

NCTM Standards, Focal Points, and TEKS

The National Council of Teachers of Mathematics (NCTM) was the first national organization to suggest national standards for an educational discipline. The Standards were first published in 1989, and revised in 2000. Most states have based their state standards on the NCTM Standards.

The Standards are available both in hard copy and online. You can subscribe free for 120 days at <http://www.nctm.org/standards/content.aspx?id=16909> (scroll to bottom of page). The student e-membership rate is \$39 and includes online access to one of the journals (Teaching Children Mathematics, Mathematics Teaching in the Middle School, or Mathematics Teacher).

The NCTM *Principles & Standards for School Mathematics* address five mathematical strands, five content standards, and six teaching and learning principles:

STRAND	STANDARD	PRINCIPLE
Number & operation	Problem Solving	Equity
Patterns & algebra	Reasoning & Proof	Curriculum
Geometry	Communication	Teaching
Measurement	Connections	Learning
Data analysis & probability	Representation	Assessment
		Technology

NCTM Number and Operations Standard

Instructional programs from prekindergarten through grade 12 should enable all students to understand numbers, ways of representing numbers, relationships among numbers, and number systems.

Pre-K–2 Expectations: In pre-Kindergarten through grade 2 all students should–

- count with understanding and recognize "how many" in sets of objects;
- use multiple models to develop initial understandings of place value and the base-ten number system;
- develop understanding of the relative position and magnitude of whole numbers and of ordinal and cardinal numbers and their connections;
- develop a sense of whole numbers and represent and use them in flexible ways, including relating, composing, and decomposing numbers;
- connect number words and numerals to the quantities they represent, using various physical models and representations;
- understand and represent commonly used fractions, such as $\frac{1}{4}$, $\frac{1}{3}$, and $\frac{1}{2}$.

Grades 3–5 Expectations: In grades 3–5 all students should--

- understand the place-value structure of the base-ten number system and be able to represent and compare whole numbers and decimals;
- recognize equivalent representations for the same number and generate them by decomposing and composing numbers;
- develop understanding of fractions as parts of unit wholes, as parts of a collection, as locations on number lines, and as divisions of whole numbers;
- use models, benchmarks, and equivalent forms to judge the size of fractions;
- recognize and generate equivalent forms of commonly used fractions, decimals, and percents;
- explore numbers less than 0 by extending the number line and through familiar applications;
- describe classes of numbers according to characteristics such as the nature of their factors.

Grades 6–8 Expectations: In grades 6–8 all students should--

- work flexibly with fractions, decimals, and percents to solve problems;
- compare and order fractions, decimals, and percents efficiently and find their approximate locations on a number line;
- develop meaning for percents greater than 100 and less than 1;
- understand and use ratios and proportions to represent quantitative relationships;
- develop an understanding of large numbers and recognize and appropriately use exponential, scientific, and calculator notation;
- use factors, multiples, prime factorization, and relatively prime numbers to solve problems;
- develop meaning for integers and represent and compare quantities with them.

Focal Points & TEKS for Number Concepts

K: Developing knowledge of and applying numbers and number relationships

Students develop and apply understanding of whole number by counting, comparing, and ordering collections and develop meaning for whole number words and symbols. Students select and apply effective strategies to answer questions involving numbers.

1: Developing an understanding of whole-number relationships, including grouping by tens and ones

Students identify, compare, and order whole numbers using a variety of models (for example, concrete objects, hundreds charts, number lines, graphs). Students are introduced to base ten place value and interpret two-digit numbers as groups of tens and ones.

2: Developing an understanding of and proficiency in the use of the base-ten numeration system.

Students use the number line, place value, and properties of numbers to read, write, compare, and order whole numbers. Students create equivalent representations of numbers and compose and decompose multi-digit numbers.

4.1 (A) The student is expected to use place value to read, write, compare, and order whole numbers through 999,999,999.

5.1 (A) The student is expected to use place value to read, write, compare, and order whole numbers through 999,999,999.