



Mathematics Standards



In *Principles and Standards for School Mathematics*, the National Council of Teachers of Mathematics (NCTM) sets forth standards in 10 areas that cover a broad range of math skills and understandings—five are identified as process standards and five as content standards.

The Process Standards

Learning mathematics requires action and thinking. NCTM has identified five processes that are especially critical to learning about mathematics: problem solving, reasoning and proof, communicating, making connections, and representing.

Problem Solving

For young children, this includes...

- Using simple approaches to solving mathematical problems: asking for help, counting, trial-and-error, guessing-and-checking

Reasoning and Proof

For young children, this includes...

- Learning to explain how they solved a mathematical problem: describing the steps taken verbally, in a drawing, or with concrete objects

Communicating

For young children, this includes...

- Telling others about their math-related work: using language, pictures or other symbols, or concrete objects
- Beginning to use some math language: numbers, shape names, size words, names of math materials, etc.

Making Connections

For young children, this includes...

- Using math skills in a variety of situations, not just when prompted by an adult
- Linking their own math experiences to those of other people, in real life or in books
- Recalling previous math experiences when engaged in current ones

Representing

For young children, this includes...

- Using simple pictures, graphs, diagrams, or dictated words to represent their mathematical ideas

The Content Standards

Numbers and Operations

For young children, this includes...

- Recognizing and naming some written numerals
- Having a sense of quantity: knowing that the number name “three” and the symbol “3” mean three of something
- Counting: learning the sequence of number names (1, 2, 3)
- Counting objects: learning to count an object only once, using one-to-one correspondence in counting objects and matching groups of objects
- Beginning addition: Adding two groups of concrete objects by counting the total
- Beginning subtraction: Taking away one group of concrete objects from another by taking some away and counting the remainder
- Comparing: understanding ideas such as more than, less than, and the same as and having a general idea that some numbers stand for a lot and some numbers mean a little

Geometry and Spatial Sense

For young children, this includes...

- Matching, sorting, naming, and describing shapes: circles, squares, rectangles, and triangles
- Naming and describing shapes found in everyday environments
- Combining shapes to make new shapes
- Making shape designs that have symmetry and balance
- Understanding and using words that describe where objects are located: over, under, through, above, below, beside, behind, near, far, inside, outside

Patterns, Functions and Algebra

For young children, this includes...

- Identifying, copying, and making simple patterns: sequenced or repeated organization of objects, sounds, or events
- Using patterns to predict what will come next in a sequence
- Recognizing single number patterns such as “one more”
- Noticing, describing, and explaining mathematical changes in quantity, size, temperature, or weight

Measurement

For young children, this includes...

- Understanding and using words referring to quantities: big, little, tall, short, long, a lot, a little, hot, cold, heavy, light
- Understanding and using comparative words: more than, less than, bigger than, smaller than, shorter than, longer than, heavier than, colder than
- Showing an awareness of and interest in measuring: imitating the use of measuring tools and measuring with non-standards units
- Comparing objects such as “Which of these two sticks is longer?”
- Beginning to use measurement words, such as inches, feet, miles, pounds, minutes, and hours in their language

Data Analysis, Statistics and Probability

For young children, this includes...

- Sorting objects to answer questions
- Collecting data to answer a question: keeping track of simple information gathered from a group of people or over a short length of time
- Making lists or basic graphs, with (adult) help, to organize collected data