# North Carolina End-of-Grade Tests of Mathematics Grades 3-8

In October 2013, 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) tests and their alternate assessments. After considering much input on the importance of having more definitive discrimination for student achievement reporting, the SBE adopted at its March 2014 meeting a methodology to add a new achievement level. The addition of the new Achievement Level 3 will identify students who are prepared for the next grade, but do not meet the college-and-career readiness standard. An additional level will also enable more accurate identification of students who need additional instruction and assistance. Effective with the 2013-14 school year, the State will report five levels as follows:

| Achievement Level* | Meets On-Grade-Level Proficiency Standard | Meets College-and- Career Readiness Standard |
|---|---|---|
| Level 5 denotes Superior Command of knowledge and skills | Yes | Yes |
| Level 4 denotes Solid Command of knowledge and skills | Yes | Yes |
| Level 3 denotes Sufficient Command of knowledge and skills | Yes | No |
| Level 2 denotes Partial Command of knowledge and skills | No | No |
| Level 1 denotes Limited Command of knowledge and skills | No | No |

*Detailed achievement level descriptors are available on the following pages.

## Math Grades 3-8 Achievement Level Ranges (Cut Scores)

| Subject | Grade | Level 1 | Level 2 | Level 3 | Level 4 | Level 5 |
|---|---|---|---|---|---|---|
| Mathematics (Starting with 2013-14 school year) | 3 | ≤ 439 | 440-447 | 448-450 | 451-459 | ≥ 460 |
| | 4 | ≤ 440 | 441-448 | 449-450 | 451-459 | ≥ 460 |
| | 5 | ≤ 440 | 441-448 | 449-450 | 451-459 | ≥ 460 |
| | 6 | ≤ 443 | 444-450 | 451-452 | 453-460 | ≥ 461 |
| | 7 | ≤ 443 | 444-450 | 451-452 | 453-460 | ≥ 461 |
| | 8 | ≤ 443 | 444-451 | 452-453 | 454-462 | ≥ 463 |

## Mathematics Achievement Level Descriptors—Grade 3

**Achievement Level 1:**
Students performing at this level have **limited command** of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 3 and are likely to need intensive academic support to engage successfully in further studies in this content area.

Level 1 students rarely represent and solve problems involving multiplication and division. They usually do not show evidence that they understand properties of multiplication and the relationship between multiplication and division. They are rarely able to multiply and divide within 100, solve problems involving the four operations, or identify and explain patterns in arithmetic. They are not usually able to use place value understanding and properties of operations to perform multi-digit arithmetic. They are usually unable to recognize and generate equivalent fractions. Level 1 students are rarely successful in solving problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects; representing data; understanding concepts of area; and relating area to multiplication and to addition. They rarely recognize perimeter as an attribute of plane figures or distinguish between linear and area measures. They do not demonstrate reasoning about shapes and their attributes.

**Achievement Level 2:**
Students performing at this level have partial command of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 3 and are likely to need additional academic support to engage successfully in further studies in this content area.

Level 2 students sometimes represent and solve problems involving multiplication and division. They do show some evidence that they understand properties of multiplication and the relationship between multiplication and division. They are inconsistent when multiplying and dividing within 100, solving problems involving the four operations, and identifying and explaining patterns in arithmetic. They are sometimes able to use place value understanding and properties of operations to perform multi-digit arithmetic. They are seldom able to recognize and generate equivalent fractions. Level 2 students are inconsistent in solving problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects; representing data; understanding concepts of area; and relating area to multiplication and to addition. They sometimes recognize perimeter as an attribute of plane figures and distinguish between linear and area measures. They show some evidence of reasoning about shapes and their attributes.

**Achievement Level 3:**
Students performing at this level have a **sufficient command** of grade-level knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 3, but they may need academic support to engage successfully in this content area in the next grade level. They are prepared for the next grade level but are not yet on track for college-and-career readiness without additional academic support.

**Achievement Level 4:**
Students performing at this level have solid command of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 3 and are academically prepared to engage successfully in further studies in this content area.

Level 4 students typically understand how to represent and solve problems involving multiplication and division. They demonstrate a strong understanding of properties of multiplication and the relationship between multiplication and division. They are usually able to multiply and divide within 100, solve problems involving the four operations, and identify and explain patterns in arithmetic. They are typically able to use place value understanding and properties of operations to perform multi-digit arithmetic. They are also typically able to recognize and generate equivalent fractions. Level 4 students generally solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects; represent data; understand concepts of area; and relate area to multiplication and to addition. They usually recognize perimeter as an attribute of plane figures and distinguish between linear and area measures. They demonstrate sound reasoning about shapes and their attributes.

**Achievement Level 5:**
Students performing at this level have superior command of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 3 and are academically well prepared to engage successfully in further studies in this content area.

Level 5 students consistently understand how to represent and solve problems involving multiplication and division. They demonstrate an excellent understanding of properties of multiplication and the relationship between multiplication and division. They are able to multiply and divide within 100, solve problems involving the four operations, and identify and explain patterns in arithmetic. They can consistently use place value understanding and properties of operations to perform multi-digit arithmetic. They are able to recognize and generate equivalent fractions. Level 5 students can solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects; represent data; understand concepts of area; and relate area to multiplication and to addition. They recognize perimeter as an attribute of plane figures and distinguish between linear and area measures. They demonstrate strong reasoning about shapes and their attributes.

## Mathematics Achievement Level Descriptors—Grade 4

**Achievement Level 1:**
Students performing at this level have **limited command** of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 4 and are likely to need intensive academic support to engage successfully in further studies in this content area.

Level 1 students rarely use the four operations with whole numbers to solve problems, show familiarity with factors and multiples, or generate and analyze patterns. They seldom generalize place value understanding for multi-digit whole numbers, or use place value understanding and

properties of operations to perform multi-digit arithmetic. They are usually unable to extend understanding of fraction equivalence and ordering. They have difficulty with building fractions from unit fractions by applying and extending previous understandings of operations on whole numbers. They rarely understand decimal notation for fractions, and compare decimal fractions. Level 1 students seldom solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit. They have difficulty in representing and interpreting data. They lack understanding of the concepts of angle and measuring angles. They are rarely able to draw and identify lines and angles and to classify shapes by properties of their lines and angles.

**Achievement Level 2:**
Students performing at this level have **partial command** of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 4 and are likely to need additional academic support to engage successfully in further studies in this content area.

Level 2 students show some evidence of using the four operations with whole numbers to solve problems, show familiarity with factors and multiples, or generate and analyze patterns. They sometimes generalize place value understanding for multi-digit whole numbers or use place value understanding and properties of operations to perform multi-digit arithmetic. They seldom extend understanding of fraction equivalence and ordering. They inconsistently build fractions from unit fractions by applying and extending their previous understandings of operations on whole numbers. They sometimes understand decimal notation for fractions and compare decimal fractions. Level 2 students sporadically solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit. They inconsistently represent and interpret data. They demonstrate an emerging understanding of the concepts of angles and measuring angles. They are sometimes able to draw and identify lines and angles and to classify shapes by properties of their lines and angles.

**Achievement Level 3:**
Students performing at this level have a **sufficient command** of grade-level knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 4, but they may need academic support to engage successfully in this content area in the next grade level. They are prepared for the next grade level but are not yet on track for college-and-career readiness without additional academic support.

**Achievement Level 4:**
Students performing at this level have **solid command** of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 4 and are academically prepared to engage successfully in further studies in this content area.

Level 4 students typically show strong evidence of using the four operations with whole numbers to solve problems, show familiarity with factors and multiples, and generate and analyze patterns. They usually generalize place value understanding for multi-digit whole numbers or use place value understanding and properties of operations to perform multi-digit arithmetic. They frequently extend understanding of fraction equivalence and ordering. They are usually able to

build fractions from unit fractions by applying and extending their previous understanding of operations on whole numbers. They can usually understand decimal notation for fractions and compare decimal fractions. Level 4 students typically solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit. They are mostly able to represent and interpret data. They demonstrate a sound understanding of the concepts of angles and measuring angles. They are usually able to draw and identify lines and angles and to classify shapes by properties of their lines and angles.

**Achievement Level 5:**
Students performing at this level have **superior command** of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 4 and are academically well-prepared to engage successfully in further studies in this content area.

Level 5 students have a high level of success in using the four operations with whole numbers to solve problems; show familiarity with factors and multiples; and generate and analyze patterns. They can consistently generalize place value understanding for multi-digit whole numbers and use place value understanding and properties of operations to perform multi-digit arithmetic. Students at level 5 are able to extend understanding of fraction equivalence and ordering. They can build fractions from unit fractions by applying and extending their previous understandings of operations on whole numbers. They can understand decimal notation for fractions and compare decimal fractions. Level 5 students regularly solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit. They are able to represent and interpret data. They demonstrate a strong understanding of the concepts of angles and measuring angles. They consistently draw and identify lines and angles and classify shapes by properties of their lines and angles.

## Mathematics Achievement Level Descriptors—Grade 5

**Achievement Level 1:**
Students performing at this level have **limited command** of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 5 and are likely to need intensive academic support to engage successfully in further studies in this content area.

Level 1 students can rarely write and interpret numerical expressions or analyze patterns and relationships. They are usually not able to understand the place value system or perform operations with multi-digit whole numbers and decimals to hundredths. Students at level 1 rarely use equivalent fractions as a strategy to add and subtract fractions. They usually do not apply and extend their previous understanding of multiplication and division to multiply and divide fractions. They can rarely convert like measurement units within a given measurement system or correctly represent and interpret data. Level 1 students can rarely graph points on the coordinate plane to solve real-world and mathematical problems. They demonstrate little understanding of the concepts of volume or relating volume to multiplication and addition.

**Achievement Level 2:**
Students performing at this level have **partial command** of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 5 and are likely to need additional academic support to engage successfully in further studies in this content area.

Level 2 students inconsistently write and interpret numerical expressions or analyze patterns and relationships. They sometimes understand the place value system or perform operations with multi-digit whole numbers and decimals to hundredths. Students at level 2 seldom use equivalent fractions as a strategy to add and subtract fractions. They show some evidence that they apply and extend their previous understanding of multiplication and division to multiply and divide fractions. They can sometimes convert like measurement units within a given measurement system as well as correctly represent and interpret data. Level 2 students can sometimes graph points on the coordinate plane to solve real-world and mathematical problems. They demonstrate emerging understanding of the concepts of volume and relating volume to multiplication and addition.

**Achievement Level 3:**
Students performing at this level have a **sufficient command** of grade-level knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 5, but they may need academic support to engage successfully in this content area in the next grade level. They are prepared for the next grade level but are not yet on track for college-and-career readiness without additional academic support.

**Achievement Level 4:**
Students performing at this level have **solid command** of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 5 and are academically prepared to engage successfully in further studies in this content area.

Level 4 students can typically write and interpret numerical expressions or analyze patterns and relationships. They usually understand the place value system and perform operations with multi-digit whole numbers and decimals to hundredths. Students at level 4 often use equivalent fractions as a strategy to add and subtract fractions. They show evidence that they can apply and extend their previous understanding of multiplication and division to multiply and divide fractions. They can typically convert like measurement units within a given measurement system as well as correctly represent and interpret data. Level 4 students can usually graph points on the coordinate plane to solve real-world and mathematical problems. They demonstrate a sound understanding of the concepts of volume and relating volume to multiplication and addition.

**Achievement Level 5:**
Students performing at this level have **superior command** of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 5 and are academically well-prepared to engage successfully in further studies in this content area.

Level 5 students can consistently write and interpret numerical expressions or analyze patterns and relationships. They understand the place value system and perform operations with multi-

digit whole numbers and decimals to hundredths. Students at level 5 consistently use equivalent fractions as a strategy to add and subtract fractions. They show strong evidence that they can apply and extend their previous understanding of multiplication and division to multiply and divide fractions. They are able to convert like measurement units within a given measurement system as well as correctly represent and interpret data. Level 5 students can consistently graph points on the coordinate plane to solve real-world and mathematical problems. They demonstrate a strong understanding of the concepts of volume and relating volume to multiplication and addition.

## Mathematics Achievement Level Descriptors—Grade 6

**Achievement Level 1:**
Students performing at this level have **limited command** of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 6 and will need academic support to engage successfully in further studies in this content area.

Level 1 students rarely show understanding and application of the skills needed to divide fractions or to find common multiples and the greatest common factor (GCF). In geometry, they are usually unable to understand and solve real-world and mathematical problems involving surface area and volume. These students usually do not show evidence that they can evaluate numerical or algebraic expressions, solve equations or inequalities, or interpret the relationship between dependent and independent variables. Level 1 students rarely show understanding and ability to apply ratios and unit rates. They are usually unable to solve problems involving percents. Students seldom show understanding of statistical variability related to the center, spread, and shape of a distribution of data.

**Achievement Level 2:**
Students performing at this level have **partial command** of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 6 and are likely to need academic support to engage successfully in further studies in this content area.

Level 2 students show limited understanding and application of the skills needed to divide fractions or to find common multiples and the greatest common factor (GCF). In geometry, they sometimes understand and solve real-world and mathematical problems involving surface area and volume. These students show some evidence that they can evaluate numerical or algebraic expressions, solve equations or inequalities, or interpret the relationship between dependent and independent variables. Level 2 students sometimes show understanding and ability to apply ratios and unit rates. They can sometimes solve problems involving percents. Students have limited understanding of statistical variability related to the center, spread, and shape of a distribution of data.

**Achievement Level 3:**
Students performing at this level have a **sufficient command** of grade-level knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at

grade 6, but they may need academic support to engage successfully in this content area in the next grade level. They are prepared for the next grade level but are not yet on track for college-and-career readiness without additional academic support.

**Achievement Level 4:**
Students performing at this level have **solid command** of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 6 and are academically prepared to engage successfully in further studies in this content area.

Level 4 students typically understand and apply the skills needed to divide fractions and to find common multiples and the greatest common factor (GCF). In geometry, they usually understand and solve real-world and mathematical problems involving surface area and volume. These students are usually able to evaluate numerical or algebraic expressions, solve equations or inequalities, and interpret the relationship between dependent and independent variables. Level 4 students typically understand and can apply ratios and unit rates. They can solve problems involving percents. Students typically understand statistical variability related to the center, spread, and shape of a distribution of data.

**Achievement Level 5:**
Students performing at this level have **superior command** of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 6 and are academically well-prepared to engage successfully in further studies in this content area.

Level 5 students have a high level of success with understanding and applying the skills needed to divide fractions and to find common multiples and the greatest common factor (GCF). In geometry, they consistently understand and solve real-world and mathematical problems involving surface area and volume. These students are able to evaluate numerical or algebraic expressions, solve equations or inequalities, and interpret the relationship between dependent and independent variables. Level 5 students consistently understand and can apply ratios and unit rates. They can solve problems involving percents. Students show strong understanding of statistical variability related to the center, spread, and shape of a distribution of data.

## Mathematics Achievement Level Descriptors—Grade 7

**Achievement Level 1:**
Students performing at this level have **limited command** of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 7 and will need academic support to engage successfully in further studies in this content area.

Level 1 students rarely show understanding and application of the skills needed to use proportional relationships in mathematical problems. They have difficulty computing operations with fractions to add, subtract, multiply, and divide all types of rational numbers. Students at Level 1 are rarely able to solve mathematical problems with expressions and equations. In geometry, they are usually unable to effectively solve real-world and mathematical problems

involving angle measure, area, surface area, and volume. Level 1 students rarely show understanding and ability to draw inferences about a population using random sampling. Students seldom show understanding of chance processes including the development and use of probability models.

**Achievement Level 2:**
Students performing at this level have **partial command** of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 7 and are likely to need academic support to engage successfully in further studies in this content area.

Level 2 students show limited understanding and application of the skills needed to use proportional relationships in mathematical problems. They have some difficulty computing operations with fractions to add, subtract, multiply, and divide all types of rational numbers. Students at Level 2 are sometimes able to solve real-world and mathematical problems with expressions and equations. In geometry, they sometimes understand and solve mathematical problems involving angle measure, area, surface area, and volume. Level 2 students sometimes show understanding and ability to draw inferences about a population using random sampling. Students have limited understanding of chance processes including the development and use of probability models.

**Achievement Level 3:**
Students performing at this level have a **sufficient command** of grade-level knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 7, but they may need academic support to engage successfully in this content area in the next grade level. They are prepared for the next grade level but are not yet on track for college-and-career readiness without additional academic support.

**Achievement Level 4:**
Students performing at this level have **solid command** of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 7 and are academically prepared to engage successfully in further studies in this content area.

Level 4 students typically understand and apply the skills needed to analyze proportional relationships in real-world and mathematical problems. They have little difficulty computing operations with fractions to add, subtract, multiply, and divide all types of rational numbers. Students at Level 4 can often solve real-world and mathematical problems with expressions and equations. In geometry, they usually understand and solve real-world problems involving angle measure, area, surface area, and volume. Level 4 students typically understand and draw inferences about a population using random sampling. Students typically understand chance processes including the development, use, and evaluation of probability models.

**Achievement Level 5:**
Students performing at this level have **superior command** of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 7 and are academically well-prepared to engage successfully in further studies in this content area.

Level 5 students have a high level of success with understanding and application of the skills needed to analyze proportional relationships in real-world and mathematical problems. They have no difficulty computing operations with fractions to add, subtract, multiply, and divide all types of rational numbers. Students at Level 5 are able to solve real-world and mathematical problems with expressions and equations. In geometry, they consistently understand and solve real-world and mathematical problems involving angle measure, area, surface area, and volume. Level 5 students consistently understand and draw inferences about a population using random sampling. Students show strong understanding of chance processes including the development, use, and evaluation of probability models.

## Mathematics Achievement Level Descriptors—Grade 8

**Achievement Level 1:**
Students performing at this level have **limited command** of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 8 and will need academic support to engage successfully in further studies in this content area.

Level 1 students can seldom identify numbers as being rational or irrational. In geometry, they are usually unable to understand and solve real-world and mathematical problems involving angles, similarity, congruence, and the Pythagorean Theorem. These students usually do not show evidence that they are able to perform and apply operations with radicals, integer exponents, and scientific notation; solve linear equations or pairs of simultaneous equations; or graph, compare, and interpret proportional relationships and linear equations. Level 1 students rarely show understanding and ability to describe, compare, evaluate, and analyze functions to model relationships between quantities. They are seldom able to compare and predict patterns of association in bivariate data.

**Achievement Level 2:**
Students performing at this level have **partial command** of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 8 and are likely to need academic support to engage successfully in further studies in this content area.

Level 2 students can sometimes distinguish between rational and irrational numbers but struggle to evaluate irrational numbers using rational approximations. In geometry, they sometimes solve real-world and mathematical problems involving angles, similarity, congruence, and the Pythagorean Theorem. These students show some evidence that they are able to perform and apply operations with radicals, integer exponents, and scientific notation; solve linear equations or pairs of simultaneous equations; or graph, compare, and interpret proportional relationships and linear equations. Level 2 students can sometimes describe, compare, evaluate, and analyze functions to model relationships between quantities. They have limited ability to compare and predict patterns of association in bivariate data.

**Achievement Level 3:**
Students performing at this level have a **sufficient command** of grade-level knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 8, but they may need academic support to engage successfully in this content area in the next grade level. They are prepared for the next grade level but are not yet on track for college-and-career readiness without additional academic support.

**Achievement Level 4:**
Students performing at this level have **solid command** of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 8 and are academically prepared to engage successfully in further studies in this content area.

Level 4 students can identify numbers as being rational or irrational and consistently evaluate irrational numbers using rational approximations. In geometry, they understand and solve real-world and mathematical problems involving angles, similarity, congruence, and the Pythagorean Theorem. These students are usually able to perform and apply operations with radicals, integer exponents, and scientific notation; solve linear equations or pairs of simultaneous equations; and graph, compare, and interpret proportional relationships and linear equations. Level 4 students typically can describe, compare, evaluate, and analyze functions to model relationships between quantities. They are usually able to compare and predict patterns of association in bivariate data.

**Achievement Level 5:**
Students performing at this level have **superior command** of the knowledge and skills contained in the *Common Core State Standards* (*CCSS*) for Mathematics assessed at grade 8 and are academically well-prepared to engage successfully in further studies in this content area.

Level 5 students can almost always identify numbers as being rational or irrational and can use rational approximations to compare and order irrational numbers. In geometry, they show strong understanding and solve real-world and mathematical problems involving angles, similarity, congruence, and the Pythagorean Theorem. These students are able to perform and apply operations with radicals, integer exponents, and scientific notation; solve linear equations or pairs of simultaneous equations; and graph, compare, and interpret proportional relationships and linear equations. Level 5 students consistently can describe, compare, evaluate, and analyze functions to model relationships between quantities. They are consistently correct when comparing and predicting patterns of association in bivariate data.