

## Growing Through Math Games: Correlation to the National Council of Teachers of Mathematics’ Standards

In support of teachers who want to incorporate standards in their small group teaching and students’ independent practice, the authors of *Growing Through Math Games: A Resource for Teachers and Students in Preschool Through Second Grade*, offer the following correlation to The National Council of Teachers of Mathematics, or NCTM.

NCTM provides teachers with *Principles and Standards for School Mathematics*. This framework’s components include:

- Perspectives—these offer teachers guidelines for making decisions that affect school mathematics
- Goals for mathematics instruction—these describe the 10 Standards
- Grade-band chapters for each of the content standards—these include a set of expectations specific to that grade band
- Discussion of how teachers can put NCTM Principles in practice

Because *Growing Through Math Games* offers small group and independent math activities for students in Prekindergarten through Grade 2, these corresponding grade band chapters were used for this correlation. Direct quotes are from NCTM’s website. Please note: The grade level suggestions in *Growing Through Math Games* are provided as approximate guidelines. In working with your students, you will need to determine which skills are appropriate for extending and practicing mathematical learning.

**The games or activities were analyzed by looking at NCTM’s content and expectations in the following 10 Standards:**

**Number and Operations**

**Geometry**

**Data Analysis and Probability**

**Reasoning and Proof**

**Connections**

**Algebra**

**Measurement**

**Problem Solving**

**Communication**

**Representation**

You may want further information on the principals that provide the foundation for these standards or more information on these standards, including specific student examples. NCTM’s website is very helpful and can be accessed with a free 90-day membership at [www.nctm.org](http://www.nctm.org).

Please visit *our* website at [www.growingthroughgames.com](http://www.growingthroughgames.com) for a printable PDF version of this document, other correlations, information about our other products, or to contact the authors.

## Game 1: Cool Sunglasses

Preschool	<p>Target Skill: One-to-One Correspondence <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Count with understanding and recognize “how many” in sets of objects</b></p> <p>“They (young children) can establish one-to-one correspondence by moving, touching, or pointing to objects...”</p>
Kindergarten	<p>Target Skill: Shape Recognition <b>NCTM Geometry Standard</b> <b>Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships</b> <b>Recognize, name, build, draw, compare and sort two- and three-dimensional shapes</b></p> <p>“Some students’ capabilities with geometric and spatial concepts exceed their number skills. Building on these strength fosters enthusiasm for mathematics and provides a context in which to develop number and other mathematics concepts (Razel and Eylon 1991).”</p>
First Grade	<p>Target Skill: Addends of a Particular Sum <b>NCTM Number and Operations Standard</b> <b>Understand meanings of operations and how they relate to one another</b> <b>Understand various meanings of addition and subtraction of whole numbers and the relationship between the two operations</b> <b>Understand the effects of adding and subtracting whole numbers</b></p> <p>“An understanding of addition and subtraction can be generated when young students solve “joining” and take-away problems by directly modeling the situation or by using counting strategies... (Carpenter and Moser 1984).”</p>
Second Grade	<p>Target Skill: Addends of a Particular Sum <b>NCTM Number and Operations Standard</b> <b>Compute fluently and make reasonable estimates</b> <b>Develop and use strategies for whole-number computations, with a focus on addition and subtraction</b></p> <p>“Students learn basic number combinations and develop strategies for computing that make sense to them when they solve problems with interesting and challenging contexts.”</p>

## Game 2: Sheriff Badges

Preschool	<p>Target Skill: Directional Words <b>NCTM Standard: Geometry Standard</b> <b>Specify locations and describe spatial relationships using coordinate geometry and other representational systems</b> <b>Describe, name, and interpret relative positions in space and apply ideas about relative position</b> “Teachers should extend young students’ knowledge of relative position in space through conversations, demonstrations, and stories.”</p>
Kindergarten	<p>Target Skills: Number Sequence and Counting <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Count with understanding and recognize “how many” in sets of objects</b> <b>Develop understanding of the relative position and magnitude of whole numbers...</b> “Children should learn that the last number named represents the last object as well as the total number of objects in the collection.”</p>
First Grade	<p>Target Skill: Number Sequence <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Count with understanding and recognize “how many” in sets of objects</b> <b>Develop understanding of the relative position and magnitude of whole numbers...</b> “In these early years, students develop the ability to deal with numbers mentally and to think about numbers without having a physical model (Steffe and Cobb 1988).”</p>
Second Grade	<p>Target Skills: Comparing Numbers, Greater Than, Less Than, Equal To <b>NCTM Representation Standard</b> <b>Create and use representations to organize, record, and communicate mathematical ideas</b> “The process of linking different representations...deepens students’ understanding of mathematics because of the connections they make between ideas and the ways the ideas can be expressed.”</p>

### Game 3: Itsy Bitsy Spider

Preschool

Target Skill: Set Construction

**NCTM Number Operations Standard**

**Understand numbers, ways of representing numbers, relationships among numbers, and number systems**

**Count with understanding and recognize “how many” in sets of objects**

“Young children are motivated to count everything from the treats they eat to the stairs they climb, and through their repeated experience with the counting process, they learn many fundamental number concepts.”

Kindergarten

Target Skills: Number Words and Set Construction

**NCTM Number Operations Standard**

**Understand numbers, ways of representing numbers, relationships among numbers, and number systems**

**Connect number words and numerals to the quantities they represent, using physical models and representations**

“Students need many instructional experiences to develop their understanding of the system, including how numbers are written.”

First Grade

Target Skill: Story Problems

**NCTM Problem Solving Standard**

**Build new mathematical knowledge through problem solving**  
**Solve problems that arise in mathematics and in other contexts**  
**Apply and adapt a variety of appropriate strategies to solve problems**

“Problem solving in the early years should involve a variety of contexts, from problems related to daily routines to mathematical situations arising from stories.”

Second Grade

Target Skill: Estimation and Measurement

**NCTM Measurement Standard**

**Apply appropriate techniques, tools, and formulas to determine measurements**

**Develop common referents for measures to make comparisons and estimates**

“Estimation activities are an early application of number sense; they focus students’ attention on the attributes being measured, the process of measuring, the sizes of units, and the value of referents.”

## Game 4: Dinosaur Days

Preschool

Target Skill: Sort and Classify

**NCTM Data Analysis and Probability Standard**

**Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them**

**Sort and classify objects according to their attributes...**

“Organizing data into categories should begin with informal sorting experiences...these experiences and the conversations that accompany them focus children’s attention on the attributes of objects and help develop an understanding of things that go together, while building a vocabulary for describing attributes and for classifying according to criteria.”

Kindergarten

Target Skill: Patterning

**NCTM Algebra Standard**

**Understand patterns, relations, and functions**

**Recognize, describe, and extend patterns such as sequences of sounds and shapes or simple numeric patterns...**

“Knowing that each pattern...could be described as having the form AABAAB (for instance) is for students an early introduction to the power of Algebra.”

First Grade

Target Skill: Ordinal Numbers

**NCTM Number Operations Standard**

**Understand numbers, ways of representing numbers, relationships among numbers, and number systems**

**Develop understanding of the relative position and magnitude of whole numbers and of ordinal and cardinal numbers and their connections**

“...use naturally occurring opportunities to help students develop number concepts by posing questions such as...Who is third in line?...”

Second Grade

Target Skill: Multiplication

**NCTM Number and Operations Standard**

**Understand meaning of operations and how they relate to one another**

**Understand situations that entail multiplication and division, such as equal groupings of objects and sharing equally**

“In prekindergarten through grade 2, students should also begin to develop an understanding of the concepts of multiplication and division.”

## Game 5: Fall Leaves

Preschool	<p>Target Skill: Matching Shapes <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Develop a sense of whole numbers and represent and use them in flexible ways, including relating, composing, and decomposing numbers</b> “Building on these strengths (geometric and spatial concepts ) fosters enthusiasm for mathematics and provides a context in which to develop number and other mathematics concepts (Razel and Eylon 1991).”</p>
Kindergarten	<p>Target Skills: Number Sequence, Counting <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Count with understanding and recognize “how many” in sets of objects</b> <b>Develop understanding of the relative position and magnitude of whole numbers...</b> “In these early years, students develop the ability to deal with numbers mentally and to think about numbers without having a physical model (Steffe and Cobb 1988).”</p>
First Grade	<p>Target Skill: Patterning <b>NCTM Algebra Standard</b> <b>Understand patterns, relations, and functions</b> <b>Recognize, describe, and extend patterns such as sequences of sounds and shapes or simple numeric patterns...</b> “Knowing that each pattern...could be described as having the form AABAAB (for instance) is for students an early introduction to the power of Algebra.”</p>
Second Grade	<p>Target Skill: Odd and Even <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Develop understanding of the relative position and magnitude of whole numbers and of ordinal and cardinal numbers and their connections</b> “Number sense develops as students understand the size of numbers and develop multiple ways of thinking about and representing numbers...(Sowder 1992).”</p>

## Game 6: Snakes in the Grass

Preschool	<p>Target Skill: Introduction to Numbers as Symbols <b>NCTM Representation Standard</b> <b>Create and use representations to organize, record, and communicate mathematical ideas</b> “Young children use many varied representations to build new understandings and express mathematical ideas. Representing ideas and connecting the representations to mathematics lies at the heart of understanding mathematics.”</p>
Kindergarten	<p>Target Skill: Linear Measurement, Non-Standard Units <b>NCTM Measurement Standard</b> <b>Apply appropriate techniques, tools, and formulas to determine measurement</b> <b>Measure with multiple copies of units of the same size, such as paper clips laid end to end</b> “If students initially explore measurement with a variety of units, nonstandard as well as standard, they will develop an understanding of the nature of the units.”</p>
First Grade	<p>Target Skill: Counting by Tens <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Use multiple models to develop initial understandings of place value and the base-ten number system</b> “They (children) should understand...that “10” is a special unit within the base-ten system.”</p>
Second Grade	<p>Target Skill: Place Value <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Use multiple models to develop initial understandings of place value and the base-ten number system</b> “Using concrete materials can help students learn to group and ungroup by tens.”</p>

## Game 7: Terrific Toothbrushes

Preschool	<p>Target Skills: One-to-one Correspondence, Count to Three <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Count with understanding and recognize “how many” in sets of objects</b></p> <p>“They (young children) can establish one-to-one correspondence by moving, touching, or pointing to objects...”</p>
Kindergarten	<p>Target Skill: Patterning <b>NCTM Algebra Standard</b> <b>Understand patterns, relations, and functions</b> <b>Recognize, describe, and extend patterns such as sequences of sounds and shapes or simple numeric patterns...</b></p> <p>“Knowing that each pattern...could be described as having the form AABAAB (for instance) is for students an early introduction to the power of Algebra.”</p>
First Grade	<p>Target Skill: Subtraction <b>NCTM Number and Operations Standard</b> <b>Understand meanings of operations and how they relate to one another</b> <b>Understand various meanings of addition and subtraction of whole numbers and the relationship between the two operations</b></p> <p>“An understanding of addition and subtraction can be generated when young students solve “joining” and take-away problems by directly modeling the situation or by using counting strategies... (Carpenter and Moser 1984).”</p>
Second Grade	<p>Target Skill: Number Sequence <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Count with understanding and recognize “how many” in sets of objects</b> <b>Develop understanding of the relative position and magnitude of whole numbers...</b></p> <p>“In these early years, students develop the ability to deal with numbers mentally and to think about numbers without having a physical model (Steffe and Cobb 1988).”</p>

## Game 8: Friendly Dolphins

Preschool	<p>Target Skill: Left-to-Right Progression <b>NCTM Reasoning and Proof Standard</b> <b>Introduction to making and investigating mathematical conjectures</b> “Young children naturally generalize from examples (Carpenter and Levi 1999) so teachers should guide them to use examples...” The authors of <i>Growing Through Math Games</i> feel that this beginning understanding sets the foundation for reading number stories and some number problems, in a left-to-right fashion.</p>
Kindergarten	<p>Target Skill: Number Concept <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Count with understanding and recognize “how many” in sets of objects</b> “They (young children) can establish one-to-one correspondence by moving, touching, or pointing to objects...”</p>
First Grade	<p>Target Skill: Counting <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Count with understanding and recognize “how many” in sets of objects</b> “Children should learn that the last number named represents the last object as well as the total number of objects in the collection.”</p>
Second Grade	<p>Target Skill: Subtraction <b>NCTM Number and Operations Standard</b> <b>Understand meanings of operations and how they relate to one another</b> <b>Understand various meanings of addition and subtraction of whole numbers and the relationship between the two operations’</b> <b>Understand the effects of adding and subtracting whole numbers</b> “An understanding of addition and subtraction can be generated when young students solve “joining” and “take-away” problems by directly modeling the situation or by using counting strategies... (Carpenter and Moser 1984).”</p>

## Game 9: Dad's Shoes

Preschool	<p>Target Skill: Introduction to the Concept of Left and Right (using shapes)</p> <p><b>NCTM Geometry Standard</b> <b>Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships</b> <b>Recognize, name, build, draw, compare and sort two- and three-dimensional shapes</b></p> <p>“Some students’ capabilities with geometric and spatial concepts exceed their number skills. Building on these strengths fosters enthusiasm for mathematics and provides a context in which to develop number and other mathematics concepts (Razel and Eylon 1991).”</p>
Kindergarten	<p>Target Skill: Developing Number Concept</p> <p><b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Count with understanding and recognize “how many” in sets of objects</b></p> <p>“They (young children) can establish one-to-one correspondence by moving, touching, or pointing to objects...”</p>
First Grade	<p>Target Skill: Counting by Twos</p> <p><b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Count with understanding and recognize “how many” in sets of objects</b></p> <p>“...many children invent problem-solving strategies based on counting strategies (Ginsburg, Klein, and Starkey 1998; Siegler 1996).”</p>
Second Grade	<p>Target Skill: Addition</p> <p><b>NCTM Problem Solving Standard</b> <b>Build new mathematical knowledge through problem solving</b></p> <p>“Problem solving is a hallmark of mathematical activity and a major means of developing mathematical knowledge.”</p>

## Game 10: Stick Your Tongue Out!

Preschool	<p>Target Skill: Number Concept <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Count with understanding and recognize “how many” in sets of objects</b></p> <p>“During the early years teachers must help students strengthen their sense of number, moving from the initial development of basic counting techniques to more sophisticated understandings...”</p>
Kindergarten	<p>Target Skill: Writing Numbers <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Connect number words and numerals to the quantities they represent, using physical models and representations</b></p> <p>“Students need many instructional experiences to develop their understanding of the system, including how numbers are written.”</p>
First Grade	<p>Target Skill: Story Problems <b>NCTM Problem Solving Standard</b> <b>Solve problems that arise in mathematics and in other contexts</b></p> <p>“Problem solving in the early years should involve a variety of contexts, from problems related to daily routines to mathematical situations arising from stories.”</p>
Second Grade	<p>Target Skill: Subtraction <b>NCTM Number and Operations Standard</b> <b>Understand meanings of operations and how they relate to one another</b> <b>Understand various meanings of addition and subtraction of whole numbers and the relationship between the two operations</b> <b>Understand the effects of adding and subtracting whole numbers</b></p> <p>“An understanding of addition and subtraction can be generated when young students solve “joining” and take-away problems by directly modeling the situation or by using counting strategies... (Carpenter and Moser 1984).”</p>

## Game 11: Play Ball

Preschool:	<p>Target Skill: Matching Shapes <b>NCTM Geometry Standard</b> <b>Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships</b> <b>Recognize, name, build, draw, compare and sort two- and three-dimensional shapes</b> “Building on these strengths (geometric and spatial concepts ) fosters enthusiasm for mathematics and provides a context in which to develop number and other mathematics concepts (Razel and Eylon 1991).”</p>
Kindergarten	<p>Target Skill: Developing Number Concept <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Count with understanding and recognize “how many” in sets of objects</b> “During the early years teachers must help students strengthen their sense of number, moving from the initial development of basic counting techniques to more sophisticated understandings...”</p>
First Grade	<p>Target Skill: Subtraction <b>NCTM Number and Operations Standard</b> <b>Understand meanings of operations and how they relate to one another</b> <b>Understand the effects of adding and subtracting whole numbers</b> “An understanding of addition and subtraction can be generated when young students solve “joining” and “take-away” problems by directly modeling the situation or by using counting strategies... (Carpenter and Moser 1984).”</p>
Second Grade	<p>Target Skill: Greater Than/Less Than <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Develop a sense of whole numbers and represent and use them in flexible ways, including relating, composing, and decomposing numbers</b> “Teachers should try to uncover students’ thinking as they work with concrete materials by asking questions that elicit students’ thinking and reasoning.”</p>

## Game 12: Patches of Pumpkins

Preschool	<p>Target Skill: One-to-One Correspondence <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Count with understanding and recognize “how many” in sets of objects</b> “They (young children) can establish one-to-one correspondence by moving, touching, or pointing to objects...”</p>
Kindergarten	<p>Target Skill: Number Concept, Counting <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Count with understanding and recognize “how many” in sets of objects</b> “They (young children) can establish one-to-one correspondence by moving, touching, or pointing to objects...”</p>
First Grade	<p>Target Skill: Counting <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Count with understanding and recognize “how many” in sets of objects</b> “Children should learn that the last number named represents the last object as well as the total number of objects in the collection.”</p>
Second Grade	<p>Target Skill: Estimation, Measurement <b>NCTM Measurement Standard</b> <b>Apply appropriate techniques, tools, and formulas to determine measurement</b> <b>Measure with multiple copies of units of the same size, such as paper clips laid end to end</b> “If students initially explore measurement with a variety of units, nonstandard as well as standard, they will develop an understanding of the nature of the units.”</p>

## Game 13: Tool Boxes

Preschool	<p>Target Skills: One-to-One Correspondence, Counting to Four <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Count with understanding and recognize “how many” in sets of objects</b> “They (young children) can establish one-to-one correspondence by moving, touching, or pointing to objects...”</p>
Kindergarten	<p>Target Skill: Sorting and Classifying <b>NCTM Data Analysis and Probability Standard</b> <b>Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them</b> <b>Sort and classify objects according to their attributes...</b> “Organizing data into categories should begin with informal sorting experiences...these experience and the conversations that accompany them focus children’s attention on the attributes of objects and help develop an understanding of things that go together, while building a vocabulary for describing attributes and for classifying according to criteria.”</p>
First Grade	<p>Target Skills: Comparing Numbers, Addition and Subtraction <b>NCTM Data Analysis and Probability Standard</b> <b>Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them</b> <b>Represent data using concrete objects, pictures, and graphs</b> “Through their data investigations, young students should develop the idea that data, charts, and graphs give information.”</p>
Second Grade	<p>Target Skill: Money Value <b>NCTM Connections Standard</b> <b>Recognize and use connections among mathematical ideas</b> “ When young students use the relationships in and among mathematical content and processes, they advance their knowledge of mathematics and extend their ability to apply concepts and skills more effectively.”</p>

## Game 14: Clowning Around

Preschool	<p>Target Skill: Directional Words <b>NCTM Standard: Geometry Standard</b> <b>Specify locations and describe spatial relationships using coordinate geometry and other representational systems</b> <b>Describe, name, and interpret relative positions in space and apply ideas about relative position</b> “Teachers should extend young students’ knowledge of relative position in space through conversations, demonstrations, and stories.”</p>
Kindergarten	<p>Target Skill: Introduction to Writing Numbers <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Connect number words and numerals to the quantities they represent, using physical models and representations</b> “Students need many instructional experiences to develop their understanding of the system, including how numbers are written.”</p>
First Grade	<p>Target Skill: Developing Number Concept <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Count with understanding and recognize “how many” in sets of objects</b> “During the early years teachers must help students strengthen their sense of number, moving from the initial development of basic counting techniques to more sophisticated understandings...”</p>
Second Grade	<p>Target Skill: Fractions of a Set <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Understand and represent commonly used fractions, such as <math>\frac{1}{4}</math>, <math>\frac{1}{3}</math>, and <math>\frac{1}{2}</math></b> “In addition to work with whole numbers, young students should also have some experience with simple fractions through connections to everyday situations and meaningful problems, starting with common fractions expressed in the language they bring to the classroom, such as half.”</p>

## Game 15: How Does Your Garden Grow?

Preschool

Target Skill: Shape Recognition

**NCTM Geometry Standard**

**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**

“Some students’ capabilities with geometric and spatial concepts exceed their number skills. Building on these strengths fosters enthusiasm for mathematics and provides a context in which to develop number and other mathematics concepts (Razel and Eylon 1991).”

Kindergarten

Target Skill: Number Concept

**NCTM Number Operations Standard**

**Understand numbers, ways of representing numbers, relationships among numbers, and number systems**

**Count with understanding and recognize “how many” in sets of objects**

“During the early years teachers must help students strengthen their sense of number, moving from the initial development of basic counting techniques to more sophisticated understandings...”

First Grade

Target Skill: Geometry

**NCTM Geometry Standard**

**Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric shapes**

**Describe attributes and parts of two- and three-dimensional shapes**

“Teachers must provide materials and structure the environment appropriately to encourage students to explore shape and their attributes.”

Second Grade

Target Skill: Fractions of a Region

**NCTM Number Operations Standard**

**Understand numbers, ways of representing numbers, relationships among numbers, and number systems**

**Understand and represent commonly used fractions, such as  $\frac{1}{4}$ ,  $\frac{1}{3}$ , and  $\frac{1}{2}$**

“In addition to work with whole numbers, young students should also have some experience with simple fractions through connections to everyday situations and meaningful problems...”

## Game 16: Hoopla

Preschool

Target Skill: Matching Size

**NCTM Geometry Standard**

**Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric shapes**

**Recognize, name, build, draw, compare, and sort two- and three-dimensional shapes**

“As students become familiar with shape, structure, location, and transformations and as they develop spatial reasoning, they lay the foundation for understanding not only their spatial world but also other topics in mathematics and in art, science, and social studies.”

Kindergarten

Target Skill: Seriation

**NCTM Algebra Standard**

**Understand patterns, relations, and functions**

**Sort, classify, and order objects by size, number and other properties**

“Sorting, classifying, and ordering facilitate work with patterns, geometric shapes, and data.”

First Grade

Target Skill: Estimation and Measurement

**NCTM Understand measurable attributes of objects and the units, systems, and processes of measurement**

**Understand how to measure using nonstandard and standard units**

“Measurement experiences should include direct comparisons as well as the use of nonstandard and standard units.”

Second Grade

Target Skill: Estimation and Measurement with Nonstandard Units

**NCTM Apply appropriate techniques, tools, and formulas to determine measurements**

**Develop common referents for measures to make comparisons and estimates**

“Estimation activities are an early application of number sense; they focus students’ attention on the attributes being measured, the process of measuring, the sizes of the units, and the value of referents.”

## Game 17: Goal!

Preschool	<p>Target Skill: One-to-One Correspondence <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Count with understanding and recognize “how many” in sets of objects</b> “They (young children) can establish one-to-one correspondence by moving, touching, or pointing to objects...”</p>
Kindergarten	<p>Target Skill: Number Concept <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Develop a sense of whole numbers and represent and use them in flexible ways, including relating, composing, and decomposing numbers</b> “Throughout the early years, teachers should regularly give students varied opportunities to continue to develop, use, and practice counting as they quantify collections of objects, measure attributes of shapes, identify locations, and solve problems.”</p>
First Grade	<p>Target Skill: Area <b>NCTM Measurement Standard</b> <b>Understand measurable attributes of objects and the units, systems, and processes of measurement</b> <b>Understand how to measure using nonstandard and standard units</b> “Measurement experiences should include direct comparisons as well as the use of nonstandard and standard units.”</p>
Second Grade	<p>Target Skill: Introduction to Division <b>NCTM Number and Operations Standard</b> <b>Understand meanings of operations and how they relate to one another</b> <b>Understand situations that entail multiplication and division, such as equal groupings of objects and sharing equally</b> “...they (students) can investigate division with real objects and through story problems, usually ones involving distribution of equal shares.”</p>

## Game 18: Going for Goldfish

Preschool	<p>Target Skills: One-to-One Correspondence, Beginning Number Concept</p> <p><b>NCTM Number Operations Standard</b></p> <p><b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b></p> <p><b>Count with understanding and recognize “how many” in sets of objects</b></p> <p>“They (young children) can establish one-to-one correspondence by moving, touching, or pointing to objects...”</p>
Kindergarten	<p>Target Skills: Comparing Numbers, Counting</p> <p><b>NCTM Number Operations Standard</b></p> <p><b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b></p> <p><b>Count with understanding and recognize “how many” in sets of objects</b></p> <p>“Children should learn that the last number named represents the last object as well as the total number of objects in the collection.”</p>
First Grade	<p>Target Skills: Problem Solving, Addition, Subtraction</p> <p><b>NCTM Problem Solving Standard</b></p> <p><b>Apply and adapt a variety of appropriate strategies to solve problems</b></p> <p>“Students working together often begin to solve problems one way and, before reaching a solution, change their strategies. In addition, as they create and modify their strategies, students often recognize the need to learn more mathematics.”</p>
Second Grade	<p>Target Skill: Fractions of a Set</p> <p><b>NCTM Number Operations Standard</b></p> <p><b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b></p> <p><b>Understand and represent commonly used fractions, such as <math>\frac{1}{4}</math>, <math>\frac{1}{3}</math>, and <math>\frac{1}{2}</math>.</b></p> <p>“In addition to work with whole numbers, young students should also have some experience with simple fractions through connections to everyday situations and meaningful problems...”</p>

## Game 19: Leap Frog

Preschool

Target Skill: Patterning

**NCTM Algebra Standard**

**Understand patterns, relations, and functions**

**Recognize, describe, and extend patterns such as sequences of sounds and shapes or simple numeric patterns...**

“Knowing that each pattern...could be described as having the form AABAAB (for instance) is for students an early introduction to the power of Algebra.”

Kindergarten

Target Skill: Linear Measurement with Nonstandard Units

**NCTM Measurement Standard**

**Apply appropriate techniques, tools, and formulas to determine measurement**

**Measure with multiple copies of units of the same size, such as paper clips laid end to end**

“If students initially explore measurement with a variety of units, nonstandard as well as standard, they will develop an understanding of the nature of the units.”

First Grade

Target Skills: Estimation, Linear Measurement, Standard Units

**NCTM Measurement Standard**

**Apply appropriate techniques, tools, and formulas to determine measurement**

**Use tools to measure**

“...using rulers, students learn concepts and procedures, including accurate alignment (e.g., ignoring the leading edge at the beginning of many rulers), starting at zero, and focusing on the lengths of the units rather than only on the numbers on the ruler.”

Second Grade

Target Skills: Addition, Multiple Addends, Comparing Numbers

**NCTM Number and Operations Standard**

**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**

**Understand the effects of adding and subtracting whole numbers**

“An understanding of addition and subtraction can be generated when young students solve “joining” and “take-away” problems by directly modeling the situation or by using counting strategies... (Carpenter and Moser 1984).”

## Game 20: Short Order Cook

Preschool

Target Skill: Shapes

**NCTM Geometry Standard**

**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**

“Some students’ capabilities with geometric and spatial concepts exceed their number skills. Building on these strengths fosters enthusiasm for mathematics and provides a context in which to develop number and other mathematics concepts (Razel and Eylon 1991).”

Kindergarten

Target Skill: One-to-One Correspondence

**NCTM Number Operations Standard**

**Understand numbers, ways of representing numbers, relationships among numbers, and number systems**

**Count with understanding and recognize “how many” in sets of objects**

“They (young children) can establish one-to-one correspondence by moving, touching, or pointing to objects...”

First Grade

Target Skills: Counting, Less Than/More Than

**NCTM Number Operations Standard**

**Understand numbers, ways of representing numbers, relationships among numbers, and number systems**

**Develop a sense of whole numbers and represent and use them in flexible ways, including relating, composing, and decomposing numbers**

“Teachers should try to uncover students’ thinking as they work with concrete materials by asking questions that elicit students’ thinking and reasoning.”

Second Grade

Target Skill: Subtraction

**NCTM Number and Operations Standard**

**Understand meanings of operations and how they relate to one another**

**Understand the effects of adding and subtracting whole numbers**

“An understanding of addition and subtraction can be generated when young students solve “joining” and “take-away” problems by directly modeling the situation or by using counting strategies... (Carpenter and Moser 1984).”

## Game 21: Paige's Purse

Preschool

Target Skills: Counting, Coin Recognition

**NCTM Number Operations Standard**

**Understand numbers, ways of representing numbers, relationships among numbers, and number systems**

**Count with understanding and recognize “how many” in sets of objects**

The authors of *Growing Through Math Games* feel that an introduction to the value of money is made as students count and match the shape of the coins in a one-to-one fashion.

“Counting is a foundation for students’ early work with number.”

Kindergarten

Target Skill: Beginning Money Value

**NCTM Number Operations Standard**

**Understand numbers, ways of representing numbers, relationships among numbers, and number systems**

**Develop a sense of whole numbers and represent and use them in flexible ways, including relating, composing, and decomposing numbers**

The authors of *Growing Through Math Games* feel that an introduction to the value of money is made as children use the coins as a means to understand numbers.

“Throughout the early years, teachers should regularly give students varied opportunities to continue to develop, use, and practice counting as they quantify collections of objects, measure attributes of shapes, identify locations, and solve problems.”

First Grade

Target Skills: Problem Solving, Addition, Subtraction

**NCTM Number and Operations Standard**

**Understand meanings of operations and how they relate to one another**

**Understand the effects of adding and subtracting whole numbers**

“An understanding of addition and subtraction can be generated when young students solve “joining” and “take-away” problems by directly modeling the situation or by using counting strategies... (Carpenter and Moser 1984).”

Second Grade

Target Skill: Story Problems

**NCTM Problem Solving Standard**

**Apply and adapt a variety of appropriate strategies to solve problems**

“Students working together often begin to solve problems one way and, before reaching a solution, change their strategies. In

addition, as they create and modify their strategies, students often recognize the need to learn more mathematics.”

## **Game 22: You’re Tops!**

Preschool	<p>Target Skill: One-to-One Correspondence <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Count with understanding and recognize “how many” in sets of objects</b> “They (young children) can establish one-to-one correspondence by moving, touching, or pointing to objects...”</p>
Kindergarten	<p>Target Skill: Number Concept <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Count with understanding and recognize “how many” in sets of objects</b> “During the early years teachers must help students strengthen their sense of number, moving from the initial development of basic counting techniques to more sophisticated understandings...”</p>
First Grade	<p>Target Skill: Addition <b>NCTM Number and Operations Standard</b> <b>Understand meanings of operations and how they relate to one another</b> <b>Understand the effects of adding and subtracting whole numbers</b> “An understanding of addition and subtraction can be generated when young students solve “joining” and take-away problems by directly modeling the situation or by using counting strategies... (Carpenter and Moser 1984).”</p>
Second Grade	<p>Target Skill: Linear Measurement, Standard Units <b>NCTM Measurement Standard</b> <b>Understand measurable attributes of objects and the units, systems, and processes of measurement</b> <b>Understand how to measure using nonstandard and standard units</b> “Measurement experiences should include direct comparisons as well as the use of nonstandard and standard units.”</p>

## Game 23: Butterfly Nets

Preschool	<p>Target Skill: Sorting <b>NCTM Algebra Standard</b> <b>Understand patterns, relations, and functions</b> <b>Sort, classify, and order objects by size, number, and other properties</b> “Caregivers and teachers should elicit from children the criteria they are using as they sort and group objects.”</p>
Kindergarten	<p>Target Skill: Number Concept <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Count with understanding and recognize “how many” in sets of objects</b> “During the early years teachers must help students strengthen their sense of number, moving from the initial development of basic counting techniques to more sophisticated understandings...”</p>
First Grade	<p>Target Skill: Addition <b>NCTM Number and Operations Standard</b> <b>Understand meanings of operations and how they relate to one another</b> <b>Understand the effects of adding and subtracting whole numbers</b> “An understanding of addition and subtraction can be generated when young students solve “joining” and “take-away” problems by directly modeling the situation or by using counting strategies... (Carpenter and Moser 1984).”</p>
Second Grade:	<p>Target Skills: Counting, Number Sequence <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Develop a sense of whole numbers and represent and use them in flexible ways, including relating, composing, and decomposing numbers</b> “Teachers should try to uncover students’ thinking as they work with concrete materials by asking questions that elicit students’ thinking and reasoning.”</p>

## Game 24: Crabs on the Beach

Preschool	<p>Target Skill: Beginning Number Concept <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Count with understanding and recognize “how many” in sets of objects</b> “They (young children) can establish one-to-one correspondence by moving, touching, or pointing to objects...”</p>
Kindergarten	<p>Target Skill: Number Sequence <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Count with understanding and recognize “how many” in sets of objects</b> <b>Develop understanding of the relative position and magnitude of whole numbers...</b> “Children should learn that the last number named represents the last object as well as the total number of objects in the collection.”</p>
First Grade	<p>Target Skill: Number Words <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Connect number words and numerals to the quantities they represent, using physical models and representations</b> “Students need many instructional experiences to develop their understanding of the system, including how numbers are written.”</p>
Second Grade	<p>Target Skills: Counting, Addition <b>NCTM Number and Operations Standard</b> <b>Understand meanings of operations and how they relate to one another</b> <b>Understand the effects of adding and subtracting whole numbers</b> “An understanding of addition and subtraction can be generated when young students solve “joining” and “take-away” problems by directly modeling the situation or by using counting strategies... (Carpenter and Moser 1984).”</p>

## Game 25: In the Hoops

Preschool	<p>Target Skills: Counting, Developing Number Concept <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Count with understanding and recognize “how many” in sets of objects</b></p> <p>“They (young children) can establish one-to-one correspondence by moving, touching, or pointing to objects...”</p>
Kindergarten	<p>Target Skill: Developing Number Concept <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Count with understanding and recognize “how many” in sets of objects</b></p> <p>“During the early years teachers must help students strengthen their sense of number, moving from the initial development of basic counting techniques to more sophisticated understandings...”</p>
First Grade	<p>Target Skills: Estimation, Counting <b>NCTM Measurement Standard</b> <b>Understand measurable attributes of objects and the units, systems, and processes of measurement</b> <b>Understand how to measure using nonstandard and standard units</b></p> <p>“Measurement experiences should include direct comparisons as well as the use of nonstandard and standard units.”</p>
Second Grade	<p>Target Skills: Subtraction, Addition <b>NCTM Number and Operations Standard</b> <b>Understand meanings of operations and how they relate to one another</b> <b>Understand the effects of adding and subtracting whole numbers</b></p> <p>“An understanding of addition and subtraction can be generated when young students solve “joining” and “take-away” problems by directly modeling the situation or by using counting strategies... (Carpenter and Moser 1984).”</p>

## Game 26: Touchdown!

Preschool

Target Skill: Left-to-Right Progression

**NCTM Reasoning and Proof Standard**

***Introduction to making and investigating mathematical conjectures***

“Young children naturally generalize from examples (Carpenter and Levi 1999) so teachers should guide them to use examples...”  
The authors of *Growing Through Math Games* feel that this beginning understanding sets the foundation for reading number stories and some number problems, in a left-to-right fashion.

Kindergarten

Target Skill: Number Words

**NCTM Number Operations Standard**

**Understand numbers, ways of representing numbers, relationships among numbers, and number systems**

**Connect number words and numerals to the quantities they represent, using physical models and representations**

“Students need many instructional experiences to develop their understanding of the system, including how numbers are written.”

First Grade

Target Skills: Counting, Comparing Numbers

**NCTM Number Operations Standard**

**Understand numbers, ways of representing numbers, relationships among numbers, and number systems**

**Develop a sense of whole numbers and represent and use them in flexible ways, including relating, composing, and decomposing numbers**

“Young children can use number sense to reason with numbers in complex ways.”

Second Grade

Target Skills: Counting, Comparing Numbers

**NCTM Number Operations Standard**

**Understand numbers, ways of representing numbers, relationships among numbers, and number systems**

**Develop a sense of whole numbers and represent and use them in flexible ways, including relating, composing, and decomposing numbers**

“Teachers should also choose interesting tasks that engage students in mathematical thinking and reasoning, which builds their understanding of numbers and relationships among numbers.”

## Game 27: It's About Time

Preschool

Target Skill: Matching Colors

**NCTM Data Analysis and Probability Standard**

**Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them**

**Sort and classify objects according to their attributes...**

“Organizing data into categories should begin with informal sorting experiences...these experience and the conversations that accompany them focus children’s attention on the attributes of objects and help develop an understanding of “things that go together”, while building a vocabulary for describing attributes and for classifying according to criteria.”

Kindergarten

Target Skill: Beginning Telling Time

**NCTM Measurement Standard**

**Understand measurable attributes of objects and the units, systems, and processes of measurement**

**Recognize the attributes of length, volume, weight, area, and time**

“Another emphasis at this level should be on developing concepts of time and the ways it is measured.”

First Grade

Target Skill: Telling Time

**NCTM Measurement Standard**

**Understand measurable attributes of objects and the units, systems, and processes of measurement**

**Recognize the attributes of length, volume, weight, area, and time**

“Opportunities arise through the school day for teachers to focus on time and its measurement through short conversations with their students.”

Second Grade

Target Skills: Problem Solving, Elapsed Time

**NCTM Problem Solving Standard**

**Apply and adapt a variety of appropriate strategies to solve problems**

“Students working together often begin to solve problems one way and, before reaching a solution, change their strategies. In addition, as they create and modify their strategies, students often recognize the need to learn more mathematics.”

## Game 28: Let's Go Fishing

Preschool	<p>Target Skills: Counting, Comparing Numbers <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Count with understanding and recognize “how many” in sets of objects</b> “During the early years teachers must help students strengthen their sense of number...”</p>
Kindergarten	<p>Target Skill: Patterning <b>NCTM Algebra Standard</b> <b>Understand patterns, relations, and functions</b> <b>Recognize, describe, and extend patterns such as sequences of sounds and shapes or simple numeric patterns...</b> “Knowing that each pattern...could be described as having the form AABAAB (for instance) is for students an early introduction to the power of Algebra.”</p>
First Grade	<p>Target Skills: Counting, Comparing Numbers, Odd and Even <b>NCTM Number Operations Standard</b> <b>Understand numbers, ways of representing numbers, relationships among numbers, and number systems</b> <b>Develop a sense of whole numbers and represent and use them in flexible ways, including relating, composing, and decomposing numbers</b> “Teachers should also choose interesting tasks that engage students in mathematical thinking and reasoning, which builds their understanding of numbers and relationships among numbers.”</p>
Second Grade	<p>Target Skill: Problem Solving <b>NCTM Problem Solving Standard</b> <b>Apply and adapt a variety of appropriate strategies to solve problems</b> “Students working together often begin to solve problems one way and, before reaching a solution, change their strategies. In addition, as they create and modify their strategies, students often recognize the need to learn more mathematics.”</p>

## Game 29: Clothes on the Line

Preschool

Target Skill: Color Matching

**NCTM Data Analysis and Probability Standard**

**Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them**

**Sort and classify objects according to their attributes...**

“Organizing data into categories should begin with informal sorting experiences...these experience and the conversations that accompany them focus children’s attention on the attributes of objects and help develop an understanding of “things that go together, while building a vocabulary for describing attributes and for classifying according to criteria.”

Kindergarten

Target Skill: Assigning Number Value

**NCTM Number Operations Standard**

**Understand numbers, ways of representing numbers, relationships among numbers, and number systems**

**Connect number words and numerals to the quantities they represent, using physical models and representations**

“As students work with numbers, they gradually develop flexibility in thinking about numbers, which is a hallmark of number sense.”

First Grade

Target Skill: Writing Numbers

**NCTM Number Operations Standard**

**Understand numbers, ways of representing numbers, relationships among numbers, and number systems**

**Connect number words and numerals to the quantities they represent, using physical models and representations**

“During the early years teachers must help students strengthen their sense of number, moving from the initial development of basic counting techniques to more sophisticated understandings of the size of numbers, number relationships, patterns, operations, and place value.”

Second Grade

Target Skill: Patterning

**NCTM Algebra Standard**

**Understand patterns, relations, and functions**

**Analyze how both repeating and growing patterns are generated**

“By encouraging students to explore and model relationships using language and notation that is meaningful for them, teachers can help students see different relationships and make conjectures and generalizations from their experiences with numbers.”

## Game 30: Pots and Pans

Preschool

Target Skill: Sort and Classify

**NCTM Data Analysis and Probability Standard**

**Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them**

**Sort and classify objects according to their attributes...**

“Organizing data into categories should begin with informal sorting experiences...these experience and the conversations that accompany them focus children’s attention on the attributes of objects and help develop an understanding of “things that go together, while building a vocabulary for describing attributes and for classifying according to criteria.”

Kindergarten

Target Skill: Assigning Number Value

**NCTM Number Operations Standard**

**Understand numbers, ways of representing numbers, relationships among numbers, and number systems**

**Connect number words and numerals to the quantities they represent, using physical models and representations**

“As students work with numbers, they gradually develop flexibility in thinking about numbers, which is a hallmark of number sense.”

First Grade

Target Skill: Addition Facts

**NCTM Number and Operations Standard**

**Understand meanings of operations and how they relate to one another**

**Understand the effects of adding and subtracting whole numbers**

“An understanding of addition and subtraction can be generated when young students solve “joining” and “take-away” problems by directly modeling the situation or by using counting strategies... (Carpenter and Moser 1984).”

Second Grade

Target Skills: Counting, Number Sequence

**NCTM Number Operations Standard**

**Understand numbers, ways of representing numbers, relationships among numbers, and number systems**

**Develop a sense of whole numbers and represent and use them in flexible ways, including relating, composing, and decomposing numbers**

“Teachers should also choose interesting tasks that engage students in mathematical thinking and reasoning, which builds their understanding of numbers and relationships among numbers.”