



C MATHEMATICS

EARLY LEARNING

AGES 3 to 5





STRATEGIES AND ACTIVITIES

For Early Learning Utah
Core Standards Ages 3 to 5

MATHEMATICS



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MATHEMATICS



INTRODUCTION

Mathematics is a way of thinking about patterns, relationships, and seeking multiple solutions to problems. Children's knowledge of math concepts and language are used in all learning domains.

Children learn mathematics best when their natural interests and curiosity are nurtured through intentional instruction. Quality learning environments should focus on actual hands-on experiences during play and interaction with others to incorporate well-designed mathematical experiences. Preschool children should experience language-rich environments that help them connect mathematical concepts, problem-solving, and reasoning skills to previous knowledge.

ADULTS SUPPORT LEARNING IN MATHEMATICS WHEN THEY:

- Give children adequate time to explore and experiment with manipulatives before starting teacher planned instruction.
- Design experiences where children explore and experience their environment to identify spatial relationships such as, "How many children fit inside the castle in the outdoor area?"
- Model and encourage correct mathematical language throughout the day.
- Use mathematical language to extend children's understanding within the context of their experiences, such as: "Do you want half a glass of milk or a full glass of milk?" or "Would you like more or fewer grapes than I have?"
- Explore addition and subtraction, and compare objects using measurable attributes (length, width, or size) in the context of classroom play or teacher-guided activities.
- Integrate mathematical experiences, including stories, chants, and songs to reinforce mathematical concepts such as "Five Little Speckled Frogs," "Five Little Ducks," and "The Three Billy Goats Gruff."
- Provide a variety of manipulatives and materials in math centers.
- Integrate mathematics throughout the day (for example, counting snacks, identifying shapes, ordering objects by length or size).
- Design home experiences to incorporate math skills (for example, count steps from the bed to the door, count chairs, find shapes in furniture, find patterns in the tablecloth).
- Use a variety of tools to incorporate mathematical concepts (for example, water table, sandbox, modeling clay, blocks).

Strategies & Activities for 3-YEAR-OLDS

Strand 1: **COUNTING AND CARDINALITY**

Counting and cardinality includes the ability to identify numerals by name, count in sequence, use one-to-one correspondence, and describe quantities of objects counted.

GENERAL ACTIVITIES AND STRATEGIES FOR COUNTING AND CARDINALITY:

- Incorporate kinesthetic activities such as clapping or jumping while counting associating each movement with a number.
- Use counting songs and nursery rhymes that involve numbers and the counting sequence.
- Have number lines and visual displays of numbers placed at the student's eye level in the classroom.
- Count food items during snack time.
- Count students and everyday objects throughout the day.
- When counting objects, frequently ask "How many?" to reinforce cardinality.
- During learning centers, represent numbers in a variety of forms such as written numerals, numeral words, and one-to-one picture representation (for example, 5, five, and /////).
- Incorporate subitizing (the child's ability to look at a number of objects and state how many objects without having to count) into activities (for example, roll dice and know that it shows "3" without counting the dots).
- Practice counting using fine motor skills (for example, use tongs to pick up pom poms).
- Use a variety of pointers during counting activities (for example, wands, witch fingers).

STANDARDS	STRATEGIES & ACTIVITIES
Math 3 yr.1.1: Count to ten by ones.	<ul style="list-style-type: none"> ■ Play “Hide and Seek” with peers and/or objects. Practice counting while doing so. ■ Count to 10 (twice) while washing hands.
Math 3 yr.1.2: Recognize that numbers have a known sequence (for example, “1, 2, 3, 4, 5. What comes next?”).	<ul style="list-style-type: none"> ■ During activities and games where counting is involved, pause and have students say what number comes next. ■ Have a puppet count and wait for students to say which number is next (for example, have the puppet say, “1, 2, 3, _5, did I count correctly?”)
Math 3 yr.1.3: Begin to recognize the difference between letters and numbers.	<ul style="list-style-type: none"> ■ “Password of the Day”—identify the written numeral before entering or exiting the classroom by pointing to the number within a letter/number visual (for example, X3F). ■ Sort numbers, letters, and symbols.
Math 3 yr.1.4: Begin to name written numerals 0–5.	<ul style="list-style-type: none"> ■ Identify written numbers while playing games (for example, musical numbers instead of musical chairs, have children name the number they sit on when the music stops). ■ Begin to match piles of objects to written numerals (cards, magnets, etc.). ■ Play “I Spy” to find written numerals around the classroom or in books.
Math 3 yr.1.5: Begin to develop an understanding of the relationship between some numbers and quantities by using one-to-one correspondence.	<ul style="list-style-type: none"> ■ Roll a die and count out that many objects. ■ Count how many people are in the “restaurant” area and pass out that same number of plates, cups, napkins, etc. to participants (up to 5).
Math 3 yr.1.6: Begin to point to and count up to five objects.	<ul style="list-style-type: none"> ■ Build towers with blocks or interlocking cubes and count how many up to 5. ■ Count around the room by counting how many chairs, windows, doors, etc.
Math 3 yr.1.7: Begin to respond to the question “How many?”.	Place objects on a table, cover with a cloth, lift the cloth and ask, “How many?”

Strand 2: **OPERATIONS AND ALGEBRAIC THINKING**

Operations and algebraic thinking involve identifying and manipulating simple patterns, the understanding of addition as putting together and adding to, and the understanding of subtraction as taking apart and removing from.

GENERAL ACTIVITIES AND STRATEGIES TO ENCOURAGE OPERATIONS AND ALGEBRAIC THINKING:

- Patterns can be visual, auditory, kinesthetic, or tactile. Provide a variety of experiences in different modalities.
- Discuss ordinality, order of first, second, third, etc. when describing patterns.
- Call attention to patterns in the environment (for example, alternating colors of floor tiles, bulletin board displays).
- Use songs, nursery rhymes, and stories that involve patterns (for example, use rhythm sticks to tap the rhythm of the song [tap on floor and then tap together], Brown Bear, Brown Bear).
- Point out patterns in children’s and teachers’ clothing (for example, stripes, buttons, etc.).
- Make and describe patterns in nature (for example, flower petals, seashells, rocks, animal prints).
- Have students line up in patterns (for example, by clothing/shoe color, hair length, age).
- Make patterns with snack foods (for example, with colored or shaped crackers, fruit snacks, or cereal).

STANDARDS	STRATEGIES & ACTIVITIES
Math 3 yr.2.1: Begins in 4-year-old standard.	NA
Math 3 yr.2.2: Begins in 4-year-old standard.	NA
Math 3 yr.2.3: Begins in 4-year-old standard.	NA
Math 3 yr.2.4: Begins in 4-year-old standard.	NA
Math 3 yr.2.5: Identify simple patterns in the environment and begin to duplicate and extend simple patterns (for example, ababab).	<ul style="list-style-type: none"> ■ Model simple patterns and provide manipulatives and materials to duplicate simple patterns. ■ Give each child an object and have them create a pattern with the objects as a group. ■ Play pattern games such as hop two times and then jump once.

Strand 3: **MEASUREMENT AND DATA**

Measurement and Data involve the ability to describe and compare measurable attributes of objects, classify objects, and count the number of objects in each category.

GENERAL ACTIVITIES AND STRATEGIES FOR MEASUREMENT AND DATA:

- Provide standard tools for measurement (for example, rulers, measuring tapes, balance scale, etc.).
- Provide non-standard tools for measurement (for example, yarn, blocks, links).
- Use measuring cups with sand/water to experiment.
- Create classroom displays to illustrate measurement and data (for example, student height chart, outdoor temperature chart, T-chart to put “Question of the Day” responses on).

STANDARDS	STRATEGIES & ACTIVITIES
Math 3 yr.3.1: Identify and describe measurable attributes (for example, big, small, tall, short).	Encourage measurement of attributes in play (for example, weighing rocks, measuring babies, lining up vehicles by size).
Math 3 yr.3.2: Begins in 4-year-old standard.	NA
Math 3 yr.3.3: Sort objects into given categories including color, size, shape, etc.	<ul style="list-style-type: none"> ■ Sort objects into measurement categories such as long/short, heavy/light, and big/small. ■ Sort objects into categories based on similar attributes such as color, size, shape, etc. ■ Use t-charts or sorting mats/trays to sort objects.
Math 3 yr.3.4: With prompting and support, compare the number of objects in each category to identify which groups contain more or less, or are the same.	<ul style="list-style-type: none"> ■ As students finish sorting objects, have them identify which group has more or less or if they have the same number. ■ Have two students each grab a handful of objects and compare their results with each other in a “Think, Pair, Share” format.

Strand 4: **GEOMETRY**

Geometry involves the ability to identify, describe, compare, and create shapes.

GENERAL ACTIVITIES AND STRATEGIES TO INCORPORATE GEOMETRY:

- Use songs and nursery rhymes that involve shapes (for example, shape song, Twinkle, Twinkle Little Star).
- Visually display shapes in the classroom (for example, on bulletin boards, graphs, table displays, spots for lining up).
- Explore creating shapes using a variety of materials (for example, shaving cream, sand, clay, finger paint, blocks, etc.).
- Do a shape hunt or I Spy game in the classroom or environment.

STANDARDS	STRATEGIES & ACTIVITIES
Math 3 yr.4.1: Match, point to, and begin to identify basic shapes by name.	<ul style="list-style-type: none"> ■ Match shapes to similar shapes. ■ Play a variety of shape sorting games (for example, the shark will only eat circles today).
Math 3 yr.4.2: Begins in 4-year-old standard.	NA
Math 3 yr.4.3: Begins in 4-year-old standard.	NA
Math 3 yr.4.4: With prompting and support, begin to identify attributes of basic two-dimensional shapes (for example, a rectangle has two long sides and two short sides).	Provide snack items with different shapes and draw children’s attention to their attributes (for example, “This cracker is shaped like a triangle. It has three sides and three corners, one, two, three.”)
Math 3 yr.4.5: Explore shapes using a variety of media (for example, blocks, stickers, play dough/clay, art supplies).	Provide opportunities for children to engage with materials that include a variety of simple shapes (for example, different types of blocks, geometric cookie cutters, stencils, etc.).
Math 3 yr.4.6: Explore combining basic shapes together to represent an object (for example, use a square and a triangle to make a house).	Use tangrams and pattern (parquetry) blocks to combine shapes to create new shapes (for example, two triangles make a rectangle, six small triangles can be arranged to make a hexagon, etc.).

Strategies & Activities for 4-YEAR-OLDS

Strand 1: **COUNTING AND CARDINALITY**

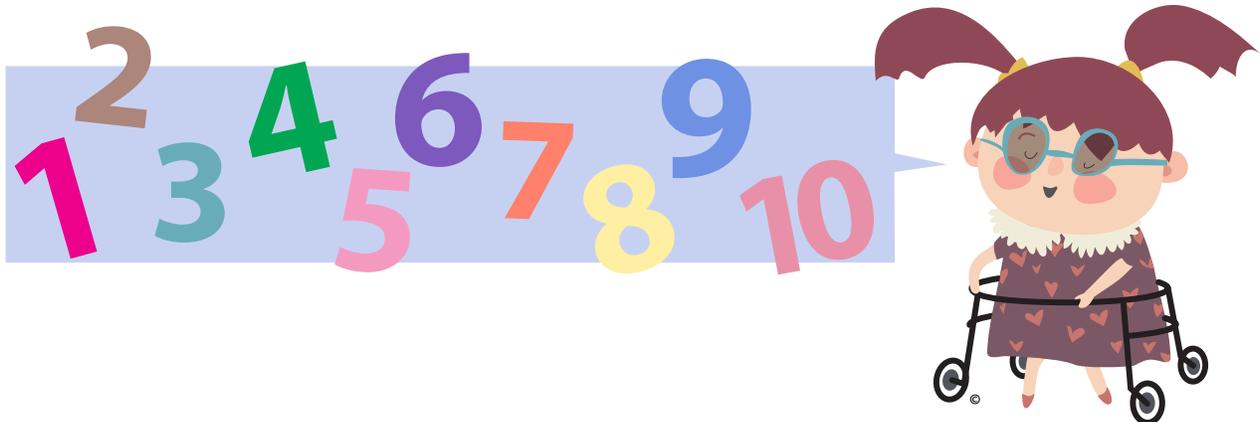
Counting and cardinality includes the ability to identify numerals by name, count in sequence, use one-to-one correspondence, and describe quantities of objects counted.

GENERAL ACTIVITIES AND STRATEGIES FOR COUNTING AND CARDINALITY

- Incorporate kinesthetic activities such as clapping or jumping while counting, associating each movement with a number.
- Use counting songs and nursery rhymes that involve numbers and the counting sequence.
- Have number lines and visual displays of numbers placed at the student's eye level in the classroom.
- Count food items during snack time.
- Count students and everyday objects throughout the day.
- When counting objects, frequently ask "How many?" to reinforce cardinality.
- During learning centers, represent numbers in a variety of forms such as written numerals, numeral words, and one-to-one picture representation (for example, 3, three, and /// (tally marks)).
- Incorporate subitizing (the child's ability to look at a number of objects and state how many objects without having to count) into activities (for example, roll dice and know that it shows "3" without counting the dots).
- Practice counting using fine motor skills (for example, use tongs to pick up pom poms).
- Use a variety of pointers during counting activities (for example, wands, witch fingers).

STANDARDS	STRATEGIES & ACTIVITIES
Math 4 yr.1.1: Count to 20 by ones.	<ul style="list-style-type: none"> ■ Play “Hide and Seek” with peers and/or objects. Practice counting while doing so. ■ Count to 20 while washing hands.
Math 4 yr.1.2: In the sequence of 1–10, identify numbers that come before or after one another.	<ul style="list-style-type: none"> ■ During activities and games where counting is involved, pause and have students say what number comes next. ■ Have a puppet count and wait for students to say which number is next (for example, have the puppet say, “1, 2, 3, _5. Did I count correctly?”)
Math 4 yr.1.3: Count a number of objects from 0–10 and begin to associate them with a written numeral.	<ul style="list-style-type: none"> ■ Count the room by counting how many chairs, windows, doors, etc. and match to a numeral on a number line. ■ Provide number cards in center activities. Have students count and identify the number of objects with the number card.
Math 4 yr.1.4: Name written numerals 0–10.	<ul style="list-style-type: none"> ■ Play games like hopscotch and have students name numerals that they jump on. ■ Identify written numbers while playing games (for example, musical numbers instead of musical chairs, have children name the number they sit on when the music stops). ■ Begin to match piles of objects to written numerals (cards, magnets, etc.). ■ Play “I Spy” to find written numerals around the classroom or in books.
Math 4 yr.1.5: Use one-to-one correspondence when counting objects to ten.	<ul style="list-style-type: none"> ■ Roll a die and count out that many objects. ■ Count how many people/stuffed animals are in the “restaurant” area and pass out that same number of plates, cups, napkins, etc. to participants (up to 10).
Math 4 yr.1.6: When counting objects to ten, understand that the last number counted in a set tells how many.	<ul style="list-style-type: none"> ■ Provide a mix of items and have students sort and count how many to 10 (shells, buttons, rocks, etc.). ■ When counting objects, repeatedly ask “How many?” to reinforce cardinality. ■ Place objects on a table, cover with a cloth, lift the cloth and ask, “How many?”

STANDARDS	STRATEGIES & ACTIVITIES
<p>Math 4 yr.1.7: Count two sets of objects up to 10 to determine which has more.</p>	<ul style="list-style-type: none"> ■ Display two piles of objects of different quantities (two bears in one hand and five bears in another hand) and ask, “Which is greater?”; “Which is less?”; “Which is five?” ■ Build towers with blocks or interlocking cubes and count how many are in the tower. Ask students which tower has more or less or is taller or shorter.



Strand 2: **OPERATIONS AND ALGEBRAIC THINKING**

Operations and algebraic thinking involve identifying and manipulating simple patterns, the understanding of addition as putting together and adding to, and the understanding of subtraction as taking apart and removing from.

GENERAL ACTIVITIES AND STRATEGIES TO ENCOURAGE OPERATIONS AND ALGEBRAIC THINKING:

- Patterns can be visual, auditory, kinesthetic, or tactile. Provide a variety of experiences in different modalities.
- Practice using appropriate mathematical language such as: combine, join, put together, take from, take away, take apart, how many altogether, how many are left, etc.
- Discuss ordinality, order of first, second, third, etc. when describing patterns.
- Call attention to patterns in the environment (for example, alternating colors of floor tiles, bulletin board displays).
- Use songs, nursery rhymes, and stories that involve patterns (for example, use rhythm sticks to tap the rhythm of the song [tap on floor and then tap together], Brown Bear, Brown Bear).
- Point out patterns in childrens' and teachers' clothing (for example, stripes, buttons, etc.).
- Make and describe patterns in nature (for example, flower petals, seashells, rocks, animal prints).
- Have students line up in patterns (for example, by clothing/shoe color, hair length, age).
- Make patterns with snack foods (for example, with colored or shaped crackers, fruit snacks, or cereal).

STANDARDS	STRATEGIES & ACTIVITIES
<p>Math 4 yr.2.1: Understand and represent addition up to five (adding to or putting together) and subtraction (taking from or taking apart) with concrete objects, fingers, movement, and simple drawings.</p>	<ul style="list-style-type: none"> ■ Use two sets of objects, count them and add them together. ■ Given a set of objects, take apart the set into two piles. ■ Given a set of objects, roll a die and take that many away; then tell how many are left.

STANDARDS	STRATEGIES & ACTIVITIES
<p>Math 4 yr.2.2: With prompting and support, solve addition and subtraction word problems created by the teacher using up to five concrete objects to represent the problem (for example, “Bring me three blocks, now bring me two more. How many blocks do we have?”).</p>	<ul style="list-style-type: none"> ■ Find commonalities between students in the class and count to find the number of students in the combined group. ■ Provide opportunities for students to solve problems in real world contexts (for example, at snack, children joining play groups, etc.). ■ Create a question of the day revolving around a theme involving addition/subtraction with objects or pictures (for example, “There are 2 bears in a cave and 2 more bears join them. How many bears are there altogether?”).
<p>Math 4 yr.2.3: Take apart numbers less than or equal to five by using objects with different attributes (for example, 5 can be taken apart into sets of 2 blue and 3 yellow or 1 square and 4 circles).</p>	<ul style="list-style-type: none"> ■ Use two different interlocking cube colors (for example, 2 blue and 3 yellow) and take them apart to show how groups of 5 can be broken down. ■ Place 5 paper cups or bowling pins in a triangle formation and roll a ball at them. Count how many are still standing.
<p>Math 4 yr.2.4: Use concrete objects to make sums of 5 using quantities from 0–5 (for example, 0 and 5 make a set of 5, 2 and 3 make a set of 5).</p>	<ul style="list-style-type: none"> ■ Using the book “Pete the Cat and the Groovy Buttons” make a set of felt “T-shirts”. Have children roll a die and put that many buttons on their “T-shirt”. ■ Create an “addition machine” to have students demonstrate the joining of quantities 0 through 5.
<p>Math 4 yr.2.5: Duplicate, extend, and create simple patterns (for example, ababab).</p>	<ul style="list-style-type: none"> ■ Model simple patterns and provide manipulatives and materials to create simple patterns. ■ Create patterns in drawings and shapes (make a pattern on the drawing of the snake, house, etc.). ■ Play pattern games such as hop two times and then jump once.

Strand 3: **MEASUREMENT AND DATA**

Measurement and Data involve the ability to describe and compare measurable attributes of objects, classify objects, and count the number of objects in each category.

GENERAL ACTIVITIES AND STRATEGIES FOR MEASUREMENT AND DATA:

- Provide standard tools for measurement (for example, rulers, measuring tapes, balance scale, etc.).
- Provide non-standard tools for measurement (for example, yarn, blocks, links).
- Use measuring cups with sand/water to experiment.
- Create classroom displays to illustrate measurement and data (for example, student height chart, outdoor temperature chart, T-chart to put “Question of the Day” responses on).

STANDARDS	STRATEGIES & ACTIVITIES
<p>Math 4 yr.3.1: Describe objects using vocabulary specific to measurable attributes (for example, length [long/short], weight [heavy/light], size [big/small], and distance [near/far]).</p>	<ul style="list-style-type: none"> ■ Encourage measurement of attributes in play (for example, weighing rocks, measuring babies, lining up vehicles by size, etc.). ■ Line up linear objects to see which are long and which are short. ■ On the playground, have a student stand in a hula-hoop. Place one item close to the student and another item farther away. Ask the student which item is near and which is far. ■ Provide non-standard tools for measurement (yarn, balance scales, blocks) ■ Use measuring cups with water to analyze full, empty, heavy, light
<p>Math 4 yr.3.2: Directly compare two objects using measurable attributes (for example, length [longer/shorter], weight [heavier/lighter], and size [bigger/smaller]).</p>	<p>Provide opportunities for two objects (for example, dinosaurs, play food, rocks, books, etc.) to be compared and use specific vocabulary to describe attributes.</p>
<p>Math 4 yr.3.3: Classify/sort objects into given categories (for example, color, size, shape) by specified attributes.</p>	<ul style="list-style-type: none"> ■ Sort objects into measurement categories such as long/short, heavy/light, and big/small. ■ Sort objects into categories based on similar attributes such as color, size, shape, etc. ■ Use t-charts, sorting mats, or colored paper to sort objects. Identify which category has more objects.

STANDARDS	STRATEGIES & ACTIVITIES
Math 4 yr.3.4: Compare the number of objects in each category to identify which groups contain more or less, or are the same.	<ul style="list-style-type: none">■ As students finish sorting objects, have them identify which group has more or less or if they have the same number.■ Have two students each grab a handful of objects and compare their results with each other in a “Think, Pair, Share” format.

Strand 4: **GEOMETRY**

Geometry involves the ability to identify, describe, compare, and create shapes.

GENERAL ACTIVITIES AND STRATEGIES TO INCORPORATE GEOMETRY

- Use songs and nursery rhymes that involve shapes (for example, shape song, Twinkle, Twinkle Little Star, etc.).
- Visually display shapes in the classroom (for example, on bulletin boards, graphs, table displays, spots for lining up, etc.).
- Explore creating shapes using a variety of materials (for example, shaving cream, sand, clay, finger paint, blocks, etc.)
- Analyze the shapes of everyday objects throughout the day.
- Do a shape hunt or “I Spy” game in the classroom or environment.

STANDARDS	STRATEGIES & ACTIVITIES
<p>Math 4 yr.4.1: Describe objects in the environment by using names of shapes and identify the relative positions of these objects using terms such as above, below, beside, in front of, behind, and next to.</p>	<ul style="list-style-type: none"> ■ Match shapes to similar shapes. ■ Play a variety of shape sorting games (the shark will only eat circles today). ■ Use positional vocabulary by describing where objects are in the room, in reference to other objects, and/or in reference to the student.
<p>Math 4 yr.4.2: Identify and name basic shapes regardless of their size and/or orientation (the way the object is turned or flipped).</p>	<p>Display the same shape in a variety of orientations and discuss the name and attributes of the shape and how they don't change when the orientation changes.</p>
<p>Math 4 yr.4.3: Begin to explore that shapes can be two-dimensional (flat) or three-dimensional (solid).</p>	<ul style="list-style-type: none"> ■ Analyze shapes of food items during snack time such as shapes of different crackers. ■ Sort objects and arrange them in categories by shape (for example, match shape to objects like a circle to a toy cookie, triangle to a toy pizza slice, etc.).
<p>Math 4 yr.4.4: Describe attributes of basic two-dimensional shapes including size, number of sides, number of corners, etc.</p>	<ul style="list-style-type: none"> ■ Describe attributes of shapes when playing games (for example, hop on a shape that has 3 corners, two short sides and two long sides, etc.). ■ Given a variety of shapes, identify which shapes have specific attributes (for example, which has three sides, etc.).

STANDARDS	STRATEGIES & ACTIVITIES
Math 4 yr.4.5: Create basic shapes using a variety of media (for example, blocks, stickers, play dough/clay, art supplies).	Create and draw shapes using a variety of materials (for example, shaving cream, sand, clay, finger paint, geoboards, paper and pencil, etc.).
Math 4 yr.4.6: Explore combining basic shapes to create new shapes (for example, two triangles make a rhombus).	Use tangrams and pattern (parquetry) blocks to combine shapes to create new shapes (for example, two triangles make a rectangle; six small triangles can be arranged to make a hexagon, etc.).

