

# North Carolina End-of-Grade Test—Grade 4 Mathematics

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| <p>What are the purposes of the NC Testing Program?</p> | <p>The North Carolina End-of-Grade tests are designed to measure student performance on the competencies specified in the goals and objectives of the North Carolina <i>Standard Course of Study</i> (SCS).</p> <p>The North Carolina End-of-Grade Tests are required by General Statute 115C.174.10 as a component of the North Carolina Annual Testing Program. As stated, the purposes of North Carolina state-mandated tests are “(i) to assure that all high school graduates possess those minimum skills and that knowledge thought necessary to function as a member of society, (ii) to provide a means of identifying strengths and weaknesses in the education process in order to improve instructional delivery, and (iii) to establish additional means for making the education system at the state, local, and school levels accountable to the public for results.”</p> <p>This test is one component of the end-of-grade tests, which include reading comprehension and mathematics tests in grades three through eight. (Students in grade three began taking a reading comprehension and mathematics pretest in the fall of 1996.) The scores from the end-of-grade tests are used to obtain a growth indicator used for school, school system, and state accountability purposes.</p> <p>North Carolina public school students in grades 3, 5, and 8 are required to meet statewide standards (gateways) for promotion in addition to local promotion requirements. The EOG mathematics test is one part of each gateway. Students must demonstrate grade-level proficiency by scoring at or above Achievement Level III on the test. (<a href="#">See Policy HSP-N-003.</a>) For students who do not meet gateway requirements, the student accountability standards include procedures (safeguards) for re-testing, as well as a formal review process. (See <a href="#">Policy HSP-N-005.</a>)</p> |
| <p>What is measured by the test?</p>                    | <p>The North Carolina End-of-Grade (EOG) Grade 4 test in mathematics assesses the fourth-grade goals and objectives in the North Carolina Mathematics Standard Course of Study adopted in March 2003. During the test administration, students are expected to demonstrate knowledge of important principles and concepts and relate mathematical information to everyday situations. In order to align with the mathematics curriculum’s focus on inquiry instruction and higher-order thinking, the EOG Grade 4 test in mathematics has a substantial focus on processing information and higher-order thinking.</p> <p>Each item on the EOG Grade 4 test in mathematics is related to one of the fourth-grade competency goals in the North Carolina Mathematics Standard Course of Study. The five competency goals for the grade 4 mathematics curriculum describe the knowledge and skills that are to be taught in all fourth-grade classes in North Carolina and provide the basis for the content of the items on the EOG test. Many of the items on the EOG Grade 4 test in mathematics assess whether a student can move beyond memorization and apply process skills to the investigation of mathematics.</p> <p>Table 1 on the next page provides some descriptive information about the test.</p>  |

Table 1. Descriptive Information for the North Carolina End-of-Grade Test—Grade 4 Mathematics

| Goal                             | Description of Goal   | Percentage of Questions on Test* |
|----------------------------------|---|----------------------------------|
| 1: Number and Operations         | <b>The learner will read, write, model, and compute with non-negative rational numbers.</b> | 35-40%                           |
| 2: Measurement                   | <b>The learner will understand and use perimeter and area.</b>                              | 10-12%                           |
| 3: Geometry                      | <b>The learner will recognize and use geometric properties and relationships.</b>           | 10-12%                           |
| 4: Data Analysis and Probability | <b>The learner will understand and use graphs, probability, and data analysis.</b>          | 15-18%                           |
| 5: Algebra                       | <b>The learner will demonstrate an understanding of mathematical relationships.</b>         | 20-25%                           |

\*All questions on the test have the same weight. Therefore, the percentage of questions on the test is also the relative weight of that goal in a student's score.

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| How is the test administered? | <p>The test is administered within the last three weeks of the school year. The EOG Grade 4 test in mathematics consists of 82 multiple-choice questions and is administered in two parts: Calculator Active (54 questions) and Calculator Inactive (28 questions). Students may use calculators during the Calculator Active part of the test. Students may not use calculators during the Calculator Inactive part of the test. The calculator active part is administered prior to the calculator inactive part.</p> <p>To best allow students to demonstrate higher-order learning, the EOG mathematics tests are designed as power tests rather than as speeded tests. As such, the tests are untimed. <a href="#">Test administration time estimates</a> are provided for scheduling, based on the time needed for the vast majority of students to complete the tests during the field test administration. At the school level, provisions are to be made for those students who, in order to have ample time to complete the mathematics tests, will need time beyond that scheduled.</p> |
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|                             | <p>Several equivalent test forms are administered in each classroom to provide a greater breadth of information for curriculum evaluation and planning. For each test form, most of the items are scored for accountability and reporting purposes. The other items are experimental items included for field testing or for research purposes. These experimental items are not included in any reporting or in any accountability decisions, whether at the student, classroom, school, or school district level. In addition, the experimental items are not counted for determinations of Adequate Yearly Progress (AYP) under the federal No Child Left Behind (NCLB) Act.</p> <p>No rulers or protractors are required or permitted during the administration of the 2003-SCS-aligned EOG Mathematics tests. End-of-grade graph paper will be provided, as done during past EOG test administrations.</p> <p>No formula sheets are required or provided for the 2003-SCS-aligned EOG Mathematics tests. Information on the formulas from the measurement and geometry strands of the SCS that students are expected to know is provided in the document <b>Required Formulas for the EOG Math Tests</b> (published January 2006). This document is available at <a href="http://www.ncpublicschools.org/accountability/testing/eog/math/">http://www.ncpublicschools.org/accountability/testing/eog/math/</a></p> |
| How was the test developed? | <p>NCDPI Test Development staff, other NCDPI staff, classroom teachers, and other professionals were involved in the development and review of the items and test forms. The questions on the EOG Grade 4 test of mathematics were written and reviewed in 2003 through 2005. The items were field tested statewide in Spring 2005. Each field test item was administered to approximately 2,000 students. For further information on the stages of the North Carolina test development process, see the following web site: <a href="http://www.ncpublicschools.org/accountability/testing/shared/testdevprocess">www.ncpublicschools.org/accountability/testing/shared/testdevprocess</a> .</p> <p>The Mathematics EOG Grade 4 tests aligned to the North Carolina Mathematics Standard Course of Study (adopted in March 2003) will be implemented statewide for the first time in the spring of the 2005-2006 school year.</p>  |

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| What kinds of test scores do students receive? | <p>Students receive scale scores, percentile scores, and achievement level results. The scores on the end-of-grade tests in mathematics are reported on a developmental scale, which allows the measurement of growth in achievement across the grade levels. The scale will be defined in the summer and fall of 2006. The use of scale scores provides for easier and more consistent interpretations of the results from test to test. Achievement levels are used to provide an interpretation of student performance relative to pre-determined standards based on ranges of scale scores. Percentile scores show student performance relative to students who took the test during the first year the tests were administered.</p> <p>For further details, please refer to the assessment brief on scale scores mentioned on the last page of this document. Descriptions of each achievement level appear in Table 2 on the following page.</p> |
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**The paragraph to the right is common to each achievement level in Table 2 below.**

In grade four, students develop number sense for rational numbers 0.01 through 99,999. They develop fluency with multiplication and division using multi-digit numbers. Fourth graders add and subtract rational numbers (halves, fourths, eighths, thirds, sixths, twelfths, fifths, tenths, hundredths, and mixed numbers) with like denominators. Students solve problems involving the perimeter of plane figures and the area of rectangles. In fourth grade, students identify, predict, and describe the results of transformations of plane figures. They collect, organize, analyze, and display data using a variety of graphs. Students use range, median, and mode to describe a set of data. Fourth graders design and use simple experiments to investigate, discuss, and describe the probability of an event. Students use symbols to represent simple proportional relationships and solve problems. They use the order of operations to verify and translate mathematical relationships with symbols, words, numbers, and pictures. Fourth-graders apply these concepts as well as those developed in previous years.

Table 2. Achievement Levels for North Carolina End of Grade Test—Grade 4 Mathematics

| Level | Description   | Scale Score Range                  |
|-------|---|------------------------------------|
| 1     | <p><b>Achievement Level I:</b><br/>Students performing at this level do not have sufficient mastery of knowledge and skills in this subject area to be successful at the next grade level.</p> <p>Students performing at Achievement Level I show minimal conceptual understanding and computational accuracy and often respond with inappropriate answers or procedures. They rarely use problem-solving strategies.</p>   | to be determined<br>September 2006 |
| 2     | <p><b>Achievement Level II:</b><br/>Students performing at this level demonstrate inconsistent mastery of knowledge and skills in this subject area and are minimally prepared to be successful at the next grade level.</p> <p>Students performing at Achievement Level II typically show some evidence of conceptual understanding and computational accuracy and sometimes respond with appropriate answers or procedures. They demonstrate limited use of problem-solving strategies.</p> | to be determined<br>September 2006 |
| 3     | <p><b>Achievement Level III:</b><br/>Students performing at this level consistently demonstrate mastery of grade level subject matter and skills and are well prepared for the next grade level.</p> <p>Students performing at Achievement Level III generally show conceptual understanding, compute accurately, and respond with appropriate answers or procedures. They use a variety of problem-solving strategies.</p>   | to be determined<br>September 2006 |
| 4     | <p><b>Achievement Level IV:</b><br/>Students performing at this level consistently perform in a superior manner clearly beyond that required to be proficient at grade level work.</p> <p>Students performing at Achievement Level IV commonly show a high level of conceptual understanding, compute accurately, and respond consistently with appropriate answers or procedures. They demonstrate flexibility by using a variety of problem-solving strategies.</p>                         | to be determined<br>September 2006 |

**For Further Information:**

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| Sample Items                                  | Sample items aligned with the 2003 Mathematics Standard Course of Study are available at the following web site.<br><br><a href="http://www.ncpublicschools.org/accountability/testing/eog/math/">http://www.ncpublicschools.org/accountability/testing/eog/math/</a>  |
| Assessment Briefs                             | The assessment briefs posted at this site include calculator use policies and a description of the thinking skills taxonomy used to classify test items. A brief document that describes the standard setting process used for determining scale scores and documents that give the ranges of scale scores corresponding to each achievement level will be available in the fall of 2006.<br><br><a href="http://www.ncpublicschools.org/accountability/policies/briefs/">http://www.ncpublicschools.org/accountability/policies/briefs/</a> |
| Mathematics Curriculum                        | <a href="http://www.ncpublicschools.org/curriculum/mathematics/scos/">http://www.ncpublicschools.org/curriculum/mathematics/scos/</a>  |
| Accommodations for Students with Disabilities | See especially Section D of <a href="#">Testing Students with Disabilities</a><br><br><a href="http://www.ncpublicschools.org/docs/accountability/testing/alternate/disabilities/testingstudents.pdf">http://www.ncpublicschools.org/docs/accountability/testing/alternate/disabilities/testingstudents.pdf</a>  |

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