropriate graphical representations of data, including histograms, box plots, and scatterplots.	**Instructor's Guide:** 75, 82, 83, 87, 88, 90, 102, 103
Select and use appropriate statistical methods to analyze data • find, use, and interpret measures of center and spread, including mean and interquartile range;	**Instructor's Guide:** 75, 83, 91, 107, 108, 123
• discuss and understand the correspondence between data sets and their graphical representations, especially histograms, stem-and-leaf plots, box plots, and scatterplots.	**Instructor's Guide:** 75, 82, 83, 87, 88, 90, 102, 103
Develop and evaluate inferences and predictions that are based on data • make conjectures about possible relationships between two characteristics of a sample on the basis of scatterplots of the data and approximate lines of fit;	**Instructor's Guide:** 82, 83
Understand and apply basic concepts of probability • understand and use appropriate terminology to describe complimentary and mutually exclusive events;	**Instructor's Guide:** 125
• use proportionality and a basic understanding of probability to make and test conjectures about the results of experiments and simulations;	**Instructor's Guide:** 85, 92, 93, 122, 125, 137, 138, 142, 143

Expectations	Afterschool Achievers: Math Club, Grade 7
• compute probabilities for simple compound events, using such methods as organized lists, tree diagrams, and area models.	**Instructor's Guide:** 85, 92, 93, 122, 125, 137, 138, 142

Problem Solving Standard

Expectations	Afterschool Achievers: Math Club, Grade 7
Build new mathematical knowledge through problem solving	**Instructor's Guide:** 1-180
Solve problems that arise in mathematics and in other contexts	**Instructor's Guide:** 1-180
Apply and adapt a variety of appropriate strategies to solve problems	**Instructor's Guide:** 1-180
Monitor and reflect on the process of mathematical problem solving	**Instructor's Guide:** 1-180

Reasoning and Proof Standard

Expectations	Afterschool Achievers: Math Club, Grade 7
Recognize reasoning and proof as fundamental aspects of mathematics	**Instructor's Guide:** 1-180
Make and investigate mathematical conjectures	**Instructor's Guide:** 17, 19, 24, 89, 112, 113, 117, 118, 132, 152, 153, 157, 158, 169
Develop and evaluate mathematical arguments and proofs	**Instructor's Guide:** 17, 19, 24, 89, 112, 113, 117, 118, 132, 152, 153, 157, 158, 169
Select and use various types of reasoning and methods of proof	**Instructor's Guide:** 17, 19, 24, 89, 112, 113, 117, 118, 132, 152, 153, 157, 158, 169

Communication Standard

Expectations	Afterschool Achievers: Math Club, Grade 7
Organize and consolidate their mathematical thinking through communication	**Instructor's Guide:** 17, 19, 24, 89, 112, 113, 117, 118, 132, 152, 153, 157, 158, 169
Communicate mathematical thinking coherently and clearly to peers, teachers, and others	**Instructor's Guide:** 17, 19, 24, 89, 112, 113, 117, 118, 132, 152, 153, 157, 158, 169
Analyze and evaluate the mathematical thinking and strategies of others	**Instructor's Guide:** 17, 19, 24, 89, 112, 113, 117, 118, 132, 152, 153, 157, 158, 169
Use the language of mathematics to express mathematical ideas precisely	**Instructor's Guide:** 17, 19, 24, 89, 112, 113, 117, 118, 132, 152, 153, 157, 158, 169

Connections Standard

Expectations	Afterschool Achievers: Math Club, Grade 7
Recognize and use connections among mathematical ideas	**Instructor's Guide:** 1-180
Understand how mathematical ideas interconnect and build on one another to produce a coherent whole	**Instructor's Guide:** 1-180
Recognize and apply mathematics in contexts outside of mathematics	**Instructor's Guide:** 44, 99, 100, 120, 131, 144, 151, 159

Representation Standard

Expectations	Afterschool Achievers: Math Club, Grade 7
Create and use representations to organize, record, and communicate mathematical ideas	**Instructor's Guide:** 2, 17, 82, 90, 102, 103, 122, 125, 135, 140, 165
Select, apply, and translate among mathematical representations to solve problems	**Instructor's Guide:** 2, 17, 82, 90, 102, 103, 122, 125, 135, 140, 165
Use representations to model and interpret physical, social, and mathematical phenomena	**Instructor's Guide:** 2, 17, 82, 90, 102, 103, 122, 125, 135, 140, 165

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NCTM Standards
Grade 8

Number and Operations Standard

Expectations	Afterschool Achievers: Math Club, Grade 8
Understand numbers, ways of representing numbers, relationships among numbers, and number systems • work flexibly with fractions, decimals, and percents to solve problems;	**Instructor's Guide:** 26, 54, 59, 61, 66, 96
• compare and order fractions, decimals and percents efficiently and find their approximate locations on a number line;	**Instructor's Guide:** 9, 26, 34, 96, 99
• develop meaning for percents greater than 100 and less than 1;	**Instructor's Guide:** 44, 151
• understand and use ratios and proportions to represent quantitative relationships;	**Instructor's Guide:** 3, 10, 44, 45, 46, 47, 54, 61, 104, 109, 118, 147
• develop an understanding of large numbers and recognize and appropriately use exponential, scientific and calculator notation;	**Instructor's Guide:** 66
• use factors, multiples, prime factorization, and relatively prime numbers to solve problems;	**Instructor's Guide:** 1, 7, 8, 14, 36
• develop meaning for integers and represent and compare quantities with them.	**Instructor's Guide:** 16, 31, 34, 37, 41, 46, 51, 56, 65, 69, 81, 85, 95, 115, 117, 118, 124, 129, 139, 141, 161
Understand meanings of operations and how they relate to one another • understand the meaning and effects of arithmetic operations with fraction, decimals, and integers;	**Instructor's Guide:** 1, 3, 10, 35, 44, 45, 46, 47, 54, 61, 95, 96, 100, 104, 106, 109, 118, 121, 129, 147
• use the associative and commutative properties of addition and multiplication and the distributive property of multiplication over addition to simplify computations with integers, fractions, and decimals;	**Instructor's Guide:** 19, 25, 41, 71, 115, 141, 149, 161
• identify and use relationships between operations, such as division as the inverse of multiplication, to solve problems;	**Instructor's Guide:** 19, 25, 41, 56, 69, 71, 95, 115, 117, 118, 124, 141, 149, 161

Expectations	Afterschool Achievers: Math Club, Grade 8
• understand and use the inverse relationships of addition and subtraction, multiplication and division, and squaring and finding square roots to simplify computations and solve problems.	**Instructor's Guide:** 14, 49, 50, 56, 92, 93, 136, 152
Compute fluently and make reasonable estimates • select appropriate methods and tools for computing with fractions and decimals from among mental computation, estimation, calculators or computers, and paper and pencil, depending on the situation, and apply the selected methods;	**Instructor's Guide:** 1, 3, 10, 35, 40, 44, 45, 46, 47, 54, 61, 95, 96, 100, 104, 106, 109, 115, 118, 121, 129, 147
• develop and analyze algorithms for computing with fractions, decimals, and integers and develop fluency in their use;	**Instructor's Guide:** 6, 25, 30, 31, 34, 35, 37, 39, 40, 45, 46, 56, 65, 66, 81, 95, 96, 100, 109, 111, 116, 117, 118, 121, 129, 140, 160, 165
• develop and use strategies to estimate the results of rational-number computations and judge the reasonableness of the results;	**Instructor's Guide:** 1, 10, 35, 40, 115
• develop, analyze, and explain methods for solving problems involving proportions, such as scaling and finding equivalent ratios.	**Instructor's Guide:** 10, 104

Algebra Standard

Expectations	Afterschool Achievers: Math Club, Grade 8
Understand patterns, relations, and functions • represent, analyze, and generalize a variety of patterns with tables, graphs, words, and, when possible, symbolic rules;	**Instructor's Guide:** 42, 43, 74, 166
• relate and compare different forms of representation for a relationship;	**Instructor's Guide:** 7, 22, 37, 77, 110, 133, 150, 172, 173
• identify functions as linear or nonlinear and contrast their properties from tables, graphs, or equations.	**Instructor's Guide:** 22, 29, 77, 97, 98, 133, 150
Represent and analyze mathematical situations and structures using algebraic symbols • develop an initial understanding of different uses of variables;	**Instructor's Guide:** 5, 16, 16, 17, 18, 23, 29, 41, 43, 64, 86, 90, 97, 105, 120, 121, 133, 144, 150, 154, 164
• explore relationships between symbolic expressions and graphs of lines, paying particular attention to the meaning of intercept and slope;	**Instructor's Guide:** 22, 29, 97, 98, 105, 164
• use symbolic algebra to represent situations and to solve problems, especially those that involve linear relationships;	**Instructor's Guide:** 5, 16, 18, 20, 22, 29, 56, 77, 78, 86, 90, 102, 154

Expectations	Afterschool Achievers: Math Club, Grade 8
• recognize and generate equivalent forms for simple algebraic expressions and solve linear equations.	**Instructor's Guide:** 5, 16, 18, 23, 41, 43, 64, 86, 90, 120, 144, 154, 164
Use mathematical models to represent and understand quantitative relationships • model and solve contextualizes problems using various representations, such as graphs, tables, and equations.	**Instructor's Guide:** 17, 18, 37, 38, 77, 80, 133, 150, 153
Analyze change in various contexts • use graphs to analyze the nature of changes in linear relationships.	**Instructor's Guide:** 22, 23, 97, 98,164

Geometry Standard

Expectations	Afterschool Achievers: Math Club, Grade 8
Analyze characteristics and properties of two- and three- dimensional geometric shapes and develop mathematical arguments about geometric relationships • precisely describe, classify, and understand relationships among types of two- and three-dimensional objects, using their defining properties;	**Instructor's Guide:** 4, 15, 23, 24, 32, 33, 50, 79, 82, 89, 91, 92, 93, 94, 101, 102, 103, 107, 108, 134, 147, 148, 169, 170, 179
• understand relationships among the angles, side lengths, perimeters, areas and volumes of similar objects;	**Instructor's Guide:** 126
• create and critique inductive and deductive arguments concerning geometric ideas and relationships, such as congruence, similarity, and the Pythagorean relationship.	**Instructor's Guide:** 15, 32, 33, 50, 72, 73, 103
Specify locations and describe spatial relationships using coordinate geometry and other representational systems • use coordinate geometry to represent and examine the properties of geometric shapes;	**Instructor's Guide:** 137, 138
• use coordinate geometry to examine special geometric shapes, such as regular polygons or those with pairs of parallel or perpendicular sides.	**Instructor's Guide:** 137, 138
Apply transformations and use symmetry to analyze mathematical situations • describe sizes, positions, and orientations of shapes under informal transformations such as flips, turns, slides, and scaling;	**Instructor's Guide:** 15, 22, 23, 38, 57, 58, 62, 82, 83, 87, 88, 137, 138, 179

Expectations	Afterschool Achievers: Math Club, Grade 8
• examine the congruence, similarity, and line or rotational symmetry of objects using transformations.	**Instructor's Guide:** 82, 83, 87, 88, 138, 179
Use visualization, spatial reasoning, and geometric modeling to solve problems • draw geometric objects with specified properties, such as side length or angle measures;	**Instructor's Guide:** 17, 32, 84, 148, 152
• use two-dimensional representations of three-dimensional objects to visualize and solve problems such as those involving surface area and volume;	**Instructor's Guide:** 19, 92, 130, 145, 176
• use visual tools such as networks to represent and solve problems;	**Instructor's Guide:** 67, 68
• use geometric models to represent and explain numerical and algebraic relationships;	**Instructor's Guide:** 42, 52, 53, 57, 58, 67, 68, 132, 162
• recognize and apply geometric ideas and relationships in areas outside the mathematics classroom, such as art, science, and everyday life.	**Instructor's Guide:** 15, 101, 135, 157, 168, 172, 176, 180

Measurement Standard

Expectations	Afterschool Achievers: Math Club, Grade 8
Understand measurable attributes of objects and the units, systems, and processes of measurement • understand both metric and customary systems of measurement;	**Instructor's Guide:** 11, 55
• understand relationships among units and convert from one unit to another within the same system;	**Instructor's Guide:** 11, 55, 159, 165
• understand, select, and use units of appropriate size and type to measure angles, perimeter, area, surface area, and volume.	**Instructor's Guide:** 4, 19, 24, 47, 48, 52, 53, 74, 76, 92, 93, 112, 113, 126, 130, 145, 144, 145, 155, 171, 176, 180
Apply appropriate techniques, tools, and formulas to determine measurements • select and apply techniques and tools to accurately find length, area, volume, and angle measures to appropriate levels of precision;	**Instructor's Guide:** 4, 19, 24, 47, 48, 52, 53, 74, 76, 92, 93, 112, 113, 126, 130, 145, 144, 145, 155, 171, 176, 180
• develop and use formulas to determine the circumference of circles and the area of triangles, parallelograms, trapezoids, and circles and develop strategies to find the area of more complex shapes;	**Instructor's Guide:** 19, 47, 52, 53, 74, 76, 92, 112, 113, 126, 130, 145, 155, 176, 180

Expectations	Afterschool Achievers: Math Club, Grade 8
• develop strategies to determine the surface areas and volumes of selected prisms, pyramids, and cylinders;	**Instructor's Guide:** 19, 92, 130, 145, 176
• solve problems involving scale factors, using ratio and proportion;	**Instructor's Guide:** 17
• solve simple problems involving rates and derived measurements for such attributes as velocity and density.	**Instructor's Guide:** 156

Data Analysis and Probability Standard

Expectations	Afterschool Achievers: Math Club, Grade 8
Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them • formulate questions, design studies, and collect data about a characteristic shared by two populations or different characteristics within one population;	**Instructor's Guide:** 39, 70, 75, 80, 110
• select, create and use appropriate graphical representations of data, including histograms, box plots, and scatterplots.	**Instructor's Guide:** 39, 70, 75, 80, 110
Select and use appropriate statistical methods to analyze data • find, use, and interpret measures of center and spread, including mean and interquartile range;	**Instructor's Guide:** 39, 70, 75
• discuss and understand the correspondence between data sets and their graphical representations, especially histograms, stem-and-leaf plots, box plots, and scatterplots.	**Instructor's Guide:** 70, 75, 80, 110, 172, 173
Develop and evaluate inferences and predictions that are based on data • use observations about differences between two or more samples to make conjectures about the populations from which the samples were taken;	**Instructor's Guide:** 70, 75, 80, 110, 172, 173
• use conjectures to formulate new questions and plan new studies to answer them.	**Instructor's Guide:** 4, 15, 23, 24, 32, 33, 50, 79, 82, 89, 91, 92, 93, 94, 101, 102, 103, 107, 108, 134, 147, 148, 169, 170, 179
Understand and apply basic concepts of probability • understand and use appropriate terminology to describe complimentary and mutually exclusive events;	**Instructor's Guide:** 128

Expectations	Afterschool Achievers: Math Club, Grade 8
• use proportionality and a basic understanding of probability to make and test conjectures about the results of experiments and simulations;	**Instructor's Guide:** 125, 128, 142, 143
• compute probabilities for simple compound events, using such methods as organized lists, tree diagrams, and area models.	**Instructor's Guide:** 125

Problem Solving Standard

Expectations	Afterschool Achievers: Math Club, Grade 8
Build new mathematical knowledge through problem solving	**Instructor's Guide:** 1-180
Solve problems that arise in mathematics and in other contexts	**Instructor's Guide:** 1-180
Apply and adapt a variety of appropriate strategies to solve problems	**Instructor's Guide:** 1-180
Monitor and reflect on the process of mathematical problem solving	**Instructor's Guide:** 1-180

Reasoning and Proof Standard

Expectations	Afterschool Achievers: Math Club, Grade 8
Recognize reasoning and proof as fundamental aspects of mathematics	**Instructor's Guide:** 1-180
Make and investigate mathematical conjectures	**Instructor's Guide:** 4, 15, 23, 24, 32, 33, 50, 79, 82, 89, 91, 92, 93, 94, 101, 102, 103, 107, 108, 134, 147, 148, 169, 170, 179
Develop and evaluate mathematical arguments and proofs	**Instructor's Guide:** 15, 32, 33, 50, 70, 72, 73, 75,103
Select and use various types of reasoning and methods of proof	**Instructor's Guide:** 15, 32, 33, 50, 70, 72, 73, 75,103

Communication Standard

Expectations	Afterschool Achievers: Math Club, Grade 8
Organize and consolidate their mathematical thinking through communication	**Instructor's Guide:** 15, 32, 33, 35, 50, 70, 72, 73, 80, 103, 110, 120, 122, 123
Communicate mathematical thinking coherently and clearly to peers, teachers, and others	**Instructor's Guide:** 15, 32, 33, 35, 50, 70, 72, 73, 80, 103, 110, 120, 122, 123
Analyze and evaluate the mathematical thinking and strategies of others	**Instructor's Guide:** 123

Expectations	Afterschool Achievers: Math Club, Grade 8
Use the language of mathematics to express mathematical ideas precisely	**Instructor's Guide:** 15, 32, 33, 35, 50, 70, 72, 73, 80, 103, 110, 120, 122, 123

Connections Standard

Expectations	Afterschool Achievers: Math Club, Grade 8
Recognize and use connections among mathematical ideas	**Instructor's Guide:** 1-180
Understand how mathematical ideas interconnect and build on one another to produce a coherent whole	**Instructor's Guide:** 1-180
Recognize and apply mathematics in contexts outside of mathematics	**Instructor's Guide:** 99, 106, 110, 119, 151, 156, 159

Representation Standard

Expectations	Afterschool Achievers: Math Club, Grade 8
Create and use representations to organize, record, and communicate mathematical ideas	**Instructor's Guide**: 5, 7, 16, 17, 18, 22, 23, 29, 37, 38, 41, 43, 64, 77, 80, 86, 90, 110, 120, 121, 133, 150, 153, 172, 173
Select, apply, and translate among mathematical representations to solve problems	**Instructor's Guide:** 5, 7, 16, 17, 18, 22, 23, 29, 37, 38, 41, 43, 64, 77, 80, 86, 90, 110, 120, 121, 133, 150, 153, 172, 173
Use representations to model and interpret physical, social, and mathematical phenomena	**Instructor's Guide:** 96, 97, 98, 114, 127, 137, 138, 146, 164

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