

Cliffside Park Public Schools

Number and Operations Standard for Grades Pre-K–2

Expectations

Instructional programs from prekindergarten through grade 12 should enable all students to—	In prekindergarten through grade 2 all students should—
Understand numbers, ways of representing numbers, relationships among numbers, and number systems	<ul style="list-style-type: none"> • 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 $\frac{1}{2}$.
Understand meanings of operations and how they relate to one another	<ul style="list-style-type: none"> • understand various meanings of addition and subtraction of whole numbers and the relationship between the two operations; • understand the effects of adding and subtracting whole numbers; • understand situations that entail multiplication and division, such as equal groupings of objects and sharing equally.
Compute fluently and make reasonable estimates	<ul style="list-style-type: none"> • develop and use strategies for whole-number computations, with a focus on addition and subtraction; • develop fluency with basic number combinations for addition and subtraction; • use a variety of methods and tools to compute, including objects, mental computation, estimation, paper and pencil, and calculators.

Algebra Standard for Grades Pre-K–2

Expectations

Instructional programs from prekindergarten through grade 12 should enable all students to—	In prekindergarten through grade 2 all students should—
Understand patterns, relations, and functions	<ul style="list-style-type: none"> • sort, classify, and order objects by size, number, and other properties; • recognize, describe, and extend patterns such as sequences of sounds and shapes or simple numeric patterns and translate from one representation to another; • analyze how both repeating and growing patterns are generated.
Represent and analyze mathematical situations and structures using algebraic symbols	<ul style="list-style-type: none"> • illustrate general principles and properties of operations, such as commutativity, using specific numbers; • use concrete, pictorial, and verbal representations to develop an understanding of invented and conventional symbolic notations.

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Use mathematical models to represent and understand quantitative relationships	<ul style="list-style-type: none"> • model situations that involve the addition and subtraction of whole numbers, using objects, pictures, and symbols.
Analyze change in various contexts	<ul style="list-style-type: none"> • describe qualitative change, such as a student's growing taller; • describe quantitative change, such as a student's growing two inches in one year.

Geometry Standard for Grades Pre-K–2

Expectations

Instructional programs from prekindergarten through grade 12 should enable all students to—	In prekindergarten through grade 2 all students should—
Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships	<ul style="list-style-type: none"> • recognize, name, build, draw, compare, and sort two- and three-dimensional shapes; • describe attributes and parts of two- and three-dimensional shapes; • investigate and predict the results of putting together and taking apart two- and three-dimensional shapes.
Specify locations and describe spatial relationships using coordinate geometry and other representational systems	<ul style="list-style-type: none"> • describe, name, and interpret relative positions in space and apply ideas about relative position; • describe, name, and interpret direction and distance in navigating space and apply ideas about direction and distance; • find and name locations with simple relationships such as "near to" and in coordinate systems such as maps.
Apply transformations and use symmetry to analyze mathematical situations	<ul style="list-style-type: none"> • recognize and apply slides, flips, and turns; • recognize and create shapes that have symmetry.
Use visualization, spatial reasoning, and geometric modeling to solve problems	<ul style="list-style-type: none"> • create mental images of geometric shapes using spatial memory and spatial visualization; • recognize and represent shapes from different perspectives; • relate ideas in geometry to ideas in number and measurement; • recognize geometric shapes and structures in the environment and specify their location.

Measurement Standard for Grades Pre-K–2

Expectations

Instructional programs from prekindergarten through grade 12 should enable all students to—	In prekindergarten through grade 2 all students should—
Understand measurable attributes of objects and the units, systems, and processes of measurement	<ul style="list-style-type: none"> • recognize the attributes of length, volume, weight, area, and time; • compare and order objects according to these attributes; • understand how to measure using nonstandard and standard units; • select an appropriate unit and tool for the attribute being measured.

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Apply appropriate techniques, tools, and formulas to determine measurements	<ul style="list-style-type: none"> • measure with multiple copies of units of the same size, such as paper clips laid end to end; • use repetition of a single unit to measure something larger than the unit, for instance, measuring the length of a room with a single meterstick; • use tools to measure; • develop common referents for measures to make comparisons and estimates.
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Data Analysis and Probability Standard for Grades Pre-K–2

Expectations

Instructional programs from prekindergarten through grade 12 should enable all students to—	In prekindergarten through grade 2 all students should—
Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them	<ul style="list-style-type: none"> • pose questions and gather data about themselves and their surroundings; • sort and classify objects according to their attributes and organize data about the objects; • represent data using concrete objects, pictures, and graphs.
Select and use appropriate statistical methods to analyze data	<ul style="list-style-type: none"> • describe parts of the data and the set of data as a whole to determine what the data show.
Develop and evaluate inferences and predictions that are based on data	<ul style="list-style-type: none"> • discuss events related to students' experiences as likely or unlikely.
Understand and apply basic concepts of probability	

Problem Solving Standard for Grades Pre-K–2

Instructional programs from prekindergarten through grade 12 should enable all students to—

- build new mathematical knowledge through problem solving;
- solve problems that arise in mathematics and in other contexts;
- apply and adapt a variety of appropriate strategies to solve problems;
- monitor and reflect on the process of mathematical problem solving.

Reasoning and Proof Standard for Grades Pre-K–2

Instructional programs from prekindergarten through grade 12 should enable all students to—

- recognize reasoning and proof as fundamental aspects of mathematics;
- make and investigate mathematical conjectures;

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- develop and evaluate mathematical arguments and proofs;
- select and use various types of reasoning and methods of proof.

Communication Standard for Grades Pre-K–2

Instructional programs from prekindergarten through grade 12 should enable all students to—

- organize and consolidate their mathematical thinking through communication;
- communicate their mathematical thinking coherently and clearly to peers, teachers, and others;
- analyze and evaluate the mathematical thinking and strategies of others;
- use the language of mathematics to express mathematical ideas precisely.

Connections Standard for Grades Pre-K–2

Instructional programs from prekindergarten through grade 12 should enable all students to—

- recognize and use connections among mathematical ideas;
- understand how mathematical ideas interconnect and build on one another to produce a coherent whole;
- recognize and apply mathematics in contexts outside of mathematics.

Representation Standard for Grades Pre-K–2

Instructional programs from prekindergarten through grade 12 should enable all students to—

- create and use representations to organize, record, and communicate mathematical ideas;
- select, apply, and translate among mathematical representations to solve problems;
- use representations to model and interpret physical, social, and mathematical phenomena.

<http://standards.nctm.org/document/chapter4/numb.htm>