

Cliffside Park Public Schools

Number and Operations Standard for Grades 3–5

Expectations

Instructional programs from prekindergarten through grade 12 should enable all students to—	In grades 3–5 all students should—
Understand numbers, ways of representing numbers, relationships among numbers, and number systems	<ul style="list-style-type: none"> • 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.
Understand meanings of operations and how they relate to one another	<ul style="list-style-type: none"> • understand various meanings of multiplication and division; • understand the effects of multiplying and dividing whole numbers; • identify and use relationships between operations, such as division as the inverse of multiplication, to solve problems; • understand and use properties of operations, such as the distributivity of multiplication over addition.
Compute fluently and make reasonable estimates	<ul style="list-style-type: none"> • develop fluency with basic number combinations for multiplication and division and use these combinations to mentally compute related problems, such as 30×50; • develop fluency in adding, subtracting, multiplying, and dividing whole numbers; • develop and use strategies to estimate the results of whole-number computations and to judge the reasonableness of such results; • develop and use strategies to estimate computations involving fractions and decimals in situations relevant to students' experience; • use visual models, benchmarks, and equivalent forms to add and subtract commonly used fractions and decimals; • select appropriate methods and tools for computing with whole numbers from among mental computation, estimation, calculators, and paper and pencil according to the context and nature of the computation and use the selected method or tools.

Geometry Standard for Grades 3–5

Expectations

Instructional programs from prekindergarten through grade 12 should enable all students to—	In grades 3–5 all students should—
Analyze characteristics and properties	<ul style="list-style-type: none"> • identify, compare, and analyze attributes of two- and three-

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<p>of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships</p>	<p>dimensional shapes and develop vocabulary to describe the attributes;</p> <ul style="list-style-type: none"> • classify two- and three-dimensional shapes according to their properties and develop definitions of classes of shapes such as triangles and pyramids; • investigate, describe, and reason about the results of subdividing, combining, and transforming shapes; • explore congruence and similarity; • make and test conjectures about geometric properties and relationships and develop logical arguments to justify conclusions.
<p>Specify locations and describe spatial relationships using coordinate geometry and other representational systems</p>	<ul style="list-style-type: none"> • describe location and movement using common language and geometric vocabulary; • make and use coordinate systems to specify locations and to describe paths; • find the distance between points along horizontal and vertical lines of a coordinate system.
<p>Apply transformations and use symmetry to analyze mathematical situations</p>	<ul style="list-style-type: none"> • predict and describe the results of sliding, flipping, and turning two-dimensional shapes; • describe a motion or a series of motions that will show that two shapes are congruent; • identify and describe line and rotational symmetry in two- and three-dimensional shapes and designs.
<p>Use visualization, spatial reasoning, and geometric modeling to solve problems</p>	<ul style="list-style-type: none"> • build and draw geometric objects; • create and describe mental images of objects, patterns, and paths; • identify and build a three-dimensional object from two-dimensional representations of that object; • identify and draw a two-dimensional representation of a three-dimensional object; • use geometric models to solve problems in other areas of mathematics, such as number and measurement; • recognize geometric ideas and relationships and apply them to other disciplines and to problems that arise in the classroom or in everyday life.

Measurement Standard for Grades 3–5

Expectations

<p>Instructional programs from prekindergarten through grade 12 should enable all students to—</p>	<p>In grades 3–5 all students should—</p>
<p>Understand measurable attributes of objects and the units, systems, and processes of measurement</p>	<ul style="list-style-type: none"> • understand such attributes as length, area, weight, volume, and size of angle and select the appropriate type of unit for measuring each attribute; • understand the need for measuring with standard units and become familiar with standard units in the customary and metric systems; • carry out simple unit conversions, such as from centimeters to meters, within a system of measurement; • understand that measurements are approximations and how differences in units affect precision; • explore what happens to measurements of a two-dimensional shape such as its perimeter and area when the shape is changed in some way.

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<p>Apply appropriate techniques, tools, and formulas to determine measurements</p>	<ul style="list-style-type: none"> • develop strategies for estimating the perimeters, areas, and volumes of irregular shapes; • select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature, and the size of angles; • select and use benchmarks to estimate measurements; • develop, understand, and use formulas to find the area of rectangles and related triangles and parallelograms; • develop strategies to determine the surface areas and volumes of rectangular solids.
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Data Analysis and Probability Standard for Grades 3–5

Expectations

Instructional programs from prekindergarten through grade 12 should enable all students to—	In grades 3–5 all students should—
<p>Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them</p>	<ul style="list-style-type: none"> • design investigations to address a question and consider how data-collection methods affect the nature of the data set; • collect data using observations, surveys, and experiments; • represent data using tables and graphs such as line plots, bar graphs, and line graphs; • recognize the differences in representing categorical and numerical data.
<p>Select and use appropriate statistical methods to analyze data</p>	<ul style="list-style-type: none"> • describe the shape and important features of a set of data and compare related data sets, with an emphasis on how the data are distributed; • use measures of center, focusing on the median, and understand what each does and does not indicate about the data set; • compare different representations of the same data and evaluate how well each representation shows important aspects of the data.
<p>Develop and evaluate inferences and predictions that are based on data</p>	<ul style="list-style-type: none"> • propose and justify conclusions and predictions that are based on data and design studies to further investigate the conclusions or predictions.
<p>Understand and apply basic concepts of probability</p>	<ul style="list-style-type: none"> • describe events as likely or unlikely and discuss the degree of likelihood using such words as <i>certain</i>, <i>equally likely</i>, and <i>impossible</i>; • predict the probability of outcomes of simple experiments and test the predictions; • understand that the measure of the likelihood of an event can be represented by a number from 0 to 1.

Problem Solving Standard for Grades 3–5

<p>Instructional programs from prekindergarten through grade 12 should enable all students to—</p> <ul style="list-style-type: none"> • 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 3–5

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

Communication Standard for Grades 3–5

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 3–5

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 3–5

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/chapter5/rep.htm>