



Achieve, Inc.

Taking Stock

An Analysis of Delaware's
High School Standards
and Course Requirements

ACHIEVE'S
BENCHMARKING
INITIATIVE



Achieve, Inc.

Created by the nation's governors and business leaders, Achieve, Inc., is a bipartisan, non-profit organization that helps states raise academic standards, improve assessments and strengthen accountability to prepare all young people for postsecondary education, work and citizenship. Achieve has helped nearly half the states benchmark their standards and tests against the best examples in this country and abroad and work in partnership to improve teaching and learning. Achieve serves as a significant national voice for quality in standards-based reform and regularly convenes governors, CEOs and other influential leaders at National Education Summits and other gatherings to sustain support for higher standards and achievement for all of America's schoolchildren.

Achieve helps states raise academic standards, measure performance against those standards, establish clear accountability for results and strengthen public confidence in our education system. To do this, we:

- help states **benchmark** their standards, assessments and accountability systems against the best in the country and the world;
- provide sustained **public leadership** and advocacy for the movement to raise standards and improve student performance;
- build **partnerships** that allow states to work together to improve teaching and learning and raise student achievement; and
- serve as a **national clearinghouse** on standards and school reform.

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January 2005

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INTRODUCTION

Created by the nation's governors and business leaders, Achieve, Inc., is a bipartisan, non-profit organization that helps states raise academic standards, improve assessments and strengthen accountability to prepare all young people for postsecondary education, work and citizenship. Achieve has helped nearly half the states benchmark their standards and tests against the best examples in the country and abroad and work in partnership to improve teaching and learning. To forward those goals, Achieve published three related reports in 2004. The first report, *Ready or Not: Creating a High School Diploma That Counts*, contains Achieve's American Diploma Project (ADP) *Benchmarks for College and Workplace Readiness* that describe the knowledge and skills students need for success in higher education and an information-based work environment. The second report, *Do Graduation Tests Measure Up?* is a six-state report that compares the content and rigor of six state high school graduation tests. The third report, *The Expectations Gap: A 50-State Review of High School Graduation Requirements*, explores the gap between states' high school course requirements and the real-world demands of college and the workplace.

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WORK WITH DELAWARE

In an effort to ensure that its expectations for high school students are sufficient to prepare all students for success in college and the workplace, Delaware has begun a process of reviewing aspects of its educational system. To help guide their efforts, Delaware's secretary of education and the president of the State Board of Education asked Achieve to provide an analysis of the quality of Delaware's high school content standards and its course-taking requirements. Achieve was asked to answer the following questions to assist Delaware in its commitment to raising the quality of its expectations for high school graduates:

- **Do Delaware's secondary-level *Mathematics and English Language Arts Content Standards* contain the skills and knowledge high school graduates need to be prepared for college and/or the workplace, as reflected in the expectations found in the American Diploma Project's *Benchmarks for College and Workplace Readiness*?**
- **How do Delaware's course-taking requirements in English language arts, mathematics, science and social studies compare with the admission requirements of the state's three public institutions of higher education and with American Diploma Project recommendations?**

The first question calls for an examination of the degree of alignment between the Delaware *Mathematics and English Language Arts Content Standards* — at the secondary level — and the ADP *Benchmarks for College and Workplace Readiness* in mathematics and English. In particular, the task presented to Achieve was to identify and define gaps that exist between the two documents in the respective content areas. The second required Achieve to analyze Delaware's current course-taking requirements with

the set of courses students are expected to have taken to be admitted to the University of Delaware, Delaware State University, or a degree program at Delaware Technical and Community College.

In addition to this comparative analysis of the Delaware *Mathematics and English Language Arts Content Standards* with respect to the ADP benchmarks, Achieve has expanded its study to include a comparison in each subject area — again, at the secondary level — of the Delaware standards with two other sets of standards that Achieve has identified as benchmarks worthy of emulation: in mathematics, with those of Indiana and Massachusetts; in English, with those of California and Massachusetts.

To conduct its comparative analysis, Achieve commissioned a cadre of three experts for each content area to review the Delaware content standards relative to the ADP benchmarks and the Achieve state benchmark standards. The reviewers were selected because of their deep knowledge and experience with the content areas of mathematics or English language arts — particularly at the secondary level. The charge to the reviewers was to critique the Delaware standards using a set of guiding questions designed to focus their analyses. A primary emphasis was a comparison of the content contained in the various documents — whether there is content not contained in the Delaware standards that is contained in the ADP benchmarks and the benchmark state documents, and whether there is content in the Delaware standards that is not in the benchmark documents. Similarly, reviewers were asked to compare the performance expectations of the Delaware standards (i.e., what students are expected to do with the knowledge they have) with the ADP and state benchmark documents. Several other questions of a more general nature — addressing such issues as clarity and specificity of language, the organizational structure of the standards, and in mathematics, the state’s approach to dealing with technology in its standards and the balance between conceptual, procedural and practical problem solving — also were posed to the reviewers.

CONTEXT FOR THE DELAWARE STANDARDS AND THEIR IMPLEMENTATION

Delaware is to be commended for taking this step to review and refine its existing standards. The standards contained within Delaware’s *Curriculum Framework* are first-generation standards, adopted in 1995. As such, they have provided guidance and structure to almost a decade of teaching and learning in the state. They have provided a common vision across the state, defining what all students should know and be able to do at certain junctures (i.e., the end of grades 3, 5, 8 and 10) in their schooling. They have provided a framework for use in developing state and local assessments and have guided the development of curriculum and professional development. The standards have been an invaluable tool and have moved the state forward in its service of students. However, it is time — and perhaps overdue — for Delaware to re-examine its mathematics and English language arts standards.

Since the adoption of Delaware’s standards, the National Council of Teachers of Mathematics (NCTM) has rewritten its standards (*Principles and Standards for School Mathematics*, released in 2000), and much has been learned about what students around the world know and can do in mathematics — based on findings from the Third International Mathematics and Science Study (TIMSS) and the Programme for International Student Assessment (PISA). Many states have already chosen to rewrite or revise their standards based on these studies and also in response to local school districts and educators asking for more guidance and support. The state documents used in this

comparative analysis, for example, are revised or rewritten versions of earlier standards. Massachusetts and California, both of whose standards are used in this analysis, have revised their standards in recent years. Additionally, the National Assessment of Educational Progress (NAEP) 2009 *Reading Framework* reflects a change from the previous reading framework in its move from a focus on the stance of the reader to the comprehension of text.

REVIEW OF THE DELAWARE MATHEMATICS CONTENT STANDARDS

ACHIEVE MATHEMATICS BENCHMARK STANDARDS

The sets of benchmark standards in mathematics used in this comparison are the American Diploma Project (ADP) *Benchmarks for College and Workplace Readiness*, Indiana's *Academic Standards* (adopted by the Indiana State Board of Education in summer 2000), and the *Massachusetts Curriculum Framework* (dated November 2000, but adopted by the Massachusetts Board of Education in July 2000). These standards have been identified by Achieve as among the best in the country, and they are particularly appropriate for this analysis because they approach high school mathematics in different ways.

The American Diploma Project commissioned leading economists to examine labor market projections for the most promising jobs — those that pay enough to support a small family and provide real potential for career advancement — to pinpoint the academic knowledge and skills required for success in those occupations. ADP then surveyed officials from 22 occupations, ranging from manufacturing to financial services, about the high school-level skills they believe are most useful for their employees to bring to the job. Following those conversations, ADP worked closely with two- and four-year postsecondary leaders in the partner states to determine the prerequisite English and math knowledge and skills required for success in entry-level, credit-bearing courses in English, math, the sciences and the humanities. The resulting ADP benchmarks are ambitious, reflecting an unprecedented convergence in what these employers and postsecondary faculty need from new employees and entering freshmen. In math, the benchmarks reflect a rigorous four-year course sequence that includes content typically taught in Algebra I, Geometry and Algebra II, as well as some data analysis and statistics.

The Indiana standards at the secondary level (available at www.indianastandards.org) are organized by course (including Algebra I, Algebra II, Geometry, Precalculus, AP Calculus, Probability/Statistics and Discrete Mathematics) — with Algebra I, Algebra II and Geometry serving as the basis of comparison for this analysis. More recently, Indiana also developed a set of integrated math standards (Integrated Math I–III), and these standards also are available on Indiana's Web site. These two sets of standards — traditional course standards and integrated standards — are comparable in that they address much of the same content in different ways. Because Indiana uses its course standards as the basis for developing its state assessment, its standards were used for that analysis.

Massachusetts also has used two different approaches in writing its standards (available at www.doe.mass.edu/frameworks/current.html). At the high school level, the most current standards are from November 2000 — even though the state has developed grade-level standards for grades 3, 5 and 7, which it published as a 2004 supplement. Massachusetts' primary format for its standards is by grade cluster, with each cluster covering two grades. For example, at the high school level, there are grade cluster standards for grades 9–10 and 11–12. In addition, Massachusetts has compiled standards by course — consisting of Algebra I, Geometry, Algebra II and Precalculus.

OVERVIEW OF THE DELAWARE MATHEMATICS CONTENT STANDARDS

Delaware's *Mathematics Curriculum Framework* — which contains the state's *Mathematics Content Standards* — was adopted in 1995. The document provides expectations for grades K–10, generally organized by grade cluster for grades K–3, 4–5, 6–8 and 9–10. Although no standards are provided for grades 11–12, brief recommendations for this grade cluster are offered in an appendix.

The Delaware *Mathematics Content Standards* are divided into two sets — a set of four mathematical process standards followed by a set of six standards for mathematical knowledge. The mathematical process standards (Standards 1–4) are aligned with the original NCTM standards (1989) and include problem solving, communicating mathematically, reasoning and making mathematical connections. Each of these four standards includes performance indicators that apply to all grades K–10. The mathematical knowledge standards (Standards 5–10) consist of performance indicators that are organized by grade cluster for grades K–3, 4–5, 6–8 and 9–10. The organizational framework for these mathematical knowledge standards is as follows: (a) Estimation, Measurement and Computation; (b) Number Sense; (c) Algebra; (d) Spatial Sense and Geometry; (e) Statistics and Probability; and (f) Patterns, Relationships and Functions. The framework document also contains sample learning events and vignettes intended to depict how the standards might play out in the classroom.

MAJOR FINDINGS OF THE ANALYSIS: MATHEMATICS

STRENGTHS OF THE STANDARDS

- **Delaware's standards show a deliberate effort to highlight and emphasize the development of problem-solving skills and deep mathematical understanding.**

The mathematical processes of problem solving, communication, reasoning and making connections are given prominence in the Delaware standards. They are set apart from — and precede — the standards addressing mathematical knowledge, so it is clear that Delaware values the development of these skills in students.

In addition, embedded within Delaware's expectations for both mathematical processes and mathematical knowledge are numerous performance indicators that clearly communicate the importance given to multiple representations and connections. Examples of such performance indicators that call for deep mathematical understanding can be found in Standard 2 (Indicator 2.01), Standard 4 (Indicators 4.01, 4.02, 4.03 and 4.04), Standard 6 (Indicator 6.90) and Standard 7 (Indicators 7.93, 7.94, 7.95, 7.96 and 7.97).

- **When compared with the ADP benchmarks and the standards for Indiana and Massachusetts, the Delaware high school standards compare favorably with respect to certain mathematical topics.**

A strength of the Delaware high school mathematics standards is the expectation that — by the end of 10th grade — all students have a grasp of the following aspects of mathematics: (1) a conceptual understanding of the basic non-linear functions (Indicator 10.92); (2) the solution of both linear and quadratic equations — using a variety of strategies (Indicator 7.95); (3) the application of right triangle trigonometry to problem

situations (Indicator 8.97); and (4) key probability concepts, including permutations and combinations (Indicator 5.90), independent and dependent events (Indicator 9.97), and sample space (Indicator 9.95).

AREAS FOR IMPROVEMENT

Although Delaware's standards may well have been state-of-the-art when they were first adopted, great strides have been made with respect to writing standards in the intervening decade. In the 10 years since Delaware has developed its standards, other states and projects have revised their expectations in a variety of ways. Using the ADP benchmarks and the high school standards from Indiana and Massachusetts for comparison, Achieve's review team suggested several ways that the Delaware standards could be strengthened.

- **The most obvious way in which Delaware's mathematics standards can be strengthened is by increasing the level of specificity used to define what is expected of students.**

Delaware's mathematics standards and performance indicators tend to be broad — and oftentimes vague — statements made at the grade cluster level. In contrast, the documents used as the basis for comparison in this analysis tend to be much clearer and more specific about the level of expectation they set for students. For example, in Delaware's Standard 7 (Algebra), Indicator 7.62 offers no examples of the types of algebraic expressions and formulas students are expected to be able to evaluate by the time they complete 10th grade. Similarly, Indicators 7.95 and 7.96 do not provide specific enough language or examples to ensure a common understanding of the level of sophistication expected of exiting high school sophomores with respect to solving systems of equations or problems requiring the application and solution of linear or quadratic equations. This is in sharp contrast to the Indiana standards and the ADP benchmarks in which examples are an important part of the expectations — helping to clarify their intent. The Massachusetts standards tend to rely less consistently on examples within the body of the standards, although such examples certainly exist. Massachusetts, however, uses very detailed and explicit language — as do the other two documents — and includes selected problems or classroom activities at the end of the standards for a grade-level band (e.g., for grades 9–10, Algebra I and Geometry, and for grades 11–12, Geometry, Algebra II and Precalculus).

Achieve's review team expressed concern that the broad, general wording of the Delaware performance indicators — devoid of examples — could result in differing interpretations and applications of the expectations at the local level. Subsequently, the curricula developed by different districts to guide classroom teaching and learning could vary with respect to their emphasis and the level of sophistication required of students. Given that development of Delaware's state assessment is guided by the standards — and given the high-stakes nature of the 10th-grade assessment — it is particularly critical that all districts have a common understanding of what is expected of 10th-grade students. Delaware would be well served — when revision of the standards is undertaken — to facilitate this common understanding by clarifying the intent of its standards through both more specific language and the inclusion of examples.

It is clear that Delaware places value on students' being able to use technology, manipulatives and other tools as they learn mathematics. This is communicated in a variety of ways throughout the document. Reference is made to “using appropriate

technology” in the stem statement that precedes the performance indicators in each of the 10 standards. In addition, the appendices provide details on recommended technology and physical materials for each grade band and describe the classroom environment as being rich in the use of these materials. As Delaware attempts to refine the clarity and specificity of its standards, it is important that the role of technology not be lost. In fact, efforts should be taken to ensure clear and consistent messages about the use of technology (e.g., what students should be able to do with and without the use of technology) and to improve some of the ambiguities in wording that now occur. For example, Indicator 7.91 states that students should be able to “develop appropriate symbol sense to use algebraic technology”; the intent of this statement is not clear.

- **To be comparable to the ADP benchmarks and to the high school standards of Indiana and Massachusetts, Delaware needs to make its high school mathematics standards more rigorous. This can be done by adding more rigorous content to the standards for grades 9–10, shifting some of the current expectations for grades 9–10 back to grades 6–8 and drafting mathematics expectations for grades 11–12.**

The Achieve review team provided detailed commentary on aspects of content that are addressed inadequately in Delaware’s grade 9–10 standards, based on their comparative analysis with the ADP benchmarks and the high school standards for Indiana and Massachusetts. Detailed information on their suggestions is provided in a supplement to this report, which was given to the secretary of education, giving guidance as to what content might be moved to grades 6–8, what might be added or clarified in grades 9–10, and what might be included in a draft of expectations for grades 11–12. However, in general, the reviewers concurred that algebra and geometry tend to be the domains most in need of improvement.

The Delaware standards for geometry should be revised to reflect the content of high school geometry, including geometric proof. As they are now written, these standards are more reflective of the geometry content typically expected of students in middle school. Delaware does not explicitly address geometric proof within Standard 8 (Geometry and Spatial Sense) and should consider doing so. Standard 3 (Mathematical Reasoning) informally alludes to geometric proof in that students are expected to be able to construct logical arguments, justify conclusions, and use mathematical properties and relationships to explain their thinking. However, there are no clear references to geometric proof, and it makes sense to indicate — within the Geometry and Spatial Sense Standard — examples of geometric proof that students should be able to handle. Geometric proof is addressed explicitly in both the ADP benchmarks and the Indiana standards, whereas Massachusetts addresses proof in a more informal way.

The Delaware high school mathematics standards also appear to be missing other aspects of the geometry content addressed in the ADP benchmarks, the Indiana standards and the Massachusetts standards. For example, the ADP benchmarks make specific reference to the converse of the Pythagorean Theorem (Benchmark K5); finding the distance between two points in the plane (Benchmark K10.3); and the relationship between slope, parallelism and perpendicularity (Benchmark K10.2). Indiana’s tends to be the most specific of the documents with respect to geometric content, referencing such things as theorems involving segments divided proportionally (Indicator G.4.5); relationships that exist when the altitude is drawn to the hypotenuse of a right triangle (Indicator G.5.2); and relationships among the faces, edges and vertices of polyhedra (Indicator G.7.3).

Both Massachusetts and Indiana emphasize knowledge of special right triangles (30° - 60° - 90° and 45° - 45° - 90°) in solving problems. Such material is appropriate for students in grades 9–10, and Delaware should consider its inclusion.

With respect to algebra, all three of the documents used in this comparative analysis are much stronger than Delaware with respect to slope, linear functions and linear equations. For example, the ADP benchmarks explicitly reference the relationship between the coefficients of a linear equation and the slope and the x - and y -intercepts of the graph of the equation (Benchmark J.4.2) and students' having an intuitive sense of the slant of a line in terms of the precise concept of slope (Benchmark K.10.1). It could be the intent of the Delaware standards that students understand slope, linear functions and linear equations at this level of specificity. However, the general wording of the standards makes this unclear. Similarly, the Massachusetts standards are quite explicit that students understand the relationships among the various representations of a line. In fact, they are so specific as to state that students are expected to be able to determine a line's slope and x - and y -intercepts from its graph or from a linear equation that represents the line; find a linear equation describing a line from a graph or a geometric description of the line (e.g., by using the point-slope formula); explain the significance of positive, negative, zero and undefined slope; and find linear equations that represent lines either perpendicular or parallel to a given line and through a point. All of this is expected of students by the end of grade 10, and Delaware should consider revisiting its standards to explore whether its expectations are in line with these benchmarks.

Another shortcoming of the Delaware algebra standards is that they do not appear to require students to develop the level of symbolic manipulation evident in the ADP, Indiana and Massachusetts standards. Although reviewers concurred that the emphasis in a set of standards should not be on manipulative facility, they also agreed it needs adequate attention so that students will have the skills they need to tackle increasingly complex algebraic and geometric tasks in high school and beyond. The Delaware standards do not contain expectations comparable to those in the ADP benchmarks J1.3 through J1.6. Similarly, while Delaware expects students to be able to solve linear and quadratic algebraic problems (Indicator 7.95), it is not clear that students are expected to be able to use factoring or completing the square as strategies for solving quadratic equations — or that enough symbolic manipulation is expected for students to be able to employ these strategies. This is addressed more explicitly in ADP. The Indiana and Massachusetts standards also are more demanding than the Delaware standards with respect to symbolic manipulation, with the Indiana standards being the most demanding of the three documents. Both of the benchmark state documents also require — by the completion of grade 10 in Massachusetts and Algebra I in Indiana — that students be able to solve quadratic equations with real roots by factoring, completing the square and applying the quadratic formula.

- **Delaware should refine its standards to ensure that a clear and appropriate balance exists among the conceptual, procedural and practical problem-solving aspects of mathematics. This refinement can be accomplished through clear and concise language and the inclusion of examples and sample problems that clarify the intent of the standards.**

The lack of clarity reviewers found regarding the balance Delaware expects with respect to the conceptual, procedural and problem-solving aspects of mathematics is due — at least in part — to the broad, vague language of the standards discussed earlier in this

report. Attempts to alleviate this through revisions in wording — to include added specificity — and the inclusion of examples and problems will be helpful. At least one reviewer commented on the dissonance created for her by the vignettes and learning events that Delaware pairs with its standards. These activities and scenarios paint pictures of dynamic mathematics classrooms with teachers and students placing an emphasis on conceptual understanding that is not readily apparent in the performance indicators themselves. A student-centered environment is further reinforced in the appendices that outline resources, physical materials, characteristics of the classroom environment and related children’s literature suggested for use in mathematics classrooms. The weakest link appears to be the performance indicator statements themselves. Clarification and refinement of these statements, supported by a range of problems that span procedural, conceptual and practical problem solving, will help clarify the intent of Delaware’s expectations.

Delaware’s mathematical processes performance indicators create still more dissonance given their prominence in the document and the emphasis they give to problem solving, reasoning, communicating and connecting. Reviewers expressed concern that it is not readily apparent in Delaware’s existing document how these processes play out across the grade bands because the mathematical processes performance indicators apply to grades K–10. It is very important that steps be taken to ensure that users of the document understand that the mathematical processes apply to each grade band and to make these processes — as interpreted for a specific grade band — reflect the content defined for that level. Again, clearer language and strong examples and problems for each grade-group designation will help address this concern.

- **Delaware should consider a more logical organizational structure for its standards.**

It appears that Delaware made some conscious, but unconventional, decisions when determining the organizational structure of its standards. For example, Standard 5 addresses estimation, measurement and computation, and Standard 6 addresses number sense. This is a format not seen in other state standards, and Delaware should consider whether such a structure still serves its needs. Consideration should be given to combining number sense (to include estimation) and operations in one standard. Measurement could be presented as a stand-alone standard or perhaps combined with geometry. In addition, the Delaware standards fragment algebra across two standards — with algebra being defined in Standard 7 and patterns, relations, and functions in Standard 10. These could easily be collapsed into one standard.

REVIEW OF THE DELAWARE ENGLISH LANGUAGE ARTS CONTENT STANDARDS

ACHIEVE BENCHMARK STANDARDS IN ENGLISH LANGUAGE ARTS

Achieve has identified several sets of standards as benchmarks of the best in the country at present. In addition to the American Diploma Project *Benchmarks for College and Workplace Readiness*, for grades 4 through 12 Massachusetts and California are the selected models.

The ADP English benchmarks demand strong oral and written communication skills because they are staples in college classrooms and most 21st-century jobs. They also contain analytic and reasoning skills that formerly were associated with advanced or honors courses in high school. The standards documents from Massachusetts and California also display a high level of expectation and clarity and can serve as models for other states embarking on a revision of their standards in English language arts. Although both states have high-quality standards, the presentations of the standards are quite different.

Two major tasks are inherent in constructing quality English language arts standards. The first is a horizontal issue: How best to categorize the variety and yet honor the interconnectedness of language arts. In addition to basic reading and writing processes, the English language arts classroom is the source of instruction in literature, which involves content (names, dates and literary techniques) and process (learning how to take the variety of direct and indirect information presented in a literary text and form generalizations as well as a critical stance). English language arts standards also have become the repository of expectations about non-literary texts, requiring the analysis and construction of persuasive and informational texts. How best to organize this increasingly large domain has implications for teaching, learning and assessment.

The second issue is how to present the vertical nature of English language arts standards so that they represent an increase in expectation across the grade spans. The study of English language arts involves processes, rather than independent skills, and these processes evolve over time in complexity, refinement and application, not in a simple sequence of steps. For example, understanding the main idea of a text is a concept as important to a 1st-grade student as to a college student, yet the increase in the demand of such a skill comes in terms of the complexity of the text examined, not in the skill itself.

The two sets of state standards used as benchmarks in this study represent different approaches to the horizontal issue of categorizing the English language arts domain. The Massachusetts standards, adopted by the state in June 2001 (a supplement was adopted in May 2004, available at www.doe.mass.edu/frameworks/ela/0601.pdf and www.doe.mass.edu/frameworks/ela/0504sup.doc), are organized into four major strands: Language, Reading and Literature, Composition, and Media. Each strand is further delineated into separate standards. Massachusetts' Language strand, for example, includes six standards as follows:

Standard 1: Discussion

Students will use agreed-upon rules for informal and formal discussions in small and large groups.

Standard 2: Questioning, Listening, and Contributing

Students will pose questions, listen to the ideas of others, and contribute their own information or ideas in group discussions or interviews in order to acquire new knowledge.

Standard 3: Oral Presentation

Students will make oral presentations that demonstrate appropriate consideration of audience, purpose, and the information to be conveyed.

Standard 4: Vocabulary and Concept Development

Students will understand and acquire new vocabulary and use it correctly in reading and writing.

Standard 5: Structure and Origins of Modern English

Students will analyze standard English grammar and usage and recognize how its vocabulary has developed and been influenced by other languages.

Standard 6: Formal and Informal

Students will describe, analyze, and use appropriately formal and informal English.

The grade-level expectations are then presented under each standard.

California, whose English language arts standards were adopted in December 1997 (available at www.cde.ca.gov/re/pn/fd/documents/english-language-arts.pdf), divides the discipline in another manner. This set of standards also organizes its expectations by strands, but in this case into four: Reading, Writing, Written Language and Oral English Language Conventions, and Listening and Speaking. Each strand also is divided into standards, with expectations listed under each standard. California's Reading strand includes three standards:

1.0: Word Analysis, Fluency, and Systemic Vocabulary Development

Students apply their knowledge of word origins to determine the meaning of new words encountered in reading materials and use those words accurately.

2.0: Reading Comprehension (Focus on Informational Materials)

Students read and understand grade-level-appropriate material. They analyze the organizational patterns, arguments, and positions advanced.

3.0: Literary Response and Analysis

Students read and respond to historically or culturally significant works of literature that reflect and enhance their studies of history and social science. They conduct in-depth analyses of recurrent patterns and themes. The selections in Recommended Literature, Grades Nine Through Twelve illustrate the quality and complexity of the materials to be read by students.

As can be seen from the two examples above, each state has chosen to "slice" the content of its English language arts standards in quite different ways. Vocabulary expectations, for example, will be found in a Language strand in Massachusetts and included as part of California's Reading strand. Similarly, while some aspects of oral language are found in Massachusetts' Language strand, like expectations will be found in California's Strand 4, Listening and Speaking. The issue here is that there are many ways to categorize the elements of English language arts to clarify the expectations for the audiences of such standards. Neither organization in these two sets of standards is essentially preferable to

the other, but both present a complicated domain in ways that attempt to represent the content as clearly as possible.

The second issue is that of effectively representing an increase in the level of expectations vertically throughout the grade levels. There are at least three ways to increase the cognitive demand of skills throughout the grades.

1. Increase the number and complexity of the content (e.g., from simile to irony).
2. Increase the demand of the performance (e.g., from simple identification to explanation, to interpretation, to analysis, to evaluation).
3. Increase the complexity of the text(s).

Massachusetts and California attempt to portray this increase in expectations in different ways. Massachusetts precedes each list of grade-level expectations with the note that readers should “[c]ontinue to address earlier standards as needed and as they apply to more difficult text.” The standards are cumulative, each year building on the ones preceding them. It is continually noted in the Massachusetts document that the expectations should apply to more difficult texts each year, and the state explicates this demand by providing lists of authors whose texts are deemed appropriate examples for the various grade levels. The standards increase in the complexity of both the content and the performance. California also presents discrete grade-level expectations for each grade level or span that increase in the complexity of the content and performance. California illustrates the level of text complexity by referring readers to its lists of recommended literature for grades 9 through 12.

Both Massachusetts and California present their high school expectations in grade bands of 9–10 and 11–12.

OVERVIEW OF THE DELAWARE ENGLISH LANGUAGE ARTS CONTENT STANDARDS

Delaware adopted its *English Language Arts Content Standards* in 1995, and the document describes four standards and performance indicators for each standard. It provides expectations for grades 9–10 at the high school level, with no expectations included for grades 11 and 12. The document is organized around four standards:

Standard 1: *Use written and oral English appropriate for various purposes and audiences.*

Standard 2: *Construct, examine, and extend the meaning of literary, informative, and technical texts through listening, reading, and viewing.*

Standard 3: *Access, organize, and evaluate information gained through listening, reading, and viewing.*

Standard 4: *Use literary knowledge accessed through print and visual media to connect self to society and culture.*

Each of these four standards includes performance indicators organized by grade cluster.

MAJOR FINDINGS OF THE ANALYSIS: ENGLISH LANGUAGE ARTS

STRENGTHS OF THE STANDARDS

- **In general, Delaware’s standards show a thoughtful response to the task of elaborating what students should know up to the end of grade 10.**

The organization shows an understanding of processes students use when reading, writing and speaking and a desire to communicate those processes to Delaware’s educators. The state has built its expectations on the foundations of reading theory, and, as such, the document provides a rather extensive view of English language arts.

The strands of Reading, Writing, Listening, Speaking and Media are included on equal terms, and the interactive nature of the processes of producing and interpreting language are attended to in a comprehensive manner. This document has served the state’s classrooms well for the past 10 years, and it will provide a dependable basis for revisions that reflect the evolution of standards in the past decade.

AREAS FOR IMPROVEMENT

Although Delaware’s standards may well have been state-of-the-art when they were first adopted, great strides have been made with respect to writing standards in the intervening decade. In the 10 years since Delaware developed its standards, other states and projects have revised their expectations in a variety of ways. Using the ADP benchmarks and the high school standards from California and Massachusetts for comparison, Achieve’s review team suggested several ways that the Delaware standards could be strengthened.

A major issue in comparing Delaware’s high school standards to those of other states or to ADP is that ADP describes the achievement goals for the end of grade 12, and both Massachusetts and California include standards for grades 11 and 12. Delaware’s standards set a lower level of expectation than ADP by reason of attending to different grade levels. A comparison of Delaware to ADP, however, reveals areas within the ADP document that Delaware can consider as starting points if the state wishes to construct grade-level expectations for grades 11 and 12. Likewise, because both California and Massachusetts are targeted to grades 11 and 12 as well as to 9 and 10, both of these sets of benchmark standards should prove helpful in the development of Delaware’s 11–12 set if so desired.

- **Delaware’s English language arts standards can be strengthened by increasing the level of specificity used to define what is expected of students.**

Although most indicators contained within Delaware’s document are not difficult to understand on their face, the vagueness of many of the standards makes them difficult to interpret with precision. Lack of clarity in this document is caused mainly by the lack of specification about the level of sophistication of the demands. As things stand, many of Delaware’s standards and indicators force the teacher, student and assessment developer to guess about the parameters.

The level of specificity of Delaware’s standards is not comparable to that of the benchmark documents, neither is it comparable to the ADP document that is meant to summarize a set of “must have” competencies that students need by the time they leave

high school if they expect to succeed in postsecondary education or in high-performance, high-growth jobs. As such, the ADP benchmarks are meant to be a more general articulation of what is expected of students than a state's focused, grade-by-grade progression from kindergarten through high school graduation, so it is especially problematic that Delaware's formulations are more general than ADP.

Some statements in the Delaware standards are quite broad and could be focused to a narrower "grain size." Having a consistent grain size of performance indicators across standards is important. Narrowing the focus of each statement helps teachers plan instruction (e.g., all of the statements are parallel in terms of their weight, rather than having some broad, all-encompassing statements that may not guide specific instructional decisions) and anticipate how statements might be measured on an assessment.

For example, 4.2.a, "making inferences about content, events, characters, setting, theme, tone, mood, and author's purpose," is broader than 4.2.f, "explaining the effect of point of view." Similarly, 2.4.a, "responding to questions requiring critical thinking," or 2.4.g, "overcoming problems presented by ambiguity," is broader and less focused than 2.4.k, "distinguishing between emotional and logical arguments," or 2.4.i, "evaluating texts and media presentations for bias and misinformation."

Some other standards included in the Delaware document do not provide a clear message to the student or teacher, as in Standard 2.5.c, "extend meaning by using divergent thinking," or Standard 2.4.c, "critically analyze and evaluate information ... by responding to questions requiring critical thinking."

Delaware also may want to consider the level of detail it uses when addressing the qualities of student-produced writing, particularly because a higher level of detail would assist teachers when creating classroom rubrics to assess student writing.

For example, under Standard 1, Written Communication, statement 2, Delaware specifies that students will write informative (subject-oriented text) that "could include letters, summaries, messages, reports, memos, proposals, resumes, or applications." The criteria for such documents include addressing the needs of the audience, exhibiting appropriate modes, conforming to the appropriate formats and containing documentation. The ADP benchmark C10 goes into much more detail about what would be expected when a student produces work-related texts such as memos, e-mails, correspondence, project plans, work orders, proposals and bios. The criteria expected for such texts include addressing audience needs, stated purpose and context; translating technical language into non-technical English; including relevant information and excluding extraneous information; using appropriate strategies such as providing facts and details, describing or analyzing the subject, explaining benefits or limitations, comparing or contrasting, and providing a scenario to illustrate; anticipating potential problems, mistakes and misunderstandings that might arise for the reader; creating predictable structures through the use of headings, white space and graphics, as appropriate; and adopting a customary format, including proper salutation, closing and signature, when appropriate. Attention to specific elements of writing forms at the state level enhances the attention to these aspects in the classroom; the goal of standards always is to translate the expectations into practice.

Additionally, ADP goes into greater detail than Delaware in discussing the construction of arguments in writing. For example, instead of expecting that students will "address the

needs of the audience” (Written Communication performance indicator 2.a), ADP expects that students will “anticipate and address the reader’s concerns and counterclaims.” This change may appear slight, but the latter example specifies the audience needs that are most relevant to the composition of a strong argument.

The intent of such specificity is not to restrict a writer’s options but rather to offer more by suggesting a variety of ways to approach a task, instead of expecting the general statement to convey the array of choices.

The California and Massachusetts standards also contain much more specificity than the Delaware standards. For example, in terms of critique and comparison of treatment, scope and organization across multiple texts, the benchmark standards are much more explicit than Delaware’s. California expects students to “[s]ynthesize the content from several sources or works by one author dealing with a single issue; paraphrase ideas and connect them to other sources and related topics to demonstrate comprehension” (9–10: 2.4). Massachusetts expects students to “[c]ompare and contrast the presentation of a theme or topic across genres to explain how the selection of genre shapes the message” (9–10: 10.5). ADP expects students to “[a]nalyze two or more texts addressing the same topic to determine how authors reach similar or different conclusions” (E8). Delaware notes similar expectations under two standards, requiring that students “demonstrate an overall understanding of oral and printed texts by comparing information between and within text” (3.g) and “critically analyze and evaluate information and messages presented through print, speech, and mass media by connecting and synthesizing information from many sources” (4.a). The specificity of the benchmark expectations relative to the general nature of the Delaware statements is the key to communicating clearly with the audiences of any set of standards. It is not enough to require that students connect information — it is the nature of those connections that provides a direction for instruction. Whether the focus is on the author, as in California; the genre, as in Massachusetts; or the conclusions, as in ADP, matters less than the fact that a specific lens for the process of comparison is stated. It is such clarity of intent that effectively translates standards into instruction.

- **The present organization of the Delaware standards could be revised to clarify the domain for the various audiences of the document.**

Delaware should consider restructuring the format of its standards by organizing the standards under strands that are more discrete and identifiable than the four current strands. The current strands are too vague to communicate clearly the state’s expectations to the public, and their integrated nature often leads to unnecessary redundancies within the standards.

Generally speaking, the organization of Delaware’s standards, although logical and true to the literacy processes that students use, is not as easy to use when locating information as the organization used by some other states and the ADP benchmarks. It is clear that the state had an understanding of the processes that students use in reading, writing and speaking and wanted to communicate those processes through the organization of their performance indicators. For example, Standard 2 begins with performance indicators that relate to word-level understanding of texts (vocabulary) and then progresses to self-monitoring, basic comprehension, critical analysis and evaluation, extending texts, and assessing the impact of media. Such a progression does demonstrate the acquisition of a

skill, but it does not clearly communicate the instructional elements. That being said, one need not always begin with vocabulary to get to assessing media.

However, while this structure is logical and does follow an understanding of various literacy processes, it is not the easiest structure to navigate or to facilitate translation into either instruction or assessment. Lettered statements are grouped together under a larger numbered statement, and readers may not see each one as separately important and thus may miss important content. The format makes it difficult to parse out individual, different topics when there is so much content grouped into each performance indicator statement. For example, readers may not note that there are different skills and strategies that apply to literary comprehension and analysis, informational text comprehension and analysis, speaking and listening, comprehension and analysis of media presentations, and analysis of persuasive techniques and propaganda as listed in Standards 3 and 4. These different topics would be highlighted better by a different organizational structure that would emphasize to educators the need to include instruction with literary texts; informational texts; and persuasive texts, speeches and media presentations.

It is difficult in the present format of the Delaware standards to find content and to be clear about expectations. Reading, listening and viewing are grouped together in all four overarching standards, and they are treated as equivalent without regard to their differences. As a result, many of the listening and viewing skills get lost. To strengthen their focus and coherence, Delaware should consider adopting a more precise framework for presenting the standards that separates the standards into the traditional areas of reading, writing and speaking/listening. The benchmark documents offer a variety of useful alternative strategies for that framing. California offers a taxonomic approach by subdividing the major skill areas (Reading/print awareness, Reading/vocabulary development, Reading/phonological development, Listening/oral comprehension, Listening/oral communications, etc.). Massachusetts standards have broad strands (Reading and Literature is one) under which are specified a series of general standards (beginning reading and understanding text, theme, genre, etc.), each of which is defined briefly in a paragraph before breaking into specific learning standards for grade spans. The ADP benchmarks use a different organization. The order and grouping of their content serve to emphasize logic and de-emphasize literature (in the sense that it appears last). Both of these serve to emphasize points about what topics are essential for success in the world of work and higher education.

With respect to listening comprehension, for example, ADP includes some specifics that mirror those in reading comprehension, but the listening benchmarks include additional targeted specifics as well. Some examples include “Analyze the ways in which the style and structure of a speech support or confound its meanings or purpose” and “Identify the thesis of a speech and determine the essential elements that elaborate it.” Delaware combines listening with reading and viewing throughout its standards without any differentiation or emphasis. While the different modes of taking in information share strategies and cover some of the same skills, they also differ, and students need to pay attention to those differences to grasp the full meaning of what they are listening to, reading or viewing.

In addition, Delaware’s organization leads to some repetition. In the above example, “drawing conclusions” appears both in 3.i and 4.d. Figurative language appears both in 3.c and 4.e. It is unclear how 3.j, “accepting or rejecting the validity of the information

and giving supporting evidence,” is different from 4.i, “evaluating texts and media presentations for bias and misinformation.”

Delaware’s organization also makes it difficult to see the progression of challenge across grades. In some cases, this is not an issue because some performance indicators repeat across grade levels. Although the basic premise of the organizational structure is sound (e.g., that the processes students use remain the same across grade levels, while the challenge of the text or writing or speaking task increases), this stance makes it difficult to articulate a progression of expectations of challenge across grade levels. Like Delaware, Massachusetts shows all grade levels under each standard. However, Massachusetts does not repeat content across grades. Instead, it refers users to earlier grades and then attempts to show a progression of challenge across the standards statements it includes at each level. California, on the other hand, lists discrete skills at each grade span — each one building off of one targeted at a lower level but also building in elaboration or complexity.

If Delaware plans to draft grade-level standards for grades 3 through 8 and the grade 11–12 band, it may want to develop tables to show how statements progress, change or remain the same across the current grade bands. This consideration of the current progression will help the state see when there is repetition that is appropriate and when there is repetition that could be revised to show a clearer progression of challenge. If content repeats in the same way across grades, the expected high levels of performance and rigor of instruction rely solely on individual teachers’ judgments of what is appropriate for each grade. Therefore, the more that the standards can assume the job of articulating what is expected across grade levels, the more the state can be assured that students are reaching high levels of achievement as they continue along in school.

What all of these organizational schemes described above offer is a guide to making sense of the bits and pieces represented by the individual expectations, as well as a way to assess the coverage of the overall domain and its numerous parts. Any of these structures would make the Delaware expectations more intelligible, more useful to teachers and less open to the possibility that there will be learning gaps. It also would allow Delaware to add more sophistication and specification to the various expectations.

- **To be comparable to the ADP benchmarks and the Achieve state benchmark standards, Delaware needs to increase the level of rigor described in its present high school standards.**

It is perhaps obvious that because the Delaware standards only progress to grade 10 they cannot describe the levels of performance that Achieve’s benchmarks can in addressing skills and concepts to be attained by the end of high school. It is the case, however, that even with the grade-level limitation Delaware could still refine and ratchet up its expectations for its secondary students.

When compared with the benchmark standards and ADP benchmarks, Delaware’s standards and performance indicators appear to include some high school-level content that is at a lower level than what is expected in the benchmark documents. This may be due, in part, to the emphasis of Delaware’s standards. While the benchmark documents emphasize the real-world applications of literacy, skill with argumentation and logic, and sophisticated literary analysis, Delaware’s standards and performance indicators have an overall emphasis on the students’ personal connections with the writing and reading processes.

A number of performance indicators in the Delaware standards, for example, have no corresponding statement among the ADP benchmarks. Some of the Delaware indicators are appropriate to high school and are present in Achieve’s benchmark state standards of California and Massachusetts. Some of the content, however, may be more appropriate for inclusion at earlier grades (and, in fact, some of it is already included in Delaware’s middle school standards).

For example, Delaware may want to consider the implications of the emphasis on personal connections with reading and writing. This type of connection is essential to developing readers and writers; beginning readers make meaning of texts by identifying with the characters in the texts or by comparing textual events with personal experiences. Early writers often take pen to paper to describe personal events or anecdotes. Delaware may want to consider, however, whether this emphasis on the connection with the personal is appropriate at the high school level, or whether it suggests a lower level of rigor than the state intends. Part of what makes reading higher-level texts challenging is that a personal connection is not always evident. High school students should be able to read, analyze, critically review and evaluate texts with which they do not have an immediate personal connection; they should be able to make arguments on issues with which they do not have personal experience. Part of what we expect from higher-level persuasive writing is that it not be based on personal opinion or experience alone.

The state also may want to consider how it expects educators to measure statements that require personal connection. The recently revised NAEP framework for its reading assessment notes a movement in measuring cognitive processes from a focus on a reader’s stance to cognitive targets.

Cognitive Processes

Previous Reading Framework	2009 NAEP Reading Framework, Draft
Stances/Aspects of Reading: <ul style="list-style-type: none"> • Forming a general understanding • Developing interpretation • Making reader/text connections • Examining content and structure 	Cognitive Targets, Distinguished by Text Type <ul style="list-style-type: none"> • Locate/Recall • Integrate/Interpret • Critique/Evaluate

Reading Framework for the 2009 National Assessment of Educational Progress, prepublication edition, September 2004.

For example, Standard 4 states that students should “apply knowledge gained from literature as a basis for understanding self and society by (a) using literature as a resource for shaping decisions; and (b) using literature as a resource for understanding social and political issues.” The state may want to consider how this expectation could be measured, either in a large-scale situation or in a classroom performance assessment or observation.

The Delaware document includes, in all four standards, strategies for self-monitoring comprehension. These are internal processes — important but not measurable on any assessment — that often are covered much earlier in a set of K–12 standards. For example, generating a purpose for reading should be learned in the primary grades, just as rereading to make sense or adjusting the rate of reading should be. The text of Standard 2 (“self-monitor comprehension while listening, reading, and viewing”) and its attendant

indicators does not change from its first inclusion at grades K–3. California and Massachusetts do not include this content at their middle or high school levels. Delaware may want to consider whether this performance indicator needs to repeat all the way into high school. Perhaps a note at the beginning of Standard 2 referring to the importance of monitoring comprehension would suffice.

In grades K–3, students are learning comprehension skills and strategies. Including self-monitoring in early grade-level standards is important. We expect to see beginning readers use the strategies specified in the Delaware performance indicators and other self-monitoring strategies, such as using sentence meaning, story meaning and syntax to confirm accurate decoding or self-correct errors and using self-monitoring strategies such as asking questions, retelling, summarizing, searching for clues or asking for help.

Likewise, the area of logic and argument is an area in which ADP’s expectations clearly exceed those of Delaware’s. This is an area in which Delaware could develop its grade 11–12 standards. Delaware includes standards material such as detecting bias, misinformation and propaganda techniques. Those skills are not insignificant, but the level of expectation set by the ADP is much higher. It includes the ability to identify false premises in an argument; evaluate connections among evidence, inferences and claims; evaluate the quality of evidence used; recognize common logical fallacies; and understand the distinction between a deductive and inductive argument, among others. Even the ADP standard concerning fact and opinion is more sophisticated than the Delaware standard, as it includes, in addition, the ability to distinguish between evidence and inference.

Regardless of a student’s plans after college, the ability to formulate and analyze arguments is absolutely essential to success. Although postsecondary study can develop these skills, students need to gain a solid foundation in these basics while they are in high school or they will fall quickly behind their peers.

Other content is present in the California and Massachusetts standards that is not included in the present Delaware document. Among these elements are:

- Vocabulary skills (affixes, etymology, denotation/connotation, figurative language)
- Literary analysis (influence of time and place on authors, poetry, drama)
- Informational text analysis (organization of texts, critique of logic of arguments)
- Writing (responses to literature, real-world writing applications, use of formal vs. informal language)
- Oral presentations (dramatics)

Each of these topics is shown in the report supplement, which also provides the wording used by California and Massachusetts to describe the expectations for high school students with regard to these skills or processes.

If Delaware decides to include some or all of these topics in its high school standards, the state also may want to consider how it might introduce these topics at earlier grades and show a progression of challenge leading up into the high school grades. An examination of the benchmark standards from grades K–12 would be one resource for the state in considering a progression of challenge from K–12.

Another way to ensure an appropriate level of rigor in reading is to be as clear as possible about what is meant by grade-appropriate texts. As Delaware states in its standards document, “Although the complexity and types of text change as students become more proficient, the processes students use to comprehend remain the same.” Providing guidance to the field about how texts change and what is appropriate for the secondary student can be very helpful for any set of standards.

The ADP recommends the reading lists of Massachusetts and Indiana as excellent repositories of essential literature and informational texts for students to read and comprehend. The ADP is clear about the need for every state to include literary specifics in its set of standards: “The only way to determine the rigor of academic expectations that address literary and informational text is to be explicit about the quality and complexity of the works students are asked to read and analyze. Students also must be exposed to the greatest works of literature in English and other literature in translation to understand our common literary heritage and to gain an appreciation for the rich literary traditions from all cultures.” Beyond showcasing those lists, the ADP, for example, includes one standard that calls out 18th- and 19th-century foundational works of American literature and another standard that sets the expectation that students have knowledge of certain foundational U.S. documents.

Delaware does attempt to identify the range and complexity of texts students need to read, but it does so too broadly to be helpful. One statement reads, “By the completion of Grade 10, using literature appropriate for age, stage, and interests, students will be able to” That statement could include just about any text at any level of demand. A second standard expects students to “[d]emonstrate an appreciation for a broad range of culturally diverse literary texts and media created by historical, modern, and contemporary authors through: (a) responding to literary texts and media representing the diversity of American cultural heritage inclusive of ages, genders, nationalities, races, religions, and disabilities; (b) responding to literary texts and media representative of various historical periods ranging from the ancient world to the present; and (c) responding to literary texts and media representative of world literature.” This standard with all of its components includes just about any text from any era. Delaware also does not include any specifics on poetry, whereas the ADP does. The new National Assessment is expected to include poetry at the high school level.

A COMPARISON OF DELAWARE’S HIGH SCHOOL COURSE REQUIREMENTS FOR GRADUATION AND DELAWARE’S UNIVERSITY ADMISSIONS REQUIREMENTS

Delaware also asked that Achieve review the degree of alignment between the courses students must take to earn a high school diploma in Delaware and the courses required for admission to the University of Delaware and Delaware State University, as well as for placement into a degree program at Delaware Technical and Community College. Even if state standards in mathematics and English language arts are aligned to rigorous benchmarks, Delaware graduates might not be well prepared for postsecondary education and work if they did not take the courses that teach those standards. Both the state’s course requirements for high school graduation and the course requirements for admissions to the state’s higher education system send strong signals to students as to the courses they should take.

Delaware’s high school graduation requirements are comparable to those of other states. Delaware’s present high school course requirement of 22 credits is the median of all minimum state diploma requirements. Likewise, the distribution of credits among the core subjects of English, math, science and social studies is consistent with the requirements in other states. Unfortunately, like slightly more than half of the states that set graduation course requirements, Delaware does not specify *which* courses students must take to earn a diploma. Yet the research conducted for the American Diploma Project and other studies show that *taking the right courses* matters more than simply *taking the right number of courses*. To be prepared for postsecondary education and work, every high school student should take four years of rigorous mathematics, including Algebra I, Geometry and Algebra II, as well as data analysis and statistics. Every student also should take four years of grade-level English, with courses that include literature, writing, reasoning, logic and communication skills.

In reviewing the admissions course requirements at Delaware’s two public universities — Delaware State University and the University of Delaware — Achieve found that the expectations for both institutions are more alike than dissimilar, and each is more prescriptive in terms of content than are the present state high school course requirements. Nevertheless, the four-year institutions have taken different approaches to communicating their admissions course requirements to prospective students.

Delaware State University (DSU) has established straightforward course requirements for freshman admissions in the core areas of English, math, science and social studies, as well as a requirement that applicants study either a foreign language or computer science, for a total of 16 credits. Unlike Delaware’s high school graduation requirements that include three unspecified math courses, DSU requires that applicants take at least a three-year course sequence in mathematics that includes Algebra I, Geometry and Algebra II. Among other differences, DSU also requires that the high school science courses include a lab component, something not specified in Delaware’s science course requirements for graduation.

The University of Delaware (UD) has established a more complex set of admissions requirements relative to high school course completion. For students applying to UD starting in fall 2006, course requirements cover the same core areas as DSU — with the addition of a foreign language requirement — and “must be at least at the college-

preparatory level.” The admissions requirements — 18 in all — include three years of math, but unlike DSU, which specifies two years of algebra and one year of geometry, UD specifies only three years of college-preparatory math. UD also requires two lab courses in science.

UD’s admission policy is complicated by a second, more rigorous set of recommended courses — a minimum of 20 — and additional requirements for certain majors. In math, UD strongly recommends that applicants complete four years of college-preparatory math, but applicants planning to major in mathematics, engineering, business, computer science or the other sciences must complete *a course beyond Algebra II* such as Trigonometry, Precalculus, and/or Calculus. A similar pattern applies to the sciences: three unspecified courses with two lab components are required for general admission, but four courses with three lab components and specified courses are recommended for applicants who wish to pursue a degree in the sciences, engineering or nursing.

UD admissions requirements, however, are attuned to its various campuses. A practice common to flagship state universities is that certain students are admitted to the main campus in bachelor’s degree programs while others are admitted into sub-baccalaureate programs in satellite facilities (including community and technical colleges). The top applicants who are admitted to UD’s main Newark campus typically have taken four years of math, including a course beyond Algebra II. Stopping at Algebra II will not disqualify applicants automatically, but it will diminish their chances of being admitted and limit their choice of major. Applicants completing just three years of math, as the admissions course requirements demand, would need to have taken three years of college-preparatory math (e.g., Algebra I, Geometry and Algebra II) to be considered. If accepted with no math beyond Algebra II, these students could likely be placed into the two-year associate in arts program located at a Delaware Technical and Community College (DelTech) campus.

Delaware Technical and Community College is an open-enrollment, two-year institution with four campuses located throughout the state. There are, however, placement requirements for degree programs at DelTech for which award-seeking applicants ought to prepare. DelTech places students into college-level math courses — included among the core requirements of the various degree programs — based on student performance on national admissions tests (SAT or ACT) or on the ACCUPLACER placement test. In addition, students seeking placement into an associate in applied science (A.A.S.) degree program should review the college catalog to see whether the program they are interested in has any prerequisites. Although there are no mandatory math requirements, students may need to complete either a college-preparatory or college-level chemistry course to be placed into certain programs.

For Delaware students who see the less well-defined requirements at DelTech or less rigorous requirements for the UD associate in arts program as an invitation to take fewer or less rigorous math courses in high school, such a strategy will undermine any attempt to transfer into a four-year institution at the end of a two-year associate’s degree program. Any student hoping to transfer from DelTech to a four-year institution must be prepared not only for the courses that count toward an associate’s degree but also for courses that are transferred to UD or DSU. The difficulty of transferring credit is further complicated by the lack of an articulation agreement between DelTech and the four-year institutions that would clearly identify which DelTech courses would be accepted for credit at UD or DSU.

TOWARD CLARITY IN EXPECTATIONS

Neither the state's high school graduation requirements nor the formal postsecondary admissions requirements give students in Delaware a clear and accurate picture of the courses they must take to be adequately prepared for postsecondary education. Low-income and minority students and those who would be first-generation college students are particularly disadvantaged by this arrangement because they must rely on the informal knowledge of family and other caring adults to give them the information the education system does not. As is the case in other states, African American and Latino students in Delaware are significantly less likely to graduate from high school with "college-ready" transcripts than are white students.

Both the K–12 and postsecondary education systems have responsibility for addressing this situation. UD in particular should be encouraged to clarify the courses students must actually take to be admitted to bachelor's degree programs. Recruitment and admission materials from UD, DSU and DelTech could clarify how students might earn an associate's or bachelor's degree while transferring credits across one or more of the state's public postsecondary institutions. These articulation agreements would identify specific courses and the level of rigor required to transfer credits toward the student's major. This would allow high school students to prepare both academically and financially to complete their degree program in a timely manner. The State Board of Education should consider phasing in an increase in course-taking requirements for high school graduation to bring them in line with the state's postsecondary institutions' requirements and with the courses that will prepare students to meet the ADP expectations.

TABLE 1: DELAWARE COURSE REQUIREMENTS

Subject	High School Graduation		University of Delaware*				Delaware State University	
	Years Required	Specified Courses	Years Required	Required Courses	Years Strongly Recommended	Strongly Recommended Courses	Years Required	Specified Courses
Mathematics	3	N/A	3	N/A	4	N/A	3	2 algebra & 1 geometry
English	4	N/A	4	N/A	4	N/A	4	“In Grammar/Composition & Literature”
Science	3	N/A	3	3 (2 with lab)	4	4 (3 with lab)	3	“Courses with a laboratory”
Social Studies/ Economics	3	N/A	4	2 history (1 world history)	4	2 history (1 world history)	2	American Civ., U.S. History, World Civ. or African American History
Foreign Language	0	N/A	2	2 of same	4	4 of same	N/A	N/A
Physical Ed./Health	1.5	1 P.E. & .5 health	N/A	N/A	N/A	N/A	N/A	N/A
Fine Arts	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Info Technology	1	“In computer literacy”	N/A	N/A	N/A	N/A	N/A	N/A
Career/Technical	3	“In career pathway”	N/A	N/A	N/A	N/A	N/A	N/A
Electives	3.5	N/A	2	Academic electives: college prep or honors/ AP/IB	0–2	Academic electives: college prep or honors/ AP/IB	4	“Including Foreign Language or Computer Science courses”
TOTAL	22		18		20–22		16	

University of Delaware requirements notes:

- These requirements will take effect with the class that is applying for **fall 2006** admission.
- All units must be at least at the college-preparatory level.
- Prospective majors in mathematics, engineering, business, computer science or other sciences should have completed four years of mathematics, including trigonometry, precalculus and/or calculus.
- Prospective majors in engineering and other science fields are strongly urged to take physics, chemistry and biology.
- Nursing applicants must have completed at least one year of both biology and chemistry.
- Senior year: Unless they also are taking college courses off campus, seniors will need to complete at least three units during their senior year, but they are strongly urged to complete at least five.
- Students may substitute an extra math or science for the fourth year of social studies/economics.

RECOMMENDATIONS FOR MOVING FORWARD

DELAWARE’S CONTENT STANDARDS

Although Delaware’s standards were considered state-of-the-art when they were adopted in 1995, they have not been revised since that time. Given the importance placed on the standards — with their role in guiding the development of state and local assessment, curriculum, and professional development — Achieve recommends that the state consider revising this important document. Revision can either be tackled by revising the document in its current grade-band configuration or by going to another level of detail to define grade-specific standards. At the high school level in mathematics, such standards could manifest themselves as either course standards (e.g., Algebra I, Algebra II and Geometry) or an integrated mathematics sequence. Some states have chosen to develop both.

Regardless of the path selected, Achieve’s suggestions are applicable. To make Delaware’s standards comparable to the ADP benchmarks and to other sets of state standards identified as exemplary, the state should — first and foremost — ensure that appropriately rigorous content is present in its standards. This report and the accompanying appendices should provide detail to assist in this revision process. Second, it is important — as the standards are being revised — to be as clear and specific as possible. Right now, given the broad, general language, the intent of the performance indicators is subject to interpretation, and it was not at all clear to Achieve’s reviewers that Delaware students completing 10th grade would have a level of mathematical or literacy proficiency comparable to 10th-grade students in the benchmark states. To ensure that Delaware students are prepared for either postsecondary education or a job in a high-performance workplace upon graduation, Delaware also should extend its standards beyond the grade 9–10 level to define what appropriate expectations look like for students in their junior and senior years of high school. At a minimum, such high school expectations in mathematics should be based on the presumption of Algebra II or its equivalent for all students, with optional expectations defined for college-intending students interested in pursuing mathematics-intensive majors.

DELAWARE’S COURSE REQUIREMENTS

An alignment of the Delaware secondary-level *Mathematics and English Language Arts Content Standards* with the ADP benchmarks for mathematics and English is not enough to guarantee that the expectations gap between high school graduation and the postsecondary worlds of college and work will close. Because students earn a state of Delaware diploma based on the completion of course requirements, the courses students take must reflect college- and work-ready standards and must be part of a required college- and work-ready course of study.

Alignment with admission requirements and recommendations for the University of Delaware (UD) and Delaware State University (DSU) can be achieved by requiring all high school students to take and pass a common college- and work-preparatory course of study to earn high school diplomas and gain admission to the state’s four-year public universities. This course of study should include four years of rigorous mathematics, including Algebra I, Geometry and Algebra II, as well as data analysis and statistics. It also should include four years of grade-level English, with courses that include literature, writing, reasoning, logic and communications skills. Admissions officers and applicant materials should clearly advise prospective students of the advantage they will gain for admission to majors and placement in competitive programs by successfully completing the common course of study in high school.

As a strategy for phasing in more rigorous course-taking requirements, Delaware may want to look at the models being implemented in Indiana, Arkansas and Texas. Those three states have made a college- and work-ready curriculum the “default” for all students, but they have provided an opportunity for students to opt out of that course of study with the approval of their parents and teachers. This is an important reversal in the way schools have traditionally approached this issue. Rather than offering a college- and work-preparatory curriculum for only some students, all students in these states will automatically be enrolled in such a course of study unless they specifically choose not to participate. This is sending a powerful new signal to students and schools about the importance of these courses in preparing all students for future success.

APPENDIX: BIOGRAPHIES

ACHIEVE'S BENCHMARKING STAFF

The following Achieve staff and senior consultants led the analysis and report development for Delaware.

MATTHEW GANDAL **EXECUTIVE VICE PRESIDENT, ACHIEVE**

Matthew Gandal joined Achieve in 1997, shortly after governors and business leaders created the organization. He opened the organization's Washington, DC, office and helped build its programs and services.

As executive vice president, Gandal has senior responsibility for overseeing Achieve's major initiatives. He supervises Achieve's work with states and helps shape the organization's national agenda. Gandal played a lead role in organizing the 1999 and 2001 National Education Summits attended by governors, corporate CEOs, and education leaders from across the country.

Gandal has extensive experience reviewing academic standards and education policies in the United States and abroad. He has written dozens of reports and articles on the topic. He also has served on a variety of national and international panels and has helped advise academic standards commissions and legislative bodies in numerous states.

Before joining Achieve, Gandal was assistant director for Educational Issues at the American Federation of Teachers (AFT), where he oversaw the national organization's work on education standards, testing and accountability. Gandal helped the AFT launch a variety of programs and publications designed to support standards-based reform efforts in states and school districts. He was the author and chief architect of *Making Standards Matter*, an annual AFT report evaluating the quality of the academic standards, assessments and accountability policies in the 50 states. He also wrote a series of reports entitled *Defining World Class Standards*, which compared student standards and achievement in the United States with that of other industrialized nations.

Prior to his role with AFT, Gandal served as assistant director of the Educational Excellence Network, an organization founded by Checker Finn and Diane Ravitch. In addition to work on domestic policy issues, Gandal was responsible for directing a series of projects aimed at helping emerging democracies around the world build democratic education systems.

Gandal is a proud graduate of the public school system in the state of Maryland. He earned a bachelor's degree in philosophy from Trinity College in Hartford, CT. He lives in Maryland with his wife and three children.

JEAN SLATTERY **DIRECTOR, BENCHMARKING INITIATIVE, ACHIEVE**

Jean Slattery has been with Achieve since 1999 and currently serves as director for the Benchmarking Initiative and lead reviewer in science. She was supervising director of curriculum development and support in Rochester, NY, from 1989 to 1997, with responsibility for overseeing the work of all subject-area directors in the K–12 instructional program. Her earlier responsibilities as a district-level administrator included serving as director of the middle

school (1987–1989) and junior high (1985–1987) programs. During that period, she initiated Teachers as Partners, a peer-coaching staff development program funded by the Ford and Matsushita (Panasonic) Foundations.

Slattery served as a peer consultant on standards and assessment for the U.S. Department of Education. She also has served as a consultant to the Washington, DC, school district; San Diego Unified School District; a Washington state consortium of rural schools; and the Arkansas and Illinois Departments of Education. Slattery also has worked for the Council for Basic Education on projects involving the Flint Community School District, the Nevada Education Department, and the Cleveland Municipal School District.

Slattery received a bachelor's degree in chemistry from Albertus Magnus College, a master's degree in science education from Yale University and a doctorate in science curriculum from the University of Rochester.

JOANNE THIBAUT ERESH
SENIOR ASSOCIATE, ENGLISH LANGUAGE ARTS, ACHIEVE

JoAnne Thibault Eresh is a senior associate at Achieve, where she leads the English language arts aspects of the Standards-to-Standards Benchmarking and Assessment-to-Standards alignment reviews. She taught writing at the university level and English at private and public high schools in St. Louis, MO, and in Fitchburg, MA. She began her work in curriculum design and performance assessment in 1979 under Superintendent Richard C. Wallace, Jr., and from 1981 to 1994 she was director of the Division of Writing and Speaking for the Pittsburgh Public Schools. During that time, she directed The Pittsburgh Discussion Model Project, funded by the Rockefeller Foundation and part of the CHART network, and she later directed the imaginative writing part of the ARTS Propel Project, a joint project with Harvard's Project Zero and the Educational Testing Service. She was the Pittsburgh district coordinator for the New Standards Project and wrote the teachers' guides for the New Standards ELA Portfolios. In 1995, she was one of the original resident fellows at the Institute for Learning at the University of Pittsburgh's Learning Research and Development Center, and she coordinated the New Standards Linking Projects. From 1997 to March 2001, she was the coordinator of staff development in Community District Two in New York City, where she was responsible for the hiring, training and coordination of that district's staff development group.

KAYE FORGIONE
SENIOR ASSOCIATE, MATHEMATICS, ACHIEVE

Kaye Forgione began consulting work with Achieve in 2000 and joined Achieve as senior associate for mathematics in March 2001. Her primary responsibilities are managing Achieve's Standards and Benchmarking Initiatives involving mathematics. Prior to joining Achieve, Forgione served as assistant director of the Systemic Research Collaborative for Mathematics, Science and Technology Education (SYRCE) project at the University of Texas at Austin funded by the National Science Foundation. Her responsibilities at the University of Texas also included management and design responsibilities for UTeach, a collaborative project of the College of Education and the College of Natural Sciences to train and support the next generation of mathematics and science teachers in Texas.

Before her work at the University of Texas, Forgione was director of academic standards programs at the Council for Basic Education, a non-profit education organization located in

Washington, DC. Prior to joining the Council for Basic Education in 1997, she worked in the K–12 arena in a variety of roles, including several leadership positions with the Delaware Department of Education. Forgione began her education career as a high school mathematics teacher. She taught mathematics at the secondary and college levels as part of adult continuing education programs.

Forgione received a bachelor’s degree in mathematics and education from the University of Delaware, a master’s degree in systems management from the University of Southern California, and a doctorate in educational leadership from the University of Delaware.

CONSULTANTS AND EXPERT REVIEWERS

Achieve relied on the expertise of nationally respected experts in academic content, standards, curriculum and assessment design to inform and conduct the standards benchmarking and alignment of assessments to standards.

ENGLISH LANGUAGE ARTS

ELIZABETH HAYDEL

Elizabeth Haydel was the project manager for Indiana University’s Center for Innovation in Assessment in Bloomington and the project coordinator for the Center for Reading and Language Studies. A graduate of Stanford University with a degree in American studies, Haydel also holds a master’s degree in language education from Indiana University. She currently is an English language arts consultant for the Ohio Department of Education.

Haydel has taught reading and writing to high school students who failed Indiana’s statewide achievement test and “Reading in the Content Areas” for Indiana University’s language education department. She has co-written a number of reading workbooks for children, including for Steck-Vaughn Think-Alongs: Comprehending While You Read program. Haydel has written test passages and items for various state assessments and test preparation programs.

SUSAN PIMENTEL

Susan Pimentel, co-founder of StandardsWork, a non-profit education consultancy, specializes in standards-driven school reform and works as an education writer, analyst and coach. After earning a bachelor of science in early childhood education and a law degree from Cornell University, Pimentel served as senior policy adviser to Maryland Governor William Donald Schaefer and subsequently as special counsel to former Superintendent John Murphy in Prince George’s County, MD, the nation’s 16th-largest school district.

In recent years, her work has focused on helping communities and schools throughout the country work together to advance meaningful and enduring standards-based education reform. This includes the development and implementation of rigorous grade-by-grade standards; results-based evaluation systems; diagnostic assessments; and a powerful new reporting tool, *The Results Card*, which helps communities and educators stay focused on student achievement. StandardsWork focuses on building the system from the inside out, equipping school leaders with the resources and support they need to sustain the process of continuous improvement, close community collaboration and producing data-driven results.

Beyond her work with districts, Pimentel has emerged as an expert in standard setting. The Fordham Foundation has ranked the states in which Pimentel has coordinated the standards-setting effort as having some of the best content standards in the country. California and Arizona were ranked first and second, respectively. She also has helped Maryland revise its English/language arts and social studies standards, raising that state's overall rank from 43rd in 1998 to 10th in 2000. Pimentel is co-author with Denis P. Doyle of the best-selling book and CD-ROM *Raising the Standard: An Eight Step Action Guide for Schools and Communities*.

MATHEMATICS

DONALD R. KING

Donald R. King received his doctorate in mathematics from the Massachusetts Institute of Technology. King is an associate professor of mathematics at Northeastern University. Previously, he was a visiting assistant professor at Salem State College, a visiting assistant professor at the University of California at San Diego, and a high school mathematics teacher in Boston, MA. King is a member of the Mathematical Association of America, American Mathematical Society, and the National Association of Mathematicians. He is active in professional and community service: King was a parent member of the Mathematics Focus Group for Boston Public Schools in 1997; director from 1993 to 1994 of NUMATH, Northeastern University's program to foster minority mathematical achievement and talent in high school; an adviser to algebra-in-middle-schools projects from 1990 to 1992; a review panelist for three years for Ford Foundation post-doctoral fellowships for minorities; and an adviser to Massachusetts' pre-engineering program for minorities from 1988 to 1991. King recently gave a speech at the American Mathematical Society's Special Session on Teaching Mathematics in the New Millennium: "Changing School Outcomes: Raising Standards and Promoting Equity," and he has advised Achieve on the quality of standards and assessments in a number of states, including Minnesota, Oklahoma, New Jersey and Texas.

BARBARA MONTALTO

Barbara Montalto is an independent consultant with deep experience in assessment and instruction. Most recently she was assistant director of mathematics for the Texas Education Agency (TEA). At TEA she conducted more than 400 presentations and workshops. Montalto has been a teacher of mathematics at the high school level and has had extensive experience in speaking, writing and providing technical assistance at the state and national levels. She co-wrote *Mathematics Teacher Resource Handbook: A Practical Guide for Teaching K-12 Mathematics*, and she is the author of both a student study guide and facilitator guide for the television course "Mathematics for Modern Living." Montalto has held office in a number of professional organizations, including NCTM and the National Council of Supervisors of Mathematics, and she served for six years as a regional director of Women in Mathematics.

MARY LYNN RAITH

Mary Lynn Raith received her bachelor of science in mathematics from Indiana University at Pittsburgh and her master's in mathematics education from the University of Pittsburgh. She currently is a mathematics specialist in the Division of Instructional Support for Pittsburgh Public Schools. As such, her responsibilities include leadership roles in curriculum development, textbook selection, design of alternative assessments, in-service program design and

implementation, and coordination of mathematics programs across levels and schools. She has special responsibility for middle schools. Raith also is the co-director of the Pittsburgh Reform in Mathematics Education project (PRIME), a K–12 professional development system.

Prior to this position, Raith was a mathematics supervisor (1986–1996) in Pittsburgh and a middle school mathematics specialist in grades 6 through 8 (1970–1986), working with remedial as well as gifted students. She has designed and presented both locally and regionally and at national conferences sessions on the infusion of algebraic thinking, geometric reasoning, statistics and probability, and problem solving into the K–8 mathematics program. In summer 1987, Raith was chosen to attend the Michigan State University (MSU) honors teachers workshop and since then has been involved with the implementation, piloting and in-servicing of MSU programs.

She also has been involved with a number of national projects, including the development of both the New Standards Reference Examination and the Portfolio project for the middle grades, the Assessment Communities of Teachers (ACT) project, and the Alternative Assessment in Mathematics (A²IM) project. She also has worked extensively with both NCTM and NCEE on their America's Choice school design and has presented at numerous national conferences.

Board of Directors, Achieve, Inc.

Achieve's board of directors is composed of six governors (three Democrats and three Republicans) and six CEOs.

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