North Carolina Tests of NCEXTEND1 Mathematics

On July 8–11, 2019, a committee of 97 North Carolina educators participated in a multi-phase standard setting for the North Carolina tests of general mathematics in grades 3–8, NC Math 1, and NC Math 3; and for the NCEXTEND1 Mathematics tests in grades 3–8 and NC Math 1. The goal of the workshop was to identify cut scores that divide students into four achievement levels for general mathematics (*Not Proficient* through *Level 4*) and three achievement levels for NCEXTEND1 (*Not Proficient* through *Level 4*).

In August 2019, the State Board of Education (SBE) adopted college-and-career readiness Academic Achievement Standards and Academic Achievement Descriptors for the End-of-Grade (EOG) and End-of-Course (EOC) mathematics tests and their alternate assessments. Effective with the 2018-19 school year, the State will report four levels as follows:

Achievement Level	Meets On-Grade-Level Proficiency Standard	Meets Career-and-College Readiness Standard
Level 4	Yes	Yes
Level 3	Yes	No
Not Proficient	No	No

NCEXTEND1 Math Achievement Level Ranges (Cut Scores)

Test	Grade	Not Proficient	Level 3	Level 4
General Education Mathematics	3	≤ 450	451-463	≥ 464
	4	≤ 450	451-464	≥ 465
	5	≤ 451	452-464	≥ 465
	6	≤ 452	453-463	≥ 464
	7	≤ 449	450-466	≥ 467
	8	≤ 452	453-464	≥ 465
	NC Math 1	≤ 451	452-462	≥ 463

NCEXTEND1 Mathematics Achievement Level Descriptors – Grade 3

Level 4

*Students at Level 4 demonstrate a **thorough** understanding of North Carolina Extended Content Standards and are on track for competitive employment and post-secondary education.*

Level 4 students can:

- Use repeated addition, bar models, and arrays to find a total product when there are repeated equal groups;
- Identify arithmetic patterns;
- Use decade numbers (10, 20, 30) as benchmarks to demonstrate understanding of place value for numbers 0–30;
- Count by tens using models such as objects, base-ten blocks, ten- frames, or money;
- Differentiate a fractional part from a whole;
- Tell time to the hour on a digital clock;
- Measure the length of objects using standard units;
- Use picture or bar graph data to answer questions about data;
- Recognize that perimeter is the distance around a shape;
- Identify the attributes of two-dimensional shapes (circle, square, rectangle, triangle, oval, rhombus).

Level 3

*Students at Level 3 demonstrate **sufficient** understanding of the North Carolina Extended Content Standards, though some support may be needed to engage with content at the next grade/course.*

Level 3 students can:

- Use repeated addition and arrays to find a total product up to 20 when there are repeated equal groups;
- Extend an arithmetic pattern with a difference of 1 or 2;
- Use decade numbers (10, 20) as benchmarks to demonstrate understanding of place value for numbers 0–20;
- Count by tens using models such as objects and base-ten blocks;
- Identify a fractional part;
- Locate and identify the hour digit(s) on a digital clock;
- Measure the length of objects using standard units (1–5 units);
- Identify data from a picture or bar graph;
- Recognize the sides of a shape;
- Recognize an attribute of two-dimensional shapes (circle, square, rectangle, triangle).

Not Proficient

*Students who are Not Proficient demonstrate **inconsistent** understanding of the North Carolina Extended Content Standards and will need significant support.*

Not Proficient students can:

- Use repeated addition up to 10 when there are repeated equal groups;
- Match a given pattern;
- Use 10 as a benchmark to demonstrate understanding of place value for numbers 0–10;
- Recognize sets of ten;
- Identify a whole;
- Locate the hour digit(s) on a digital clock;
- Measure the length of objects using nonstandard units, or measure the length of objects using standard units (1–3 units);
- Recognize a bar graph or a picture graph;
- Recognize rectangles and triangles;
- Identify two-dimensional shapes (circle and rectangle).

NCEXTEND1 Mathematics Achievement Level Descriptors – Grade 4

Level 4

*Students at Level 4 demonstrate a **thorough** understanding of the North Carolina Extended Content Standards and are on track for competitive employment and post-secondary education.*

Level 4 students can:

- Identify the connection between repeated addition and multiplication;
- Solve one-step word problems using addition or subtraction within 20;
- Show one way to arrive at a product;
- Use repeating patterns to make predictions;
- Count up to 100 items;
- Round any whole number 0–30 to the nearest ten;
- Add and subtract two-digit whole numbers;
- Identify models of one-half and one-fourth;
- Represent one-half as one of two parts to make 1 whole;
- Identify the smaller measurement unit that comprises a larger unit within a measurement system (inches/foot, centimeter/meter, minutes/hour);
- Determine the area of a square or rectangle by counting units of measure (unit squares);
- Interpret data from a picture or bar graph;
- Identify angles in geometric shapes;
- Recognize parallel lines and intersecting lines;
- Describe the attributes of two-dimensional shapes;
- Use lines of symmetry to partition shapes into equal areas.

Level 3

*Students at Level 3 demonstrate **sufficient** understanding of the North Carolina Extended Content Standards, though some support may be needed to engage with content at the next grade/course.*

Level 3 students can:

- Identify the connection between repeated addition and multiplication with whole numbers 1–4;
- Solve one-step word problems using addition or subtraction within 10;
- Identify one way to arrive at a product using a model (equal groups);
- Use repeating patterns to determine the next term;
- Count up to 50 items;
- Round any whole number 0–20 to the nearest ten;
- Add and subtract two-digit whole numbers 0–50;
- Identify models of one-half and one-fourth in circles and squares;
- Identify one-half as one of two parts to make 1 whole;
- Identify units that belong to the same measurement system (inches/feet, minutes/hour);
- Determine the square or rectangle that matches a given area by counting units of measure (unit squares);
- Identify data from a picture or bar graph;

- Recognize corners as angles in geometric shapes;
- Recognize parallel lines or intersecting lines;
- Describe the attributes of rectangles and triangles;
- Use lines of symmetry to partition quadrilaterals and circles into equal areas.

Not Proficient

*Students who are Not Proficient demonstrate **inconsistent** understanding of the North Carolina Extended Content Standards and will need significant support.*

Not Proficient students can:

- Recognize a mathematical problem that demonstrates repeated addition or multiplication;
- Solve an addition or subtraction mathematical problem within 10;
- Recognize a product;
- Recognize a repeating pattern;
- Count up to 30 items;
- Round any whole number 0–10 to the nearest ten;
- Add or subtract two-digit whole numbers 0–50;
- Understand the relationship between the denominator and the number of parts in the whole;
- Recognize a whole can be divided into two equal parts;
- Identify tools for each system of measurement;
- Recognize that the area of a square or rectangle is the amount of space (unit squares) it covers;
- Recognize a bar graph or a picture graph;
- Recognize an angle;
- Recognize a line;
- Identify two-dimensional shapes;
- Identify a line of symmetry that partitions shapes into equal areas.

NCEXTEND1 Mathematics Achievement Level Descriptors – Grade 5

Level 4

*Students at Level 4 demonstrate a **thorough** understanding of the North Carolina Extended Content Standards and are on track for competitive employment and post-secondary education.*

Level 4 students can:

- Identify and extend numerical patterns;
- Identify equivalent groupings for quantities up to 99;
- Compare whole numbers up to 100 using symbols (<, >, =);
- Multiply whole numbers up to 5 × 5;
- Use fair and equal shares to solve division problems;
- Identify models of halves, fourths, thirds, and tenths;
- Use standard units to measure weight and length of objects;
- Identify and interpret data on a picture, line plot, or bar graph;
- Determine the volume of a rectangular prism by counting units of measure (unit cubes);
- Use the *x*- and *y*-axes to locate a point or object on a graph;
- Sort two-dimensional figures, and identify the attributes (angles, number of sides, corners) they have in common.

Level 3

*Students at Level 3 demonstrate **sufficient** understanding of the North Carolina Extended Content Standards though some support may be needed to engage with content at the next grade/course.*

Level 3 students can:

- Extend numerical patterns;
- Identify equivalent groupings for quantities up to 50;
- Compare whole numbers up to 50 using symbols (<, >, =);
- Multiply whole numbers up to 3 × 5;
- Use fair and equal shares to solve division problems using visual models;
- Identify models of halves, fourths, and thirds;
- Use standard units to measure weight or length of objects;
- Interpret data on a picture, line plot, or bar graph;
- Determine the volume of a rectangular prism up to 1 × 2 × 3 by counting units of measure (unit cubes);
- Determine the *x*- or *y*-coordinate of a point on a graph;
- Identify the attributes (angles, number of sides, corners) of a two-dimensional figure.

Not Proficient

*Students who are Not Proficient demonstrate **inconsistent** understanding of the North Carolina Extended Content Standards and will need significant support.*

Not Proficient students can:

- Identify numerical patterns;
- Identify equivalent groupings for quantities up to 20;
- Compare whole numbers up to 20 using symbols (<, >, =);
- Multiply whole numbers up to 2 x 5;
- Identify fair and equal shares within division problems using visual models;
- Identify models of halves and fourths;
- Identify the standard unit needed to accurately measure weight or length of objects;
- Identify data on a picture, line plot, or bar graph;
- Recognize volume as an attribute of rectangular prisms;
- Recognize the *x*- and *y*-axes on a coordinate plane;
- Identify two-dimensional shapes.

NCEXTEND1 Mathematics Achievement Level Descriptors – Grade 6

Level 4

*Students at Level 4 demonstrate a **thorough** understanding of the North Carolina Extended Content Standards and are on track for competitive employment and post-secondary education.*

Level 4 students can:

- Demonstrate a ratio relationship with whole numbers, using pictures or numbers;
- Find equivalent ratios by multiplying or dividing the quantities by the same whole number;
- Compare the relationships between two unit fractions;
- Apply the concept of fair share and equal shares to divide;
- Solve two-factor multiplication problems with products up to 50, using concrete objects and using a calculator;
- Use integers to describe real-world context, including zero and negative numbers;
- Identify equivalent number sentences;
- Apply the properties of addition to identify equivalent numerical expressions;
- Identify an equation that represents a real-world problem in which variables are used to represent numbers;
- Solve real-world and mathematical problems about area, using unit squares;
- Display data on a graph or table that shows variability in the data;
- Interpret data distributions shown in graphs or tables.

Level 3

*Students at Level 3 demonstrate **sufficient** understanding of the North Carolina Extended Content Standards though some support may be needed to engage with content at the next grade/course.*

Level 3 students can:

- Interpret a ratio relationship with whole numbers, using pictures or numbers;
- Find equivalent ratios by multiplying the quantities by the same whole number with a multiplication factor of 2, 3, 4, 5, or 10;
- Compare the relationships between two unit fractions with denominators of 2 or 4;
- Identify a number sentence that shows the concept of fair share and equal shares to divide;
- Solve two-factor multiplication problems with products up to 20, using concrete objects and using a calculator;
- Use integers to describe real-world context, include zero;
- Identify equivalent number sentences, limited to the operations of addition or subtraction;
- Identify the properties of addition;
- Identify an equation limited to the operation of addition that represents a real-world problem in which variables are used to represent numbers;
- Solve mathematical problems about area using unit squares;
- Display data on a graph or table, limited to three data points, that shows variability in the data;
- Describe the shape of a data distribution shown in a graph.

Not Proficient

*Students who are Not Proficient demonstrate **inconsistent** understanding of the North Carolina Extended Content Standards and will need significant support.*

Not Proficient students can:

- Identify a ratio relationship with whole numbers using pictures;
- Identify equivalent ratios by multiplying the quantities by the same whole number with a multiplication factor of 2 or 5;
- Compare the relationships between two unit fractions when given a visual model;
- Identify the model that shows the concept of fair share and equal shares to divide;
- Solve two-factor multiplication problems with products up to 12, using concrete objects and using a calculator;
- Identify integers on a given visual model;
- Identify equivalent number sentences limited to addition, using whole numbers;
- Identify equivalent numerical expressions formed, using properties of addition;
- Identify an equation limited to the operation of addition that represents a mathematical problem in which variables are used to represent numbers;
- Find the area of rectangles with side lengths less than 10, using unit squares;
- Recognize variability of data displayed on a graph or table;
- Identify a gap, an outlier, or a peak on a graph.

NCEXTEND1 Mathematics Achievement Level Descriptors – Grade 7

Level 4

*Students at Level 4 demonstrate a **thorough** understanding of the North Carolina Extended Content Standards and are on track for competitive employment and post-secondary education.*

Level 4 students can:

- Compare part-to-whole and part-to-part ratios of two measures of the same type;
- Add fractions with like denominators (halves, thirds, fourths, and tenths) with sums less than or equal to one;
- Solve multiplication problems with products up to 100 using a calculator;
- Solve division problems with divisors up to five and also with a divisor of 10 without remainders;
- Express any remainder as a fraction;
- Solve one-step real-world problems involving decimal numbers to the tenths place;
- Use one of the four operations to determine if expressions are equivalent;
- Identify arithmetic sequences where the difference between two consecutive terms is constant;
- Solve one-step addition and subtraction equations;
- Identify two similar geometric shapes that are proportional in size and in the same orientation;
- Recognize geometric shapes with given conditions;
- Determine the perimeter of a rectangle by adding the measures of the sides;
- Recognize angles that are acute, obtuse, and right;
- Determine the area of a rectangle using the formula for length × width;
- Answer a question related to the collected data from an experiment, given model of data, or from data collected by the student;
- Compare two sets of data within a single data display such as a picture graph, line plot, or bar graph;
- Determine the probability of events occurring as possible or impossible.

Level 3

*Students at Level 3 demonstrate **sufficient** understanding of the North Carolina Extended Content Standards, though some support may be needed to engage with content at the next grade/course.*

Level 3 students can:

- Determine part-to-whole or part-to-part ratios in a mathematical problem using models or numbers;
- Add fractions with like denominators (halves, fourths, and tenths) with sums less than or equal to one;
- Solve multiplication problems with products up to 50 using a calculator;
- Solve division problems with divisors up to five;
- Express any remainder as a whole number;
- Identify the expression needed to solve one-step real-world problems involving decimal numbers to the tenths place;

- Use addition or subtraction to determine if expressions are equivalent;
- Identify arithmetic sequences where the difference between two consecutive terms is 2, 5, or 10;
- Solve one-step addition and subtraction equations with whole numbers less than 10;
- Identify two similar rectangles or triangles that are proportional in size and in the same orientation;
- Recognize quadrilaterals and triangles with given conditions;
- Identify the addition expression that represents the perimeter of a rectangle;
- Recognize angles that are acute and right;
- Recognize the area of a rectangle using the formula for length × width;
- Identify information related to the collected data from an experiment or from data collected by the student;
- Identify characteristics from one set of data when two sets of data are shown within a single data display such as a picture graph, line plot, or bar graph;
- Distinguish between possible and impossible events.

Not Proficient

*Students who are Not Proficient demonstrate **inconsistent** understanding of the North Carolina Extended Content Standards and will need significant support.*

Not Proficient students can:

- Identify a part-to-part ratio in a mathematical problem using models;
- Add fractions with like denominators (halves and tenths) with sums equal to one;
- Solve multiplication problems with products up to 25 using a calculator;
- Solve division problems with divisors of 2;
- Recognize a remainder is present;
- Identify the expression needed to solve one-step mathematical problems involving decimal numbers to the tenths place using a visual model;
- Use addition to identify if expressions are equivalent;
- Identify arithmetic sequences where the difference between two consecutive terms is 10;
- Solve one-step addition equations with whole numbers less than 10;
- Identify two similar rectangles that are proportional in size and in the same orientation;
- Recognize quadrilaterals with given conditions;
- Recognize the formula used to calculate the perimeter of a rectangle;
- Recognize right angles;
- Recognize the formula for the area of a rectangle as length × width;
- Identify relevant data from data collected by the student;
- Identify characteristics of one set of data shown in a data display such as a picture graph, line plot, or bar graph;
- Identify possible and impossible events.

NCEXTEND1 Mathematics Achievement Level Descriptors – Grade 8

Level 4

*Students at Level 4 demonstrate a **thorough** understanding of the North Carolina Extended Content Standards and are on track for competitive employment and post-secondary education.*

Level 4 students can:

- Subtract fractions with like denominators (halves, thirds, fourths, and tenths) with minuends less than or equal to one;
- Express a fraction with a denominator of 100 as a decimal;
- Compare decimal quantities using less than (<), greater than (>), or equal to (=), in real-world examples to the hundredths place;
- Identify the meaning of an exponent (limited to single digits and exponents of 2);
- Compose and decompose whole numbers up to 999;
- Given a table or graph with identified points, determine a ratio that describes the relationship between quantities;
- Solve simple algebraic equations with one variable using addition and subtraction;
- Given a linear function table containing at least 2 complete ordered pairs, identify a missing number that completes another ordered pair (limited to linear functions);
- Determine the values or rule of a function using a graph or a table;
- Describe how a graph represents a relationship between two quantities as increasing or decreasing;
- Identify congruent shapes after transformation (translation, rotation, and reflection);
- Identify similar shapes after dilation (resizing);
- Compare any angle to a right angle, and describe the angle as greater than, less than, or congruent to a right angle;
- Use the formula for volume to solve real-world and mathematical problems (limited to volume of rectangular prisms);
- Identify a graph or table from given categorical data, and compare data categorized in the graph or table.

Level 3

*Students at Level 3 demonstrate **sufficient** understanding of the North Carolina Extended Content Standards though some support may be needed to engage with content at the next grade/course.*

Level 3 students can:

- Subtract fractions with like denominators (halves, fourths, and tenths) with minuends less than or equal to one;
- Express a fraction with a denominator of 10 as a decimal;
- Compare decimal quantities using less than (<), greater than (>), or equal to (=), in mathematical examples to the hundredths place;
- Identify the meaning of an exponent (limited to single digits 1–5 and exponents of 2);
- Compose and decompose whole numbers up to 400;

- Given a table or graph with identified points, identify a ratio that describes the relationship between quantities;
- Solve simple algebraic equations with one variable using addition;
- Given a linear function table containing at least 2 complete ordered pairs, identify a missing whole number that completes another ordered pair (limited to linear functions);
- Determine the values or rule of a function using a table;
- Identify a graph that represents a relationship between two quantities that is increasing or decreasing;
- Identify congruent shapes after a translation or reflection;
- Identify similar shapes after dilation (resizing) with a whole-number scale factor;
- Compare angles that are less than or congruent to a right angle;
- Use the formula for volume to solve mathematical problems (limited to volume of rectangular prisms);
- Compare data categorized in a graph or table.

Not Proficient

*Students who are Not Proficient demonstrate **inconsistent** understanding of the North Carolina Extended Content Standards and will need significant support.*

Not Proficient students can:

- Subtract fractions with like denominators (halves and tenths) with minuends less than or equal to one;
- Recognize the decimal equivalent of a fraction with a denominator of 10;
- Compare decimal quantities using less than (<), greater than (>), or equal to (=), in mathematical examples to the tenths place;
- Identify the meaning of an exponent (limited to single digits 1–3 and exponents of 2);
- Compose and decompose whole numbers up to 50;
- Given a table with identified points, recognize a ratio that describes the relationship between quantities;
- Solve simple algebraic equations with one variable using single-digit addition;
- Given a linear function table containing at least 3 complete ordered pairs, identify a missing whole number that completes another ordered pair (limited to linear functions);
- Identify the values of a function using a table;
- Identify a graph that represents a relationship between two quantities that is increasing;
- Identify congruent shapes after a translation;
- Identify similar rectangles after dilation (resizing) with a whole-number scale factor;
- Identify angles that are greater than or congruent to a right angle;
- Given the formula for volume, solve mathematical problems (limited to volume of rectangular prisms) using whole numbers;
- Compare data categorized in a table.

NCEXTEND1 Mathematics Achievement Level Descriptors – NC Math 1

Level 4

*Students at Level 4 demonstrate a **thorough** understanding of the North Carolina Extended Content Standards and are on track for competitive employment and post-secondary education.*

Level 4 students can:

- Determine the value of a quantity that is squared (up to 20) or cubed (up to 10);
- Identify the different parts of the linear expression (Ax + B) using context;
- Use the properties of operations to determine equivalent expressions;
- Add and subtract quadratic expressions;
- Use equations to solve problems using addition and subtraction with decimals when a part is unknown;
- Solve a three-step linear equation;
- Understand that a graph represents the solutions to an equation. Interpret a point on a graph in context;
- Identify input and output when given a context;
- Evaluate linear functions;
- Use patterns to solve problems (adding and multiplying);
- Given a graph of a linear function, identify the rate of change (slope) and intercepts. Identify whether the line is increasing or decreasing, and whether it has a positive or negative slope;
- Given two points on a line, identify the slope;
- Given a linear function, identify the slope and y-intercept and graph the line;
- Given two graphs of linear functions, compare the rates of change and initial values;
- On a coordinate plane, find the perimeter and area of geometric figures, in which all needed measurements can be counted on the grid;
- Identify geometric figures on the coordinate plane, using estimation and counting;
- Identify and compare attributes of perpendicular lines, parallel lines, and line segments;
- Compare lines on the coordinate plane, to identify parallel lines and recognize that parallel lines have the same slope (rate of change);
- Use coordinates to find the midpoints or endpoints of a line segment, in the first quadrant;
- Given data, identify a simple graph (line, pie, bar, or picture) or table, and interpret the data;
- Interpret general trends on a graph or chart (more, less, increasing, decreasing). Given a graph, table, or word problem, calculate the mean of a given data sets (when the number of data points is fewer than five) and compare the mean;
- Identify general outliers in a data set and explain why they are important to identify.

Level 3

*Students at Level 3 demonstrate **sufficient** understanding of the North Carolina Extended Content Standards though some support may be needed to engage with content at the next grade/course.*

Level 3 students can:

- Determine the value of a quantity that is squared (up to 10) or cubed (up to 3).
- Interpret expressions in terms of a context;
- Identify the different parts of a linear expression ($Ax + B$);
- Apply the commutative and distributive properties to determine equivalent expressions with three terms or fewer;
- Add quadratic expressions with positive and negative terms;
- Use equations to solve problems using addition and subtraction with decimals (tenths place) when a part is unknown;
- Solve a two-step linear equation;
- Interpret a point on a graph in context;
- Distinguish between input and output;
- Evaluate linear functions for whole-number inputs 0–10;
- Use patterns to solve problems (multiplying);
- Given a graph of a linear function, identify the intercepts and whether the line is increasing or decreasing;
- Given two points that are plotted on the graph of a line, with one point being the origin, identify the slope;
- Given a linear function, identify the slope and *y*-intercept;
- Given two graphs of linear functions, compare the rates of change or initial values;
- On a coordinate plane, find the perimeter or area of a rectangle, in which all needed measurements can be counted on the grid;
- Identify geometric figures on the coordinate plane, using estimation or counting, where vertices are in the first quadrant;
- Identify the properties of perpendicular lines, parallel lines, or a line segment;
- Compare lines on a coordinate plane to identify parallel lines;
- Use coordinates to find a missing endpoint of a line segment, given the midpoint and one endpoint, both in the first quadrant;
- Given data, identify a simple graph (line, bar) or table;
- Given a graph, table, or word problem, calculate the means of given data sets (when the number of data points is fewer than five) and compare the means;
- Explain why identifying a data set's outliers is important.

Not Proficient

*Students who are Not Proficient demonstrate **inconsistent** understanding of the North Carolina Extended Content Standards and will need significant support.*

Not Proficient students can:

- Identify the base and exponent of an exponential expression or determine the value of a quantity that is squared (up to 5);
- Recognize variables, coefficients, and constants in monomial expressions;
- Identify the properties of operations that have been used to determine equivalent expressions;
- Add the coefficients of like terms in quadratic expressions with all positive terms;

- Use equations to solve problems using addition with decimals (tenths place) when a part is unknown;
- Solve a one-step linear equation;
- Identify the coordinates of a point on a graph;
- Recognize $f(x)$ function notation;
- Evaluate linear functions for whole-number inputs 0–5;
- Use patterns to solve problems (adding);
- Given a graph of a linear function, determine whether the line is increasing or decreasing;
- Given one first quadrant point plotted on the graph of a line, with one point being the origin, identify the slope;
- Given a linear function, identify the y-intercept;
- Given two graphs of linear functions, identify the rates of change and initial values;
- On a coordinate plane, find the perimeter of a square, in which all needed measurements can be counted on the grid, and where vertices are in the first quadrant;
- Identify geometric figures on the coordinate plane, using counting, where vertices are in the first quadrant;
- Identify the properties of parallel lines;
- Recognize that parallel lines have the same slope;
- Identify the coordinates of the midpoint of a graphed line segment in the first quadrant;
- Given data, identify a simple graph (picture);
- Given a graph or table, calculate the means of given data sets (when the number of data points is fewer than five);
- Identify potential outliers in a data set.