

## Curriculum Unit Overview

**Curriculum Area: Mathematics**

**Grade Level: Pre-K**

**Unit Summary:** This unit is designed as an introduction to applying mathematical knowledge to explore, represent, communicate, and solve problems in their environment.

### Learning Targets

**Curriculum aligned with Standards:** New Jersey Preschool Teaching and Learning Standards 2014

**21<sup>st</sup> Century Skills:** Critical Thinking & Problem Solving X, Creativity and Innovation X, Collaboration, Teamwork and Leadership X, Cross-Cultural Understanding and Interpersonal Communications X, Communication and Media Fluency X, Accountability, Productivity and Ethics X

**Interdisciplinary Connection: Math=MA, English=ELA, Science=SCI, Social Studies=SS, Physical Education=PE, Art=ART, Music=MU, Technology=TECH, World Language=WL**

### Standards:

**Standard 4.1: Children begin to demonstrate an understanding of number and counting.**

4.1.1: Count to 20 by ones with minimal prompting.

4.1.2: Recognize and name one-digit written numbers up to 10 with minimal prompting.

4.1.3: Know that written numbers are symbols for number quantities and, with support, begin to write numbers from 0 to 10.

4.1.4: Understand the relationship between numbers and quantities (i.e., the last word stated when counting tells “how many”):

(a) Accurately count quantities of objects up to 10, using one-to-one-correspondence, and accurately count as many as 5 objects in a scattered configuration.

(b) Arrange and count different kinds of objects to demonstrate understanding of the consistency of quantities (i.e., “5” is constant, whether it is a group of 5 people, 5 blocks or 5 pencils).

(c) Instantly recognize, without counting, small quantities of up to 3 or 4 objects (i.e., subitize).

4.1.5: Use one to one correspondence to solve problems by matching sets (e.g., getting just enough straws to distribute for each juice container on the table) and comparing amounts (e.g., collecting the number of cubes needed to fill spaces in a muffin tin with one cube each).

4.1.6: Compare groups of up to 5 objects (e.g., beginning to use terms such as “more,” “less,” “same”).

**Standard 4.2: Children demonstrate an initial understanding of numerical operations.**

4.2.1: Represent addition and subtraction by manipulating up to 5 objects:

(a) putting together and adding to (e.g., “3 blue pegs, 2 yellow pegs, 5 pegs altogether.”); and

(b) taking apart and taking from (“I have four carrot sticks. I’m eating one. Now I have 3.”).

4.2.2: Being to represent simple word problem data in pictures and drawings.

**Standard 4.3: Children begin to conceptualize measurable attributes of objects.**

4.3.1: Sort, order, pattern, and classify objects by non-measurable (e.g., color, texture, type of material) and measurable attributes (e.g., length, capacity, height).

4.3.2: Begin to use appropriate vocabulary to demonstrate awareness of the measurable attributes of length, area, weight and capacity of everyday objects (e.g., long, short, tall, light, heavy, full).

4.3.3: Compare (e.g., which container holds more) and order (e.g., shortest to longest) up to 5 objects according to measurable attributes.

**Standard 4.4: Children develop spatial and geometric sense.**

**4.4.1:** Respond to and use positional words (e.g., in, under, between, down, behind).

**4.4.2:** Use accurate terms to name and describe some two-dimensional shapes and begin to use accurate terms to name and describe some three-dimensional shapes (e.g., circle, square, triangle, sphere, cylinder, cube, side point, angle).

**4.4.3:** Manipulate, compare and discuss the attributes of:

- (a) two-dimensional shapes (e.g., use two dimensions shapes to make designs, patterns and pictures by manipulating materials such as paper shapes, puzzle pieces, tangrams; construct shapes from materials such as straws; match identical shapes, sort shapes based on rules [something that makes them alike/different]; describe shapes by sides/angles; use pattern blocks to compose/decompose shapes when making and taking apart compositions of several shapes).
- (b) three-dimensional shapes by building with blocks and with other materials having height, width and depth (e.g., unit blocks, hollow blocks, attribute blocks, boxes, empty food containers, plastic pipe).

**Unit Essential Questions**

*Students will wonder...*

- Why are numbers and mathematical concepts important?
- How do we use numbers and numerical operations in everyday life?
- How are shapes connected to our daily environment?
- What kind of shapes will you use in your collage?
- How can you combine these pattern blocks to create a new shape (design)?
- Why is measurement important?
- Which material would be the best material for measuring how long \_\_\_\_ is? Why?
- How would the classroom look different to you if you were really tall (short)?
- How can we use data to compare and contrast?
- Which materials would make a really interesting pattern?
- Using the balance scale, what would you need to add to each side to make the balance level?

**Unit Enduring Understandings**

*Students will understand that...*

- Number words and symbols are recognized and used in everyday life and that numerical operations are part of daily activities.
- Quantities can be combined and separated
- Spatial concepts including shapes and measurement are part of daily life.
- Patterns, relationships, and classifications are important in everyday activities.
- Data can be used to analyze, draw conclusions, make decisions, and problem solve.

**Unit Learning Targets**

*Students will know:*

- Number words and symbols:  
Children recognize and use number words and symbols.
- Counting:  
Children count things. Children count with one-to-one correspondence (e.g., touch an object and say a number).
- Part-whole relationships:  
Children combine and separate quantities of objects.
- Shapes:  
Children identify, name, and describe shapes.
- Spatial awareness:

*Students will be able to:*

- Recognize and name numerals in their environment. They understand that cardinal numbers (e.g., one, two, three) refer to quantity and that ordinal numbers (e.g., first, second, last) refer to the order of things. They write numerals.
- Understand that the last number counted tells “how many.” Children compare and order quantities (e.g., more, fewer/less, same). They understand the concepts of “adding to” and “taking away.”
- “Compose” and “decompose” quantities. They use parts to make up the whole set (e.g., combine two blocks and three blocks to make a set of five blocks). They also divide the whole set into parts

<p>Children recognize spatial relationships among people and objects.</p> <ul style="list-style-type: none"> <li>● <b>Measuring:</b> Children measure to describe, compare, and order things.</li> <li>● <b>Unit:</b> Children understand and use the concept of units.</li> <li>● <b>Patterns:</b> Children identify, describe, copy, complete, and create patterns.</li> <li>● <b>Data analysis:</b> Children use information about quantity to draw conclusions, make decisions, and solve problems.</li> </ul>	<p>(e.g., separate five blocks into one block and four blocks).</p> <ul style="list-style-type: none"> <li>● Recognize, compare, and sort two- and three-dimensional shapes (e.g., triangle, rectangle, circle; cone, cube, sphere). They understand what makes a shape a shape (e.g., all triangles have three sides and three points). Children transform (change) shapes by putting things together and taking them apart.</li> <li>● Use position, direction, and distance words to describe actions and the location of objects in their environment. They solve simple spatial problems in play (e.g., building with blocks, doing puzzles, wrapping objects).</li> <li>● Use measurement terms to describe attributes (i.e., length, volume, weight, temperature, and time). They compare quantities (e.g., same/different, bigger/smaller, more/less, heavier/lighter) and order them (e.g., shortest/medium/longest). They estimate relative quantities (e.g., whether something has more or less).</li> <li>● Understand that a unit is a standard (unvarying) quantity. They measure using unconventional (e.g., block) and conventional (e.g., ruler) measuring tools. They use correct measuring procedures (e.g., begin at the baseline and measure without gaps or overlaps).</li> <li>● Lay the foundation for algebra by working with simple alternating patterns (e.g., ABABAB) and progressing to more complex patterns (e.g., AABAABAAB, ABCABCABC). They recognize repeating sequences (e.g., the daily routine, movement patterns) and begin to identify and describe increasing and decreasing patterns (e.g., height grows as age increases).</li> <li>● Collect, organize, and compare information based on measurable attributes. They represent data in simple ways (e.g., tally marks, stacks of blocks, pictures, lists, charts, graphs). They interpret and apply information in their work and play (e.g., how many cups are needed if two children are absent).</li> </ul>
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**Evidence of Learning**

<p><b>Suggested Assessments</b> Students learning is documented through anecdotal records and the Children’s Observation Record (COR) <b>Developmental Range:</b> The children will approach each activity at different developmental levels: <b>Earlier:</b></p>	<p><b>Suggested Assessment Evidence</b></p> <p>SAMPLE PERFORMANCE TASK (S):</p> <p><b>Small Group:</b> Bowling and Beanbags (Adapted from Numbers Plus High/Scope Mathematics Curriculum) Children will use counting, comparing and ordering quantity, number operations, and data analysis</p>
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Student requires adult supervision throughout the activity. Student needs to be redirected back to activity several times. For small group activities, student explores materials. For large group activities, student observes others or participates with adult assistance. Student uses little or no language and requires prompts to follow directions.

**Middle:**

Student requires some adult supervision and can do an activity independently for brief periods. Student needs some verbal prompts to be redirected back to the activity. For small group activities, student uses materials in a purposeful way, copies actions of other students, or starts using materials purposely with verbal suggestion from adult. For large group activities, student participates with some verbal prompt from adult or copies actions of other students. Student uses some language to describe, request, suggest, and comment during activities.

**Later:**

Student can independently participate in activities after the adult introduces them. Student needs to be redirected a few times or does not need redirection. For small group activities, student uses materials in purposeful and complex ways. Student is able to assist peers with their materials. For large group activities, student participates independently and offers suggestions during the activity. Student uses sentences to describe what they are doing, ask questions, and participate in conversations.

while playing a game of bowling. They will each be given 2 bean bags, dot-and-numeral cards 0-9, a set of 10 bowling pins (e.g. counting bears) and paper and pencil for recording data. Children will work with a partner, one as a bowler and one as a pinsetter. Each student will take turns bowling two consecutive slides and counting the “pins” they knock down after each slide. They will choose the corresponding dot-and-numeral card after each slide and put the numbers together to see how many bean bags they knock down all together. They will tally and total their results on paper. Encourage the children to write their scores in any way they can. (e.g. tally marks or numerical scores). They will work together as a group and with the teacher to look at their tallies and compare and contrast their results. (e.g. Which number was your biggest? Which number was your lowest? What was your highest score?) The students should demonstrate:

- Counting skills
- Identifying number symbols
- Number sense and operations
- Combining and separating quantities of objects
- Comparing and ordering quantity
- Ability to chart and record results
- Ability to analyze the data they collected (tally chart) to compare and contrast results and draw conclusions
- Working together with a partner

**Large Group:** Musical Shapes (Adapted from Numbers Plus High/Scope Mathematics Curriculum)

Students will identify shapes and follow directions as they listen to musical cues.

Students will play a marching game with shapes. After reviewing names and characteristics of shapes, children will march to the music around the shapes that are spread out on the floor. When the music stops, they will stand on a shape and perform different actions depending on their shape. The activities can include simple directions (e.g. “If you are standing on a circle, wave your hand. If you are standing on a rectangle touch your knees. If you are standing on a triangle, shake your foot.”), spatial directions (e.g. “If you are standing on a circle, take a step forward. If you are standing on a

rectangle, turn around and look behind you.), “not” statements, (e.g. “If you are not on a triangle, clap your hands.), and clues using characteristics of the shapes (e.g. “If you are standing on a shape that’s round like the sun, stand on your toes.”). After a few rounds of teacher modeling, encourage children to take turns suggesting the actions. The students should demonstrate:

- Ability to identify, name, and describe shapes
- Ability to recognize spatial relationships among people and objects
- Ability to follow simple directions
- Ability to follow spatial directions
- Ability to work in a group to play a cooperative game

OTHER EVIDENCE:

- Teacher observations (anecdotal notes) during greeting time, work time, large group time, small group time
- Writing samples
- Journal samples
- COR report
- Drawing and painting samples
- Samples of three-dimensional art
- Pictures of art work or pretend play scenarios

**Learning Activities:**

Suggested Learning Events:

- Message Board
- Planning/Recall Activities
- Work Time
- Puzzles
- Games
- Teacher created materials
- Classroom manipulatives
- Large Group Time
- Small Group Time
- Planning/ recall time: math related activities
- Math transition activities
- Snack time /Meal time conversations
- Children’s literature involving math themes

**Modifications and/or Accommodations:**

- **Special Education:** Utilize a multi-sensory (VAKT) approach during instruction, provide alternate presentations of skills by varying the method (repetition, simple explanations, additional examples, modeling, etc.), modify test content and/or format, allow students to retake test for additional credit, provide additional times and preferential seating as needed, review, restate and repeat directions, provide study guides, and/or break assignments into segments of shorter tasks.
- **English Language Learners:** Extend time requirements, preferred seating, positive reinforcement, check often for understanding/review, oral/visual directions/prompts when necessary, supplemental materials including use of online bilingual dictionary, and modified assessment and/or rubric.
- **Students at Risk of School Failure:** Deliver instruction utilizing varied learning styles including audio, visual, and tactile/kinesthetic, provide individual instruction as needed, modify assessments and/or rubrics, repeat instructions as needed.
- **Gifted Students:** Create an enhanced set of introductory activities, integrate active teaching/learning opportunities, incorporate authentic components, propose interest-based extension activities, and connect student to related talent development opportunities.

**Teacher Resources:**

Numbers Plus High Scope Curriculum Box

- Math in the Preschool Classroom (High/Scope Press)
- Educating Young Children (High/Scope Press)
- Essentials of Active Learning in Preschool (High/Scope Press)
- Small-Group Times to Scaffold Early Learning (High/Scope Press)
- 50 Large-Group Activities for Active Learners (High/Scope Press)
- Lesson Plans for the First 30 Days (High/Scope Press)
- [www.highscope.org](http://www.highscope.org)