

Mathematics

- Number and Operations
- Patterns and Measurement
- Geometry and Spatial Sense

Young children develop number and mathematical concepts through meaningful and active learning experiences that are broader in scope than numerals and counting.

In an inclusive, developmentally appropriate play-based environment, preschool children have opportunities to acquire and understand mathematical skills and concepts using hands-on materials and use of numbers in real-life situations.

Early childhood teachers and caregivers must be flexible during daily routines and try to capture teachable moments using open-ended questioning techniques to expand mathematical concepts. These adults must also plan activities that build upon young children's existing skills based on their curiosity and enthusiasm for the objects in their environment.



Strategies to support inclusive learning environments:

- ❖ Simplify a complicated task by breaking it into smaller parts or reducing the number of steps
- ❖ Use shorter but more frequent activities and routines

Some general accommodations to support children with special learning or developmental needs can be found on page 9 and in Rule 51.

Number and Operations

Widely Held Expectations

- Child develops awareness of numerals
 - Counts up to ten
 - Can judge whether groups of up to five objects each contain the same number of objects
 - Uses one to one matching (correspondence)
 - Distinguishes between numbers and letters
- Child uses language to demonstrate understanding of space and time (next to, on top of, before, after, etc.)
 - Begins to learn sequences of events in time (first, next, last, etc.)
- Child develops an understanding of the counting process
 - Counts in nursery rhymes; counts all types of objects; plays with counting forward or backward

Learning in Action: Examples

The Child

- Compares the quantities of small groups of objects, correctly using words like more/less, some/all
- Recognizes numerals, points to each object when counting, assigning the correct number to it
- Uses words such as yesterday, today, and tomorrow in conversation

The Adult

- Offers counting activities, number puzzles and books
- Provides counting finger plays, books, songs and other activities and materials throughout the daily routine and program
- Provides opportunities for children to pair objects, to count, and to develop and practice using number words
- Uses descriptive words throughout the day such as yesterday, today, tomorrow, before, and after
- Gives children opportunities to practice grouping objects and comparing quantities

THE ENVIRONMENT INCLUDES

- Materials available within the daily routine for sorting and counting
- Objects that include numbers and number words (clocks, timers, calendars, thermometers, calculators, measuring cups, number lines, etc.)

Related Standards

Nebraska K-12 State Standards

Reading/Writing

1.1.2

1.2.1

Science

1.5.2

1.5.3

Mathematics

1.1.1

1.1.2

1.1.3

1.1.4

1.3.5

1.4.1

1.5.3

Nebraska Rule 11 Regulations

004.05A6

004.06C

004.06D

004.06E

Head Start

Outcomes

Framework

3.1.1

3.1.2

3.1.3

3.1.4

3.1.5

3.1.6

Geometry and Spatial Sense

Widely Held Expectations

Related Standards

Nebraska K-12
State Standards
Mathematics
1.1.1
1.1.2
1.4.1
1.4.2
1.5.3
1.5.4
1.6.2
1.6.3

Nebraska Rule 11
Regulations
004.05A3
004.05A6
004.06C
004.06D
004.06E

Head Start
Outcomes
Framework
3.2.1
3.2.2
3.2.3
3.2.4
3.2.5

- Child develops knowledge of geometric principles
 - Learns about shapes
 - Classifies and sorts different shapes
 - Combines different shapes to make representations or patterns
- Child develops spatial sense
 - Uses comparison words correctly
 - Uses words that describe the relative position of things
- Child groups objects together that are the same in some way and gives reasons for groupings

Learning in Action: Examples

The Child

- Recognizes and names simple shapes (circle, square, triangle, etc.) in various sizes and positions
- Uses a pegboard to create geometric shapes with rubber bands
- Uses descriptive words (on, off, on top of, under, in, out, behind, below, above, between, around, through, across, up, down, near, far, next to, etc.)
- Compares the various sizes of unit blocks (longer, shorter, same length) to build math skills

The Adult

- Provides blocks of various shapes and sizes to encourage children to make comparisons
- Gives children opportunities to create designs with pattern blocks; draw, paint and cut shapes in their artwork; return blocks to the shelves by sorting them; and locate shapes in the outdoor environment
- Provides empty boxes, tubes and containers for children to use in creating and constructing

THE ENVIRONMENT INCLUDES

- A variety of materials (purchased, teacher made and items from nature, etc.) for counting, comparing and drawing conclusions about relationships, including blocks and other manipulatives

Patterns and Measurement

Widely Held Expectations

- Child develops knowledge of patterns
 - Begins to recognize duplicates and extends simple patterns using a variety of materials
 - Describes patterns in the environment
- Child develops knowledge of measurement
 - Uses standard and/or non-standard measures
 - Recognizes that different types of measurement can be made (height, length, weight, etc.)

Learning in Action: Examples

The Child

- Sorts buttons, beads or pegs into egg cartons, with each compartment holding a different color or size
- Makes a pattern with interlocking cubes (white, blue, green, white, blue, green, etc.)
- Takes leaves brought in from a class walk and arranges them from biggest to smallest
- Uses measuring tools at workbench or water table

The Adult

- Engages in conversations with children about quantity and comparisons as they interact with materials throughout the day
- Encourages children to begin to predict what comes next in a pattern or sequence of events
- Shows children how to use objects to measure things, "Look, this table is five pencils long."

THE ENVIRONMENT INCLUDES

- Materials of various sizes, colors, textures, and shapes that can be arranged in order as well as sorted and compared (blocks, beads, peg boards, matching games, etc.)
- Measuring cups, scales, rulers, unit blocks, etc.

Related Standards

Nebraska K-12 State Standards Mathematics

- 1.1.1
- 1.1.2
- 1.2.1
- 1.2.2
- 1.3.1
- 1.3.2
- 1.4.1
- 1.5.2
- 1.5.3
- 1.5.4
- 1.6.1
- 1.6.2
- 1.6.3

Nebraska Rule 11 Regulations

- 004.05A3
- 004.05A6
- 004.06C
- 004.06D
- 004.06E

Head Start Outcomes Framework

- 3.3.1
- 3.3.2
- 3.3.3
- 3.3.4

Resources

Children's Mathematical Thinking: A Developmental Framework for Preschool, Primary and Special Education Teachers--Arthur J. Baroody

Counting Caterpillars and Other Math Poems--Betsy Franco

Engaging Young Children in Mathematics: Standards for Early Childhood Mathematics Education--Douglas H. Clements, Julie Sarama and Ann-Marie Dibiase

Graphing Across the Curriculum--Valeriein Williams

Learning Through Play: Math, A Practical Guide--Sandra Waite-Stupiansky

Math for the Very Young: A Handbook of Activities for Parents and Teachers--Lydia Polonsky, Dorothy Freedman, Susan Leshner and Kate Morrison

Math Games and Activities from Around the World--Claudia Zaslavsky

Mathematics in the Early Years--Juanita V. Copley

Number in Preschool and Kindergarten: Educational Implications of Piaget's Theory (NAEYC)--Constance Kamii

Showcasing Mathematics for the Young Child: Activities for Three-, Four-, and Five-Year-Olds--Juanita V. Copley

Spotlight on Young Children and Math--Derry G. Koralek

Early Childhood: Where Learning Begins, Mathematics--Carol Sue Fromboluti

These books and many other resources may be borrowed by Nebraska residents from the Early Childhood Training Center. A web-based search of these media materials is offered at www.esu3.org/ectc or telephone contact may be made by calling 1-402-597-4826 or 1-800-89CHILD.

Books for Children

Anno's Counting Book--Mitsumasa Anno

The Doorbell Rang--Pat Hutchins

Eating Fractions--Bruce McMillan

The Greedy Triangle--Marilyn Burns

How Many, How Many, How Many--Rick Walton

Is a Blue Whale the Biggest Thing There Is?--Robert E. Wells

Moja Means One: Swahili Counting book--Muriel L. Feelings

Over in the Meadow--Ezra Jack Keats

Too Many Tamales--Gary Soto