North Carolina End-of-Course Tests
Physics

What are the purposes of the NC Testing Program?

The North Carolina End-of-Course 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."

How are the Physics Test Scores Used?

Scores from the North Carolina End-of-Course Tests (EOC) of Physics are used in the State's ABCs Accountability Program in the growth component and the performance composite.

Students entering the ninth grade for the first time in 2006-07 and beyond will be required to meet new exit standards. The exit standards are applicable to all students expecting to graduate with a North Carolina High School Diploma except students with disabilities who are following the Occupational Course of Study. These students are required to achieve at Achievement Level III (with one standard error of measurement) or above on the five EOC assessments (Algebra I, Biology, English I, Civics & Economics, and U.S. History) and to successfully complete a senior project. Students following the Occupational Course of Study are required to meet rigorous exit standards as outlined in State Board of Education policy HSP-N-004 (16 NCAC 6D. 0503).

What is measured by the test?

The North Carolina End-of-Course Test of Physics assesses the Physics goals and objectives of the 2004 North Carolina *Standard Course of Study* for science. Students who are administered the Physics EOC tests are expected to demonstrate knowledge of important principles and concepts, understand and interpret laboratory activities, and relate scientific information to everyday situations. In order to align with the curricular focus on inquiry instruction and higher order thinking, the revised Physics EOC tests have a concentration on processing information, understanding the relationship between science and technology, and scientific concepts.

Each item on the Physics EOC test is related to one of the Physics content objectives in the North Carolina *Standard Course of Study* for science. The content objectives (goals 2 through 8) of Physics describe the knowledge and skills that are to be taught in all Physics courses in North Carolina and provide the basis for the content of the items on the tests. Many of the items in this revision of the Physics EOC test assess whether a student can move beyond memorization and apply process skills to the investigation of science. The physics testing materials include reference tables containing common formulas and data that students will have access to when taking the test. Additional information about the content of the objectives can be obtained from the NCDPI Web site at http://www.dpi.state.nc.us/curriculum/science/scos/. The physics reference tables can be obtained from the NCDPI Web site at http://www.dpi.state.nc.us/docs/accountability/testing/eoc/Physics/physicsreferencetable.pdf.

Descriptive Information for the North Carolina End-of-Course Test of Physics

Goal	Description of Goal	Percentage Range of Emphasis
1*	The learner will develop abilities necessary to do and understand scientific inquiry.	33% – 37%
2	The learner will build an understanding of linear motion.	10% – 15%
3	The learner will build an understanding of two-dimensional motion including circular motion.	10% – 15%
4	The learner will develop an understanding of forces and Newton's laws of motion.	15% – 20%
5	The learner will build an understanding of impulse and momentum.	10% – 15%
6	The learner will develop an understanding of energy as the ability to	15% – 20%

	cause change.	
7	The learner will develop an understanding of wave motion and the wave nature of sound and light.	10% – 15%
8	The learner will build an understanding of static electricity and direct current electrical circuits.	10% – 15%

*To assess the student's understanding of scientific inquiry and technological design, objectives in Goal 1 are assessed in the context of the content of Goals 2 – 8.

How is the test administered?

Multiple equivalent forms are administered in each classroom to provide a breadth of information for curriculum evaluation and planning. The North Carolina End-of-Course Test of Physics consists of 84 multiple-choice questions administered online during a fixed block of time not to exceed four hours within the final week (block schedule or summer school) or the final two weeks (traditional schedule) of the course.

How was the test developed?

Most of the questions on the Physics EOC tests were written by trained North Carolina teachers and educators. All items on the Physics EOC tests were reviewed by trained North Carolina teachers and educators during the 2004-05 and 2005-06 school years. The questions were field tested in the first and second semesters of the 2006-07 school year. The field test involved approximately 8,500 students from all schools across the state. The revised Physics EOC tests are being implemented statewide initially as operational tests in the 2007-08 school year.

What kinds of scores do students receive on the test?

Each student's Individual Student Report (ISR) will report a scale score, achievement level, and achievement level descriptor for the Physics EOC test performance. The scale used will have a range of approximately 120-180 with a mean of 150 and a standard deviation of 10. The use of scale scores provides for easier and more consistent interpretations of the results from test to test. Achievement levels are also generated to provide an interpretation of student performance relative to a predetermined standard. Achievement level descriptors are provided to describe typical student behaviors relative to curricular expectations as measured by the Physics EOC tests. Student scores are converted to one of the four achievement level categories shown below. The four achievement levels are typically initially established by linking teacher judgments to the performance distribution of student scores from the first fall operational administration of the test. Final performance standards will be established after the first full operational year (2007-08).

Achievement Levels for the North Carolina Test of Physics

Level	Description	Scale Score Range
1	Students performing at this level do not have sufficient mastery of knowledge and skills of the course to be successful at a more advanced level in the content area. Students performing at Level 1 do not have sufficient mastery of the concepts relating to physics. They have minimal understanding of: motion; forces; energy; impulse and momentum; wave motion and the nature of sound and light; thermodynamics; and electricity and magnetism.	TBD
2	Students performing at this level demonstrate inconsistent mastery of knowledge and skills of the course and are minimally prepared to be successful at a more advanced level in the content area. Students performing at Level 2 demonstrate inconsistent mastery of the concepts relating to physics. They have limited understanding of: motion; forces; energy; impulse and momentum; wave motion and the nature of sound and light; thermodynamics; and electricity and magnetism.	TBD
3	Students performing at this level consistently demonstrate mastery of the course subject matter and skills and are well prepared for a more advanced level in the content area.	TBD

	Students performing at Level 3 demonstrate mastery of the concepts relating to physics and are prepared for more advanced science courses. They have an adequate understanding of: motion; forces; energy; impulse and momentum; wave motion and the nature of sound and light; thermodynamics; and electricity and magnetism.	
4	Students performing at this level consistently perform in a superior manner clearly beyond that required to be proficient in the course subject matter and skills and are very well prepared for a more Advanced level in the content area. Students performing at Level 4 demonstrate superior understanding of concepts relating to physics and are very well prepared for more advanced science courses. They have an advanced level of understanding of: motion; forces; energy; impulse and momentum; wave motion and the nature of sound and light; thermodynamics; and electricity and magnetism.	TBD

Who takes the NC EOC in Physics?

Students enrolled in a Physics Course for credit regardless of the grade level of the student shall take the Physics EOC test. Students who are repeating the Physics course for credit shall take the EOC test. Students enrolled for standard Physics credit in a similar course, honors course, Advanced Placement (AP) course, International Baccalaureate (IB) course, or Principals of Technology I and II shall take the EOC test in Physics. In cases in which a local system exempts students from the Physics course final exams, the student must take the Physics EOC tests. Effective with the 2001-02 school year, student scores on the Physics EOC test shall count for at least 25 percent of the student's final course grade.

Sample Items

Sample items will be available on the NCDPI Web site at http://www.dpi.state.nc.us/accountability/testing/eoc/physics/ later in the fall 2007. The objective noted on each item indicates the curriculum objective the item is designed to measure. The thinking skill corresponds to the level of thinking skill the item requires as defined by a thinking skills framework adapted from *Dimensions of Thinking* by Robert J. Marzano and others.