

# **Determining Composite Scores in the ABCs Model**

**2002 - 2003**

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## **Determining Composite Scores in the ABCs Model 2002-2003**

In the ABCs, a school's growth and performance are summarized using composite scores. There are two types of composite scores: growth, and the performance composite.

There are two growth composites—one for expected growth and one for high growth. These growth composites summarize a school's growth over all grade levels and subjects included in the accountability model. The two composites indicate whether or not a school makes expected or exemplary growth, respectively. The growth composite scores allow a school to fall short of expected or exemplary growth in some areas but exceed it in others and still reach the growth standard overall. If the expected growth composite equals or exceeds zero, the school makes the goal of expected growth. Similarly if the high growth composite equals or exceeds zero then the school makes the goal of exemplary growth.

The performance composite summarizes the performance of students in the school with respect to attaining Achievement Level III. It tells the percent of student test scores at or above Achievement Level III (consistent mastery of subject/course content matter) in the subjects taught in the school and included in the accountability model.

The performance composite and the expected growth composite are used when determining which schools may need special assistance (i.e., Priority schools and Low-Performing schools). A school with an expected growth composite that is negative (less than zero) and a performance composite less than 50 (fewer than 50% of scores were at Level III or above) is identified as a low-performing school.

An outline of the process for determining these composite scores, using the accountability formulas follows. Necessary constants and parameters are summarized in this document. The formula used in the calculations for End-of-Grade (EOG) tests is published in the Accountability Brief "Setting Annual Growth Standards: *The Formula*," first published September 1996, revised March 2003. The formulas used in the calculations for the End-of-Course (EOC) tests are published in the "*EOC Prediction Formulas*," revised March 2003. These documents are available on the DPI web site ([www.ncpublicschools.org/accountability/reporting/index.html#ABC](http://www.ncpublicschools.org/accountability/reporting/index.html#ABC)). From the Reporting Section homepage, scroll down and click on ABCs of Public Education Program Information. (Please keep in mind that ABC Tools software, provided to all LEAs by the Division of Accountability Services, performs these calculations automatically).

## I. Expected Growth

### A. End-of-Grade, Grades 3 through 8.

1. Determine the actual growth in reading and mathematics at each grade level in the school, using data on **matched** groups of students (i.e., students with both reading and mathematics "pretest" and "posttest" scores). Subtract the mean pretest score (use pretest for grade 3, use previous year's EOG for grades 4 through 8) from the mean posttest score (current year's EOG) at each grade level to find actual growth.
2. Determine the expected growth for reading and mathematics at each grade level. (For an explanation of these computations, see the Accountability Brief, "Setting Annual Growth Standards: The Formula.")
3. Subtract the expected growth from the actual growth in reading and mathematics at each grade level.
4. Divide the difference (at each grade level) by the associated standard deviation. *This step is very important. By dividing by the standard deviations, the resulting numbers are standardized to accommodate the different score distributions.* The quotient is labeled "standard expected growth."
5. For each component (subject/grade) divide the number of scores/students by the total number of scores/students across all components. The quotient is the weight.
6. For each component determine the weighted standard expected growth by multiplying the weight times the standard expected growth. Sum across all components to obtain the weighted expected growth composite. Example 1 illustrates steps 1- 6 for a school with a grade 3 through 8 configuration.

**Example 1. Calculating Weighted Expected Growth Composite for a School with Grades 3 - 8 and Algebra I**

Subject/ Grade	A Pretest Mean	B Posttest Mean	C Actual Growth (B - A)	D Expected Growth Goal	E Actual minus Expected Growth (C - D)	F Standard Deviation of Change <sup>2</sup>	G Standard Expected Growth (E/F)	H # (n)	I Weight (H/Total # of N)	J Weighted Standard Expected Growth (GxI)
Reading 3	137.3	144.9	7.6	7.0	0.6	1.6	0.38	215	0.07	0.03
Reading 4	145.2	149.2	4.0	5.0	-1.0	1.3	-0.80	189	0.06	- 0.05
Reading 5	151.8	158.0	6.2	4.8	1.4	1.2	1.20	193	0.06	0.07
Reading 6	160.0	163.0	3.0	2.6	0.4	1.3	0.30	220	0.07	0.02
Reading 7	158.5	163.5	5.0	3.7	1.3	1.1	1.20	251	0.09	0.11
Reading 8	163.8	165.8	2.0	2.6	-0.6	1.2	-0.50	269	0.09	- 0.04
Math 3	231.2	243.7	12.5	12.4	0.1	1.7	0.06	215	0.07	0.00
Math 4	143.3	151.7	8.5	7.1	1.4	2.1	0.70	189	0.06	0.04
Math 5	156.3	162.6	6.3	5.8	0.5	2.0	0.30	193	0.06	0.02
Math 6	165.5	172.6	7.2	5.5	1.7	2.1	0.80	220	0.07	0.06
Math 7	168.8	172.3	3.5	4.8	-1.3	2.0	-0.70	251	0.09	- 0.06
Math 8	175.4	180.7	5.3	3.4	1.9	1.7	1.10	269	0.09	0.10
<b>EOC Components</b>	<b>Actual EOC Average</b>	<b>Expected EOC Average</b>			<b>Actual Minus Expected</b>	<b>Standard Deviation of Differences<sup>2</sup></b>	<b>Standard Expected Growth (E/I)</b>			
Algebra I	63.0	62.1			0.9	3.3	0.30 <sup>2</sup>	248	0.08	0.02
							<b>Total # (N)</b>	2922		
									<b>Weighted Expected Growth Composite<sup>3</sup></b>	0.32

<sup>1</sup>Full precision, though not shown here, is used in ABC Tools calculations. The composite is rounded to one-hundredths  
<sup>2</sup>These figures are set as constants.  
<sup>3</sup>The weighted expected growth composite must be equal to or greater than zero to meet the expected growth standards.

## B. End-of-Course

For the EOC tests, an equation is used to calculate an ABCs goal (or expected score) for each school on each EOC test. Each expected score is based on the proficiency of the students when they were in previous grades or courses. Proficiency is determined by students' performance average (scores) on the North Carolina End-of-Grade (EOG) or End-of-Course (EOC) tests, which serve as predictors of the same students' performance in the course in which they are currently enrolled. The EOG or EOC test(s) serving as predictor(s) are different for each EOC test. For details, see the Accountability Brief, [The EOC Prediction Formulas](#).

Let's look at an example of a calculation to find a school's ABCs goal (expected score) for Algebra I. The equation used to compute the expected score for Algebra I is

$$\text{Algebra I Expected Score} = b_0 + (b_{\text{IMP}} \times \text{IMP}),$$

- where  $b_0$  is the state average performance of schools (scale score) for the EOC = 60.4;
- $b_{\text{IMP}}$  is the value used to estimate the effect of the school's average math proficiency on the expected average EOC test score = 0.88;
- IMP is the index of mathematics proficiency [it equals the school's average EOG grade 8 Math scale score for students in Algebra I minus 176.1, (the state's average scale score in Algebra I)]. [2<sup>nd</sup> edition mathematics scores are converted to the 1<sup>st</sup> edition mathematics scale for use with the EOC prediction formulas.]

Substituting the values from the Prediction Formula Parameters for End-of-Course Performance, the equation looks like this:

$$\text{Algebra I Expected Score} = 60.4 + [0.88 \times (\text{Math} - 176.1)]$$

Step 1: Identify a group of students currently enrolled in Algebra I with predictor scores. In this case, the group of students must have scores on EOG Math from grade 8.

**Note.** Important considerations in selecting a matched set of students: Some students currently enrolled in Algebra I may not have a grade 8 EOG score in math, for a number of reasons. There may be students who have transferred from other states; a student may have been absent and failed to complete a make-up. Enrollment can change daily due to the addition of new students, transfers, and withdrawals. This makes it impossible to compute a totally accurate target score until the current enrollment is "captured" on the first day of testing for Algebra I.

Step 2: Find the average EOG Math (grade 8) score for the matched group of students; using this average in the equation, determine the expected Algebra I score. Let's say the average EOG Math score in grade 8 for this group was 178.

$$\text{Algebra I Expected Score} = 60.4 + [0.88 \times (178 - 176.1)]$$

$$\text{Algebra I Expected Score} = 60.4 + 1.672 = 62.072^*, \text{ or, } 62.1 \text{ (rounded).}$$

This means that to reach the expected score for expected growth, the school must have an average Algebra I EOC score that equals or exceeds 62.1.

\*This sum reflects full precision carried throughout each computation, and does not reflect the sum of the rounded numbers shown in this example.

**Example 2. Calculating Standard Expected Growth for Algebra I.**

EOC Components	A Actual EOC Average	B Predicted EOC Average	C Actual Minus Predicted	D Standard Deviation Of Differences	E Standard Expected Growth (C/D)
Algebra I	63.0	62.1	0.90	3.30	+0.30 <sup>1</sup>

<sup>1</sup>Full precision, though not shown here, is used in ABC Tools calculations. The composite is rounded to one-hundredths.

C. Determining Growth in **Other Components of the ABCs** at the High School level.

1. College/University Prep/College Tech Prep (CUP/CTP) growth.
  - a. Calculate the percent of current accountability year graduates (receiving diplomas) who completed either the college university prep or the college tech prep course of study for the three most recent years. *Students are counted only once if they complete both courses of study.*
  - b. Add the average of the two prior years’ percent of graduates that received diplomas and completed either course of study and divide by 2; this is the baseline.
  - c. Subtract the baseline from the current year’s percent.
  - d. Subtract 0.1, *unless the percentages are both 100, in which case the standard growth is set to zero.*
  - e. Divide by the associated standard deviation. The result is the standard expected growth for the College University Prep/College Tech Prep component. There is no high growth component for College University Prep/College Tech Prep. The standard expected growth is used in computing the expected growth composite AND the high growth composite. (See Example 6.)
  - d. Repeat steps 5-6 on page two to determine the weighted growth. (See Example 8)

**Example 3. Computations for College University Prep/College Tech Prep component (Year One of Three Consecutive Years)**

	Current Year
Total graduates earning diplomas	213
Completed only college university prep	45
Completed only college tech prep	75
Completed both courses of study	10

$$45 + 75 + 10 = 130; 130 / 213 = .61 (X100) = 61.0\%$$

**Example 4. Completed high school worksheet for College University Prep/College Tech Prep component.**

Other Components	Column A Current %	Column B Previous Year's %	Column C Year One %	Column D Baseline (B + C) / 2	Column E Difference (A -D)	Column F Subtract 0.1	Column G Standard Deviation	Column H Standard Expected Growth (F / G)
CUP/CTP	63.0	62.0	61.0	61.5	1.5	1.4	10.0	0.1

2. Competency passing rate.

- a. Find the grade 10 competency passing rate and the grade 8 competency passing rate on a matched set of students. (All current 10<sup>th</sup> graders in membership that were enrolled in a NC public school in grade 8).
- b. Subtract the grade 8 rate from the grade 10 rate.
- c. Subtract 0.1 so that zero represents growth. (*If the grade 8 competency passing rate and the grade 10 passing rate are 100%, then do not subtract 0.1*)
- d. The result is the expected growth component for the competency passing rate. (*See Example 7.*)
- e. Repeat steps 5-6 on page two to determine the weighted growth. (See Example 8)

**Example 5. Completed high school worksheet for expected growth in competency passing rate.**

Other components	Column A Grade 10 Competency Rate	Column B Grade 8 Competency Rate	Column E Difference (A -B)	Column F Subtract 0.1	Column G Standard Deviation	Column H Standard Expected Growth (F / G)
Competency	97.3	80.0	17.3	17.2	12.8	1.3

3. ABCs Dropout Rate.

The ABCs dropout rate is based on the federal (duplicated) dropout rates, with two modifications: the ABCs dropout rate is based on dropouts in grades 9-12 rather than 7-12; and, the ABCs dropout rates have been adjusted to take into account schools' compliance with the Safe Schools Act and efforts to handle chronic behavior problems. The ABCs dropout rate is expressed as a percentage.

- a. **ABCs dropout numerator** = Total Number of dropouts in grades 9-12, minus the total number of expulsions in grades 9-12, minus the total number of long term suspensions in grades 9-12, minus the total number of students incarcerated in an Adult Facility in grades 9-12.
- b. **ABCs dropout membership** = 20<sup>th</sup> day 2000-2001 membership in grades 9-12, minus the initial enrollees in membership day 20 in grades 9-12, plus the 20<sup>th</sup> day 2001-02 membership in grades 9-12, divided by 2.
- c. **ABCs dropout rate** =  $\frac{100 * \text{ABCs dropout numerator}}{\text{ABCs dropout membership} + \text{ABCs dropout numerator}}$

- d. Average the ABCs dropout rates (expressed as percentages) for Year One (1999-00) and Year Two (2000-2001) to form a baseline. Subtract the ABCs dropout rate from the ABCs dropout rate (percentage) in Year Three (difference in column E).
- e. Divide the difference in column E by the standard deviation. This yields the standard expected growth.
- f. Multiply the standard expected growth by the largest number of dropouts that occurred in Year One or Year Two or Year Three.
- g. Divide the product by the total number (N) across all components. This yields the weighted standard expected growth for the ABCs dropout component. (*See Example 6*)

E. Completing Calculations for Determining the Expected Growth Composite.

1. Sum standard expected growth for reading and math in grades 3-8; EOC, College University Prep/College Tech Prep, competency passing rate, and ABCs dropout rate. If the sum equals or is greater than zero, the school has made expected growth. (*See Example 6.*)

### Example 6. A Completed High School Worksheet for Computing Weighted Expected Growth Composite

Column	A	B	C		D	E	F	G	H	I	J	K	
Components EOC	Actual EOC Average	Expected EOC Average	Actual Minus Expected					Standard Deviation Of Differences <sup>1</sup>	Standard Expected Growth (C / G) <sup>3</sup>	# (n)	Weight (I/Total # of N)	Weighted Standard Expected Growth (J x H)	
Algebra I	66.0	59.6	+6.4					3.3	+1.9	475	0.10	0.19	
Algebra II	61.8	64.2	-2.4					2.9	-0.8	328	0.07	-0.06	
Biology	55.8	56.2	-0.4					2.6	-0.2	479	0.10	-0.02	
Chemistry	58.6	58.8	-0.1					2.5	-0.1	241	0.05	-0.01	
ELPS	52.7	54.7	-2.0					3.1	-0.6	548	0.12	-0.07	
English I	56.0	54.5	+1.5					1.8	+0.8	550	0.12	0.10	
Geometry	63.7	64.2	-0.5					2.5	-0.2	408	0.09	-0.02	
Physical Science	55.3	56.3	-0.9					2.5	-0.4	529	0.11	-0.04	
Physics	61.9	58.5	+3.4					3.3	+1.0	23	0.00	0.00	
US History	57.1	57.2	-0.1					2.2	0.0	416	0.09	0.00	
	Current %	Previous Year %	Year One %		Baseline	Difference		Subtract 0.1	Standard Deviation <sup>1</sup>	Standard Expected Growth			
CUP/CTP	61.0	62.6	63.9		63.3	- 2.3		- 2.4	10.0	+6.39	100	0.02	0.13
	Gr. 10 Rate	Gr. 8 Rate	Year One %	Year Two %		Year Three %	Differ- ence	Subtract 0.1	Standard Deviation <sup>1</sup>	Standard Expected Growth			
Competency	97.3	80.0					17.3	17.2	12.8	+1.3	432	0.09	0.12
Dropout Rate			6.7	5.1		6.6	-0.7		2.0	-0.35	29	0.01	-0.00
										Total # (N)	4558	Weighted Expected Growth Composite	0.32 <sup>3</sup>

<sup>1</sup>These figures are set as constants.

<sup>2</sup>Full precision, though not shown here, is used in ABC Tools calculations. The composite is rounded to one-hundredths.

<sup>3</sup>If the weighted expected growth composite is greater than or equal to zero, the school has made expected growth

## II. High Growth Composite.

### A. End-of-Grade, grades 3 through 8..

1. Use actual growth calculated at each grade level in reading, math, and Algebra I as computed earlier. (*See pages 2 through 3.*)
2. Determine the high growth goal for each grade level. (The  $b_0$  in the K-8 growth formula is multiplied by 1.1 in these calculations.)
3. Subtract the high growth goal from the actual growth in reading and mathematics at each grade level.
4. Divide the difference in growth for reading and mathematics at each grade level by the standard deviation. The quotient is the standard high growth.
5. Repeat steps 5-6 on page two to determine the weighted growth composite. (*See Example 7 for an illustration of these steps.*)

**Example 7. Calculating Weighted High Growth Composite for a School with Grades 3-8 and Algebra I**

Column	A	B	C	D	E	F	G	H
Subject/ Grade	Actual Growth	High Growth Goal	Difference	Standard Deviation	Standard High Growth	# (n)	Weight (F/Total # of N))	Weighted High Growth (E x G)
Reading 3	+7.6	+7.6	0.0	1.6	0.0	215	0.07	0.00
Reading 4	+4.0	+5.5	-1.5	1.3	-1.2	189	0.06	-0.07
Reading 5	+6.2	+5.3	+0.9	1.2	+0.8	193	0.06	0.05
Reading 6	+3.0	+2.9	+0.1	1.3	+0.1	220	0.07	0.01
Reading 7	+5.0	+4.0	+1.0	1.1	+0.9	251	0.09	0.08
Reading 8	+2.0	+2.9	-0.9	1.2	-0.8	269	0.09	-0.07
Math 3	+12.5	+13.7	-1.2	1.7	-0.71	215	0.07	-0.05
Math 4	+8.5	+7.8	+0.7	2.1	+0.3	189	0.06	0.02
Math 5	+6.3	+6.5	-0.2	2.0	-0.1	193	0.06	-0.01
Math 6	+7.2	+6.2	+1.0	2.1	+0.5	220	0.07	0.04
Math 7	+3.5	+5.4	-2.1	2.0	-1.1	251	0.09	-0.10
Math 8	+5.3	+3.9	+1.4	1.7	+0.8	269	0.09	0.07
<b>Components EOC</b>	<b>Actual EOC Average</b>	<b>Expected EOC Average</b>	<b>Actual Minus Expected</b>	<b>Standard Deviation Of Differences<sup>2</sup></b>	<b>Standard High Growth (C / G)</b>			
Algebra I	66.0	62.6	3.4	3.3	+1.0	248	0.08	0.08
					<b>Total # (N)</b>	<b>2922</b>		
							<b>Weighted High Growth Composite</b>	<b>0.05<sup>1</sup></b>

<sup>1</sup>The composite must be equal to or greater than zero to meet the expected and high growth standard.

<sup>2</sup> Full precision, though not shown here, is used in ABC Tools calculations. The composite is rounded to one-hundredths.

**B. End-of-Course**

For high growth, the same EOC prediction formulas are used. However, the state average performance is multiplied by 1.03. This means that the high growth standard is approximately 3% greater than the expected EOC growth standard. The formula for high growth in Algebra I is:

$$\text{Algebra I High Growth} = (b_0 \times 1.03) + (b_{\text{IMP}} \times \text{IMP}).$$

From the earlier example for Algebra I, computations for determining high growth would follow the two steps below.

Step 1: Multiply  $b_0 \times 1.03$ .

$$60.4 \times 1.03 = 62.21$$

Step 2: Substitute the appropriate values in the formula and complete the calculations.

$$62.21 + [0.88 \times (178 - 176.1)]$$

$$62.21 + 1.672 = 63.88^*, \text{ or } 63.9 \text{ (rounded).}$$

This means that to reach the high growth, the school's average performance on Algebra I EOC tests must equal or exceed 63.90.

\*This sum reflects full precision carried throughout each computation, and does not reflect the sum of the rounded numbers shown in this example.

C. Completing the Calculations for High Growth.

1. Add the standard high growth in reading and math in grades 3-8; EOC; expected growth in College University Prep/ College Tech Prep, Competency Passing Rate and ABCs Dropout Rate. The sum is the high growth composite. (See Example 8)

**Example 8. Worksheet for Computing Weighted High Growth Composite using Data from Example 4, 5, and 6.**

Column Components EOC	I Actual EOC Average	J Predicted EOC Average	K Actual Minus Predicted	L Standard Deviation Of Differences <sup>1</sup>	M Standard High Growth	N # (n)	O Weight (N/ Total # of N)	P Weighted High Growth (O x M)
Algebra I	66.0	62.6	3.4	3.3	1.0	475	0.10	0.10
Algebra II	61.8	67.1	-5.3	2.9	-1.8	328	0.07	-0.13
Biology	55.8	59.0	-3.2	2.6	-1.2	479	0.10	-0.12
Chemistry	58.6	61.6	-3.0	2.5	-1.2	241	0.05	-0.06
ELPS	52.7	57.4	-4.7	3.1	-1.5	548	0.12	-0.18
English I	56.0	57.2	-1.2	1.8	-0.7	550	0.12	-0.08
Geometry	63.7	67.1	-3.4	2.5	-1.4	408	0.09	-0.13
Physical Science	55.3	59.0	-3.6	2.5	-1.5	529	0.11	-0.17
Physics	61.9	61.3	0.6	3.3	0.2	23	0.00	0.00
US History	57.1	60.0	-2.9	2.2	-1.3	416	0.09	-0.12
CUP/CTP	Use standard expected growth from earlier calculations.				-0.2	100	0.02	0.00
Competency					+0.9	432	0.09	0.08
ABCs Dropout					0.0	150	0.03	0.00
					<b>Total # (N)</b>	<b>6225</b>		
							<b>Weighted High Growth Composite</b>	<b>-0.81<sup>2</sup></b>

<sup>1</sup>These figures are set as constants:

<sup>2</sup>The composite must be equal to or greater than zero to meet the expected and high growth standards. The composite is rounded to one-hundredths.

### III. Performance Composite

#### A. Determining the Composite

1. Compute the percent of students who score at or above Achievement Level III on reading and mathematics EOG tests, Computer Skills at grade 8, all EOC tests given at the school, the North Carolina Alternate Assessment Portfolio, and the North Carolina Alternate Assessment Academic Inventory (NCAAAI). *EOC subjects are included with the EOG reading and mathematics in elementary/middle schools where the subjects are offered. EOC includes all state tested subjects: Algebra I, Biology, ELPS, English I, U.S. History, Algebra II, Geometry, Chemistry, Physics, and Physical Science.*
  - a. Sum the scores at or above Achievement Level III on each of the tests.
  - b. Divide this sum by the total number of valid scores on each of the tests. (*See Examples 9 and 10.*)

#### Example 9. Computing the performance composite for a high school.

Column EOC Test	A # Scores At or Above Level III	B # of Valid Scores	C Total A / Total B X 100
Algebra I	43	60	$668/991 = .6741 \times 100 = 67.41\%^1$
Algebra II	67	75	
Biology	76	100	
Chemistry	73	89	
ELPS	94	165	
English I	89	150	
Geometry	50	72	
Physical Science	75	90	
Physics	25	40	
U.S. History	76	150	
<b>TOTALS</b>	<b>668</b>	<b>991</b>	

#### Example 10. Computing the performance composite for a grade 3-5 School.

Column EOG Test	A # Scores At or Above Level III	B # of Valid Scores	C Total A/Total B x 100
Reading			504/818 = 0.6161 x 100 = 61.61% <sup>1</sup>
Grade 3	62	100	
Grade 4	60	108	
Grade 5	80	120	
Math			
Grade 3	65	100	
Grade 4	64	108	
Grade 5	75	120	
Writing			
Grade 4	70	110	
Alternate Assessment Portfolio			
Grade 3	3	4	
Grade 4	5	10	
Grade 5	6	8	
Alternate Assessment Academic Inventory			
Reading			
Grade 3	2	5	
Grade 4	1	4	
Grade 5	3	4	
Math			
Grade 3	1	5	
Grade 4	4	4	
Grade 5	1	4	
Writing			
Grade 4	2	4	
Total	504	818	

<sup>1</sup> Full precision, though not shown here, is used in ABC Tools calculations.

**Note:** Details on how to compute the NCAAP are located at the following web address:  
<http://www.ncpublicschools.org/accountability/testing/alternate/AapScoreModel.pdf>.  
 Details on how to compute the NCAAAI are in the North Carolina Testing Program North Carolina Alternate Assessment Academic Inventory Guidelines for Implementation located in the NCAAAI manual.

**Worksheet to Calculate Weighted Expected Growth Composite for a School with Grades 3 - 8 and Algebra I**

Column Subject/ Grade	A Pretest Mean	B Posttest Mean	C Actual Growth (B - A)	D Expected Growth Goal	E Actual minus Expected	F	G	H	I Standard Deviation of Change <sup>1</sup>	J Standard Expected Growth (E/I)	K # (n)	L Weight (K/Total # of N)	M Weighted Standard Expected Growth (J x L)
Reading 3									1.6				
Reading 4									1.3				
Reading 5									1.2				
Reading 6									1.3				
Reading 7									1.1				
Reading 8									1.2				
Math 3									1.7				
Math 4									2.1				
Math 5									2.0				
Math 6									2.1				
Math 7									2.0				
Math 8									1.7				
<b>EOC Components</b>	<b>Actual EOC Average</b>	<b>Expected EOC Average</b>			<b>Actual Minus Expected</b>				<b>Standard Deviation of Differences<sup>1</sup></b>	<b>Standard Expected Growth (C/I)</b>			
Algebra I									3.3				
										<b>Total # (N)</b>			
<sup>1</sup> These figures are set as constants. <sup>2</sup> Full precision, though not shown here, is used in ABC Tools calculations. The composite is rounded to one-hundredths.										<b>Weighted Expected growth composite</b>			

**Worksheet for calculating Weighted High Growth Composite for a school with grades 3-8 and Algebra I.**

Subject/Grade	Actual Growth	High Growth Goal	Difference	Standard Deviation	Standard High Growth	# (n)	Weight (n /N)	Weighted High Growth (Wt x High Growth)
Reading 3				1.6				
Reading 4				1.3				
Reading 5				1.2				
Reading 6				1.3				
Reading 7				1.1				
Reading 8				1.2				
Math 3				1.7				
Math 4				2.1				
Math 5				2.0				
Math 6				2.1				
Math 7				2.0				
Math 8				1.7				
<b>Components EOC</b>	<b>Actual EOC Average</b>	<b>Expected EOC Average</b>	<b>Actual Minus Expected</b>	<b>Standard Deviation Of Differences<sup>1</sup></b>	<b>Standard High Growth (C / G)</b>			
Algebra I				3.3				
						<b>Total # (N)</b>		
						<b>Weighted High Growth Composite</b>		

### High School (9-12) Worksheet for Computing Weighted Expected Growth Composite for 2002-2003

Column	A	B	C	D		E	F	G	H	I	J	K
<b>Components</b>	<b>Actual EOC Average</b>	<b>Predicted EOC Average</b>	<b>Actual Minus Predicted</b>					<b>Standard Deviation Of Differences<sup>1</sup></b>	<b>Standard Expected Growth (C / G)</b>	<b># (n)</b>	<b>Weight (I/Total # of N)</b>	<b>Weighted Standard Expected Growth (H x J)</b>
Algebra I								3.3				
Algebra II								2.9				
Biology								2.6				
Chemistry								2.5				
ELPS								3.1				
English I								1.8				
Geometry								2.5				
Physical Science								2.5				
Physics								3.3				
US History								2.2				
<b>EOC Component</b>	<b>Current %</b>	<b>Previous Year %</b>	<b>Year 1 %</b>		<b>Baseline</b>		<b>Difference</b>	<b>Subtract 0.1</b>	<b>Standard Deviation</b>	<b>Standard Growth (Expected)</b>		
CUP/CTP									10.0			
	<b>Gr. 10 Rate</b>	<b>Gr. 8 Rate</b>	<b>Year 1 %</b>	<b>Year 2 %</b>	<b>Base-line</b>	<b>Year 3 %</b>	<b>Difference</b>	<b>Subtract 0.1</b>	<b>Standard Deviation</b>	<b>Standard Growth (Expected)</b>		
Competency									12.8			
ABCs Dropout Rate									2.1			
<b>Total # (N)</b>												
											<b>Weighted Expected Growth Composite</b>	

<sup>1</sup>These figures are set as constants.

### High School (9-12) Worksheet for Computing High Growth Composite for 2002-2003

Column	I	J	K	L	M	N	O	P
Components EOC	Actual EOC Average	Predicted EOC Average	Actual Minus Predicted	Standard Deviation Of Differences <sup>1</sup>	Standard High Growth	# (n)	Weight (n/Total # of N)	Weighted High Growth (O x M)
Algebra I				3.3				
Algebra II				2.9				
Biology				2.6				
Chemistry				2.5				
ELPS				3.1				
English I				1.8				
Geometry				2.5				
Physical Science				2.5				
Physics				3.3				
US History				2.2				
CUP/CTP	Use standard expected growth from earlier calculations.							
Competency								
	Use standard expected growth from earlier calculations.			<b>Standard Deviation</b>				
ABCs Dropout				2.1				
<b>Total # (N)</b>								
							<b>Weighted High Growth Composite</b>	

<sup>1</sup>These figures are set as constants.

**Table 1. EOG Parameters and Other Constants Used in the ABCs Growth Model for 2002-2003**

Using 2<sup>nd</sup> Edition EOG Mathematics Scores for Grade 3 Pretest and Posttest and Equipercentile Equating for Grades 4-8

Grade “pre”	Grade “post”	B <sub>0</sub>	b <sub>1</sub>	b <sub>2</sub>	Centering Mean	Standard Deviation for composite component
Reading						
Pre3	3	8.0	0.47	- 0.98	139.1	1.645731
3	4	5.2	0.22	- 0.60	143.4	1.283104
4	5	4.6	0.22	- 0.60	147.6	1.215183
5	6	3.0	0.22	- 0.60	152.4	1.270763
6	7	3.3	0.22	- 0.60	154.5	1.105819
7	8	2.7	0.22	- 0.60	158.1	1.197829
Mathematics						
Pre3	3	14.3	0.20	- 0.58	236.4	1.675164
3	4	7.3	0.26	- 0.58	141.2	2.065777
4	5	7.4	0.26	- 0.58	147.9	1.989928
5	6	7.1	0.26	- 0.58	154.4	2.130592
6	7	6.5	0.26	- 0.58	160.2	1.966777
7	8	4.9	0.26	- 0.58	166.0	1.730942

**Table2. Prediction Formula Parameters for End-of-Course Performance**  
(Revised March 24, 2000)

	$b_0$	$b_{IRP}$	$b_{IMP}$	$b_{IMP}^2$	$b_{IMP}^3$	$b_{IAP}$	$b_{IBP}$	$b_{IEP}$	
Algebra I	60.365508		0.882877						IRP = Index of Reading Proficiency IMP = Index of Mathematics Proficiency IAP = Index of Algebra I Proficiency IBP = Index of Biology Proficiency IEP = Index of English I Proficiency
Biology	55.211147	0.709879	0.317544	-0.013484	-0.001827				
ELPS	53.951374	0.883888							
English I	53.256009	1.005168							
U.S. History	55.952964	0.680936	0.147541	-0.011331					
Algebra II	59.265552	0.434241				0.887402			
Chemistry	56.880878					0.184021	0.513002	0.269941	
Geometry	58.483974	0.416898	0.389016			0.431191			
Physical Science	53.839061	0.583869	0.340070						
Physics	56.061420		0.280134				0.656071	0.315458	

Centering Means for Proficiency Indexes\*

	EOG Reading	EOG Math	Algebra I	Biology	English I	Standard Deviation for Composite Component
Algebra I		176.1				3.349160
Biology	161.3	172.0				2.624947
ELPS	161.3					3.136528
English I	161.0					1.765422
U.S. History	161.1	171.8				2.241525
Algebra II	164.7		60.0			2.945220
Chemistry			59.9	59.7	58.1	2.545592
Geometry	164.5	176.7	59.7			2.486069
Physical Science	160.7	171.6				2.490687
Physics		182.0		63.7	61.6	3.321596

\* Means are based on all students in the school with scores for the predicted EOC and all other EOG/EOC tests used as predictors.

Prediction Formulas for End-of-Course Performance  
(Revised March 24, 2000)

$$\text{Predicted School Algebra I Mean} = 60.40 + [0.88 \times (\text{Math} - 176.10)]$$

$$\text{Predicted School Biology Mean} = 55.20 + [0.710 \times (\text{Reading} - 161.30)] + [0.318 \times (\text{Math} - 172.00)] + [-0.013 \times (\text{Math} - 172.00)^2] + [-0.002 \times (\text{Math} - 172.00)^3]$$

$$\text{Predicted School ELPS Mean} = 54.00 + [0.88 \times (\text{Reading} - 161.30)]$$

$$\text{Predicted School English I Mean} = 53.30 + [1.01 \times (\text{Reading} - 161.00)]$$

$$\text{Predicted School U.S. History Mean} = 56.00 + [0.68 \times (\text{Reading} - 161.10)] + [0.15 \times (\text{Math} - 171.80)] + [-0.01 \times (\text{Math} - 171.80)^2]$$

$$\text{Predicted School Algebra II Mean} = 59.30 + [0.43 \times (\text{Reading} - 164.70)] + [0.89 \times (\text{Alg} - 60.00)]$$

$$\text{Predicted School Chemistry Mean} = 56.90 + [0.18 \times (\text{Alg} - 59.90)] + [0.51 \times (\text{Bio} - 59.70)] + [0.27 \times (\text{Eng} - 58.10)]$$

$$\text{Predicted School Geometry Mean} = 58.50 + [0.42 \times (\text{Reading} - 164.50)] + [0.39 \times (\text{Math} - 176.70)] + [0.43 \times (\text{Alg} - 59.70)]$$

$$\text{Predicted School Physical Science Mean} = 53.80 + [0.58 \times (\text{Reading} - 160.70)] + [0.34 \times (\text{Math} - 171.60)]$$

$$\text{Predicted School Physics Mean} = 56.10 + [0.28 \times (\text{Math} - 182.00)] + [0.66 \times (\text{bio} - 63.70)] + [0.32 \times (\text{Eng} - 61.60)]$$

where

Reading = EOG Reading mean for all students in the school with scores for the predicted EOC and all other EOG/EOC tests used as predictors

Math = EOG Math mean for all students in the school with scores for the predicted EOC and all other EOG/EOC tests used as predictors

Alg = Algebra I mean for all students in the school with scores for the predicted EOC and all other EOG/EOC tests used as predictors

Bio = Biology mean for all students in the school with scores for the predicted EOC and all other EOG/EOC tests used as predictors

Eng = English I mean for all students in the school with scores for the predicted EOC and all other EOG/EOC tests used as predictors

2002-2003 Constants Used in the ABCs Gain Model for High Schools

Component of Growth Composite	Standard Deviation of change for expected growth composite	Standard Deviation of change for high growth composite
College University Prep/College Tech Prep %	10.0	10.0
Competency Passing Rate	12.8	12.8
ABCs Dropout Rate	2.1	2.1

**How to Include the North Carolina Alternate Assessment Portfolio (NCAAP) Results in the  
Performance Composite**

(IN PROCESS OF REVISION)