Building Numeracy in Pre-Kindergarten Students

Children learn through play. Games are a great way to have fun with your child but they are also a great way to build important math skills. Listed below are some games and activities that will help develop math skills and build numeracy – or fluency in mathematics. Numeracy, like literacy, is a skill that needs to be encouraged in children. The following activities will help develop the three foundation skills that help build numeracy. Those pre-skills are:

- 1 to 1 correspondence
- Sequencing
- Visual clustering/subitizing (Subitizing is the ability to 'see' a small amount of objects and know how many there are without counting)

These prerequisite skills help students learn, retain, and master formal concepts, skills, and procedures that they will encounter in mathematics.

Example Activities for building 1-to-1 correspondence:
- Set one napkin for each member of the family at the dinner table
- Count out one potato to peel for each family member
- Count the cans as you place them in a recycle bin
- Play board games like Sorry or Candy Land

Example Activities for building an understanding of sequencing:
- Use words like: first, second, third, next, then, before, after, when, finally, following, etc…
- Have children retell event in the day: (Example: At the zoo today first we saw the elephants and then we saw the zebra… Before we had lunch, we went to the park.)
- Put cards in order from smallest to largest (use cards with or without numbers)

Example Activities for developing visual clustering/subitizing:
- Play Dominos
- Dice games (examples, 2 players each roll a standard die and the person with the higher roll wins a counter.)
- Play card games like War or Go Fish with cards that do not have numbers. (Free download at Ms. Huntress’ webpage)

Please visit http://www.scituate.k12.ma.us/hatherlymath/dhuntress.htm for more information
Pre-Kindergarten

Introduction

The pre-kindergarten standards presented by Massachusetts are guideposts to facilitate young children’s underlying mathematical understanding. The preschool/pre-kindergarten population includes children from the age of 2 years, 9 months until they are kindergarten-eligible. A majority attend programs in diverse settings—community-based early care and education centers, family child care, Head Start, and public preschools. Some children do not attend any formal program.

The Massachusetts pre-kindergarten standards apply to children who are at the end of this age group, meaning older four- and younger five-year olds. The standards—which correspond with the learning activities in the Massachusetts Guidelines for Preschool Learning Experiences (2003)—can be promoted through play and exploration activities, and embedded in almost all daily activities. They should not be limited to “math time.” In this age group, foundations of mathematical understanding are formed out of children’s experiences with real objects and materials.

In preschool or pre-kindergarten, activity time should focus on two critical areas: (1) developing an understanding of whole numbers to 10, including concepts of one-to-one correspondence, counting, cardinality (the number of items in a set), and comparison; and (2) recognizing two-dimensional shapes, describing spatial relationships, and sorting and classifying objects by one or more attributes. Relatively more learning time should be devoted to developing children’s sense of number as quantity than to other mathematics topics.

1. Young children begin counting and quantifying numbers up to 10. They begin with oral counting and recognition of numerals and word names for numbers. Experience with counting naturally leads to quantification. Children count objects and learn that the sizes, shapes, positions, or purposes of objects do not affect the total number of objects in the group. One-to-one correspondence matches each element of one set to an element of another set, providing a foundation for the comparison of groups and the development of comparative language such as more than, less than, and equal to.

2. Young children explore shapes and the relationships among them. They identify the attributes of different shapes, including length, area, and weight, by using vocabulary such as long, short, tall, heavy, light, big, small, wide, narrow. They compare objects using comparative language such as longer/shorter, same length, heavier/lighter. They explore and create 2- and 3-dimensional shapes by using various manipulative and play materials such as popsicle sticks, blocks, pipe cleaners, and pattern blocks. They sort, categorize, and classify objects and identify basic 2-dimensional shapes using the appropriate language.

The Standards for Mathematical Practice complement the content standards so that students increasingly engage with the subject matter as they grow in mathematical maturity and expertise throughout the elementary, middle, and high school years.
Pre-Kindergarten

Overview

Counting and Cardinality
- Know number names and the counting sequence.
- Count to tell the number of objects.
- Compare numbers.

Operations and Algebraic Thinking
- Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.

Measurement and Data
- Describe and compare measurable attributes.
- Classify objects and count the number of objects in each category.
- Work with money.

Geometry
- Identify and describe shapes (squares, circles, triangles, rectangles).
- Analyze, compare, create, and compose shapes.

Massachusetts Curriculum Framework for Mathematics, March 2011

STANDARDS FOR MATHEMATICAL PRACTICE

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for an express regularity in repeated reasoning.
Pre-Kindergarten

Content Standards

Counting and Cardinality

Know number names and the counting sequence.
MA.1. Listen to and say the names of numbers in meaningful contexts.
MA.2. Recognize and name written numerals 0–10.

Count to tell the number of objects.
MA.3. Understand the relationships between numerals and quantities up to ten.

Compare numbers.
MA.4. Count many kinds of concrete objects and actions up to ten, using one-to-one correspondence, and accurately count as many as seven things in a scattered configuration.
MA.5. Use comparative language, such as more/less than, equal to, to compare and describe collections of objects.

Operations and Algebraic Thinking

Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.
MA.1. Use concrete objects to model real-world addition (putting together) and subtraction (taking away) problems up through five.

Measurement and Data

Describe and compare measurable attributes.
MA.1. Recognize the attributes of length, area, weight, and capacity of everyday objects using appropriate vocabulary (e.g., long, short, tall, heavy, light, big, small, wide, narrow).
MA.2. Compare the attributes of length and weight for two objects, including longer/shorter, same length; heavier/lighter, same weight; holds more/less, holds the same amount.

Classify objects and count the number of objects in each category.
MA.3. Sort, categorize, and classify objects by more than one attribute.

Work with money.
MA.4. Recognize that certain objects are coins and that dollars and coins represent money.

Geometry

Identify and describe shapes (squares, circles, triangles, rectangles).
MA.1. Identify relative positions of objects in space, and use appropriate language (e.g., beside, inside, next to, close to, above, below, apart).
MA.2. Identify various two-dimensional shapes using appropriate language.

Analyze, compare, create, and compose shapes.
MA.3. Create and represent three-dimensional shapes (ball/sphere, square box/cube, tube/cylinder) using various manipulative materials (such as popsicle sticks, blocks, pipe cleaners, pattern blocks).
Building Numeracy
Activities That Promote Early Numeracy Skills

How to build number knowledge:

- Make play dough numbers - Make your own playdough recipe together too.

- Point and say numbers as you dial a telephone. Have your child help you push the numbers.

- Play Hide and Go Seek with numbers. Hide numbers around the house and have your child find them. Tell him the name of the number as he brings it to you. When all the numbers are found, put them in order.

- Paint numbers on cement with water or in a sand box or at the beach, make numbers in the sand with a hand, foot or tool.

- Play What's Missing. Place some numbers on a table. Say the name of the numbers. Have your child close his eyes. Remove one number from the pile. See if your child can name the missing number. Take turns removing numbers. Great game for building memory!

- Put a number on each step in a staircase. Say the number as your child climbs the stairs. Have your child repeat the number. Add a few new numbers each time.

- Make cookies, pretzels or bread in number shapes.

- Play card games, board games, and hop scotch.

- Make numbers on sandpaper. Cut them out. Have your child trace the number with his finger.