What Americans Believe Students Should Know

A Survey of U.S. Adults

by

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January 1999

This publication is based on work sponsored wholly, or in part, by the Office of Educational Research and Improvement, Department of Education, under Contract Number RJ96006101. The content of this publication does not necessarily reflect the views of OERI or any other agency of the U.S. Government.

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CHAPTER 1

THE NEED FOR STANDARDS IN THE STANDARDS MOVEMENT

Since the mid-1980s, U.S. education has seen tremendous attention placed on the identification of what students should know and be able to do as a result of K–12 education. These efforts have manifested in the form of "standards" documents for various subject areas. The first of these documents produced by national subject-matter organizations was *Curriculum and Evaluation Standards for School Mathematics,* published by the National Council of Teachers of Mathematics (NCTM) in 1989. It had a profound impact on how educators viewed the teaching of mathematics. As *Education Week* reporter Karen Diegmueller (1995) explains, the NCTM standards "redefined the study of math so that topics and concepts would be introduced at an earlier age, and students would view math as a relevant problem-solving discipline rather than as a set of obscure formulas to be memorized" (p. 5). The perceived quality and success of this document coincided with efforts on the part of the federal government to increase the academic achievement of U.S. students. Specifically, one of the outcomes of the 1989 education summit in Charlottesville, Virginia, attended by President Bush and the nation's governors, was the identification of six broad goals for education to be reached by the year 2000.[1] These goals and their rationale were published under the title *The National Education Goals Report: Building a Nation of Learners* (National Education Goals Panel [NEGP], 1991). Two of those goals (3 and 4) related specifically to academic achievement:

> Goal 3: By the year 2000, American students will leave grades 4, 8, and 12 having demonstrated competency in challenging subject matter, including English, mathematics, science, history, and geography; and every school in America will ensure that all students learn to use their minds well, so they may be prepared for responsible citizenship, further learning, and productive employment in our modem economy.
>
> Goal 4: By the year 2000, U.S. students will be first in the world in science and mathematics achievement.

Funding soon became available for a variety of subject-matter professional organizations to identify the important information and skills within their content areas. By 1996, standards documents had been developed and published within at least twelve subject areas. These subject areas and related documents are listed in Table 1.1.

The documents listed in Table 1.1 are the result of efforts by groups that were either funded by the U.S. Department of Education or identified themselves as representing the national consensus in their subject areas. Thus, collectively, these documents could be said to articulate the "official" version of standards for the K–12 subject areas.

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[1]The initial set of goals was expanded to eight goals in 1994.

Table 1.1
Official Standards Documents

Subject Area	Documents
Science	National Research Council. (1996). *National Science Education Standards.* Washington, DC: National Academy Press.
Foreign Language	National Standards in Foreign Language Education Project. (1996). *Standards for Foreign Language Learning: Preparing for the 21st Century.* Lawrence, KS: Allen Press.
Language Arts	National Council of Teachers of English and the International Reading Association. (1996). *Standards for the English Language Arts.* Urbana, IL: National Council of Teachers of English.
History	National Center for History in the Schools. (1994). *National Standards for History for Grades K–4: Expanding Children's World in Time and Space.* Los Angeles: Author. National Center for History in the Schools. (1994). *National Standards for United States History: Exploring the American Experience.* Los Angeles: Author. National Center for History in the Schools. (1994). *National Standards for World History: Exploring Paths to the Present.* Los Angeles: Author. National Center for History in the Schools. (1996). *National Standards for History: Basic Edition.* Los Angeles: Author.
Arts	Consortium of National Arts Education Associations. (1994). *National Standards for Arts Education: What Every Young American Should Know and Be Able to Do in the Arts.* Reston, VA: Music Educators National Conference.
Health	Joint Committee on National Health Education Standards. (1995). *National Health Education Standards: Achieving Health Literacy.* Reston, VA: Association for the Advancement of Health Education.
Civics	Center for Civic Education. (1994). *National Standards for Civics and Government.* Calabasas, CA: Author.
Economics	National Council on Economic Education. (1996. *Voluntary National Content Standards in Economics.* New York: Author.
Geography	Geography Education Standards Project. (1994). *Geography for Life: National Geography Standards.* Washington, DC: National Geographic Research and Exploration.
Physical Education	National Association for Sport and Physical Education. (1995). *Moving Into the Future: National Standards for Physical Education: A Guide to Content and Assessment.* St. Louis: Mosby.
Mathematics	National Council of Teachers of Mathematics. (1989). *Curriculum and Evaluation Standards for School Mathematics.* Reston, VA: Author.
Social Studies	National Council for the Social Studies. (1994). *Expectations of Excellence: Curriculum Standards for Social Studies.* Washington, DC: Author.

Problems with the National Documents

Unfortunately, these documents, taken as a group, present a number of challenges to educators who attempt to use standards as the cornerstone of their system redesign or reform initiatives: (1) differing approaches to standards development, (2) multiple perspectives on standards within a subject area, and (3) too much content within and across content areas. (For a detailed discussion of the problems surrounding the national standards documents see Marzano & Kendall, 1996, and Kendall & Marzano, 1997.)

Differing Development Approaches

It is immediately apparent when one consults the documents listed in Table 1.1 that vastly different approaches were used to define standards and their associated elements. This is most evident in the varying levels of generality at which the various documents describe standards. For example, the standards in *National Standards for Arts Education* (Consortium of National Arts Education Associations, 1994) are described in very general terms, for example:

- Understands the arts in relation to history and culture

In contrast, the standards in *National Standards for United States History: Exploring the American Experience* (National Center for History in Schools [NCHS], 1994) are described in relatively specific terms, for example:

- Students should understand the causes of the Civil War

The example from the *National Standards for United States History* obviously is more specific than that from the *National Standards for Arts Education.* In addition, the history document provides more detailed information for each of its standards than does the arts document. These and other differences in approaches to articulating standards have made it very difficult for educators to gain a comprehensive view of standards across subject areas. In other words, because of the idiosyncratic approaches to articulating standards in various subject-matter documents, it is very difficult for education practitioners to obtain an overall sense of the nature and function of standards across all content areas.

Multiple Documents in a Content Area

A second problem that has plagued the national standards movement involves multiple documents for some subject areas. Although it is safe to say that the documents listed in Table 1.1 are generally considered the "official" accountings of the essential know ledge within their respective areas, a number of other documents also address the issue of what students should know and be able to do as a result of K–12 schooling. For example, in the area of mathematics, *Curriculum and Evaluation Standards for School Mathematics,* published by NCTM (1989), is certainly unquestioned as the official standards document. However, mathematics standards and benchmarks also are articulated in the following documents:

- Project 2061, American Association for the Advancement of Science. (1993). *Benchmarks for Science Literacy*. New York: Oxford University Press.

- National Assessment of Educational Progress. (n.d.). *Mathematics Framework for the 1996 National Assessment of Educational Progress*. Washington, DC: Author.

- New Standards Project. (1997). *Performance Standards: English Language Arts, Mathematics, Science, Applied Learning, Volume 1, Elementary School.* Washington, DC: National Center on Education and the Economy.

- New Standards Project. (1997). *Performance Standards: English Language Arts, Mathematics, Science, Applied Learning, Volume 2, Middle School.* Washington, DC: National Center on Education and the Economy.

- New Standards Project. (1997). *Performance Standards: English Language Arts, Mathematics, Science, Applied Learning, Volume 3, High School.* Washington, DC: National Center on Education and the Economy.

- International Baccalaureate. (1993). *Group 5 Mathematics Guide* (Edition 1.2). Geneva, Switzerland: Author.

- International Baccalaureate. (1995). *Middle Years Programme: Mathematics* (Edition 1.1) Geneva, Switzerland: Author.

A similar situation exists in the subject area of science. At least three documents have gained recognition as publications that provide worthwhile descriptions of what students should know and be able to do in science:

- Research Council. (1996). *National Science Education Standards.* Washington, DC: National Academy Press.

- Project 2061, American Association for the Advancement of Science. (1993). *Benchmarks for Science Literacy.* New York: Oxford University Press.

- Pearsall, M. K. (Ed). (1993). *Scope, Sequence, and Coordination of Secondary School Science. Vol.* 1. *The Content Core: A Guide for Curriculum Designers.* Washington, DC: National Science Teachers Association.

In addition, 12 other documents offer useful support for developing standards and benchmarks in science. (For a list of these documents, see Kendall & Marzano, 1997, p. 67.)

In summary, a school or district wishing to review *all* relevant documents that articulate essential subject-matter content would have to go beyond those listed in Table 1.1. To illustrate, McREL researchers have determined that one would need to review 12 documents in history, 8 documents in mathematics, and 32 documents in English language arts to gain a comprehensive perspective in those subject areas.

Too Much Content

In the early stages of the effort to create national standards documents, it was assumed that, considered as a group, the standards would present a manageable, concise listing of what students should know and be able to-do in the various subject areas. However, as the standards documents were completed and made available to the public, it soon became clear that the composite list of information and skills would be overwhelming to the practitioner. Criticisms of the lack of conciseness soon arose. For example, in 1995, Chester Finn, Jr., then Assistant Secretary of Education, noted that "the professional associations, without exception, lacked

discipline. They all demonstrated gluttonous and imperialistic tendencies" (in Diegmueller, 1995, p. 6). At the time of Finn's statement in 1995, the standards documents, taken together, weighed about 14 pounds, stood six inches tall, and contained over 2,000 pages. Since then, more documents, more pounds, and more inches have been added. By contrast, education researcher Diane Ravitch (1995) notes that the Japanese national curriculum fits into "three slender volumes--one for elementary schools, one for lower secondary, and one for upper secondary schools" (p. 15). Similarly, in 1995, Ron Brandt (1995), then executive editor of the Association for Supervision and Curriculum Development, noted that the designers of the national standards documents fell prey to the same trap that plagues subject-matter specialists in local districts: "Specialists naturally expect a lot [in terms of what students should learn]; they know their subject and they know its possibilities. Taken as a whole, however, such statements of aspirations are overwhelming" (p. 5).

The problem of too much content in the national standards was underscored by findings from the Third International Mathematics and Science Study (TIMSS). TIMSS was a large-scale, cross-national comparative study of the education systems in 41 countries. TIMSS researchers examined mathematics and science curricula and instructional practices in all participating countries. Overall, U.S. students did not fare well. To determine why U.S. students performed so poorly, TIMSS researchers examined the curricular practices in participating countries. One of the key findings from this analysis (Schmidt, McKnight, & Raizen, 1996) dealt with the amount of content covered in the mathematics and science curricula:

> Mathematics curricula in the U.S. consistently cover far more topics than is typical in other countries. The number of mathematics topics in the U.S. composite is higher than the 75th percentile internationally in all grades until ninth, when schools typically teach specific courses as algebra, geometry, etc. In science, the tendency toward inclusion is similar, though less pronounced. The number of science topics in the U.S. composite exceeds the 50th percentile internationally in all but one grade until the tenth, when schools tend to abandon general science approaches for specific courses, such as chemistry and physics. (p. 4)

To illustrate the differences in the number of topics addressed by U.S. schools as compared to schools in other countries, consider Table 1.2.

Table 1.2
Number of Topics in Textbooks

Country	Mathematics		
	Grade 4	**Grade 8**	
United States	30 to 35	30 to 35	
Germany	20	20	
Japan	10	10	
Country	**Science**		
	Grade 4	**Grade 8**	**Grade 12**
United States	50 to 65	50 to 65	50 to 65
Germany		7	
Japan	5 to 15	5 to 15	5 to 15

Note: Data from Schmidt, McKnight, & Raizen, 1996, p. 6.

As Table 1.2 shows, U.S. fourth- and eighth-grade mathematics textbooks cover between 30 and 35 topics, whereas textbooks in Germany and Japan cover 20 and 10 topics, respectively. Similarly, whereas U.S. fourth-, eighth-, and twelfth-grade science textbooks cover between 50 and 65 topics, Japanese textbooks cover between 5 and 15 topics, and German textbooks cover 7 topics (at least at the eighth grade). In short, the TIMSS study indicates that although U.S. mathematics textbooks attempt to address nearly 175 percent as many topics than do German textbooks and 350 percent as many topics as do Japanese textbooks, both German and Japanese students performed better than U.S. students in mathematics. Similarly, although U.S. science textbooks attempt to cover more than nine times as many topics as do German textbooks and four times as many topics as do Japanese textbooks, both German and Japanese students significantly outperform U.S. students in their understanding and use of science knowledge.

One might easily conclude that in their current state, the standards documents from the various subject areas are not useful tools for facilitating standards-based reform in American education. Specifically, the three problems outlined above must be addressed if the standards documents are to fulfill the bright promise they once embodied.

The McREL Standards Database

Over the last eight years, the Mid-continent Regional Educational Laboratory (McREL) has attempted to systematically address the three issues described above: (1) differing approaches to standards development, (2) multiple perspectives on standards within a subject area, and (3) too much content within and across content areas. Specifically, in part through its funding from the U.S. Office of Educational Research and Improvement, McREL has undertaken a series of research efforts that address each of these three issues. This report briefly describes McREL's

efforts to address the first two issues[2] and focuses on the third concern; too much content in the national standards documents.

To address the first two problems of differing approaches to developing standards and multiple documents within a content area, McREL analyzed 116 documents covering 14 different subject areas. The number of documents addressed for each subject area is reported in Table 1.3. The full list of documents is presented in Appendix A.

Table 1.3
Number of Documents Consulted for Each Subject Area

Subject Area	Number of Documents
Mathematics	8
Science	15
History (U.S. and World)	12
Language Arts	32
The Arts	6
Civics	9
Economics	6
Foreign Language	3
Geography	6
Health	6
Physical Education	3
Technology	14
Behavioral Studies (Social Studies)	4
Lifelong Learning	18
Total	**142***

**Note:* The total number of documents is 142 as opposed to 116 because some documents address more than one subject area.

The subject areas listed in Table 1.3 represent the subjects that typically are part of the explicit and implicit curriculums in K–12 education. The subject area that is perhaps least recognizable is lifelong learning. This content area is composed of four subgroups of information and skill: (1) thinking and reasoning, (2) working with others, (3) self-regulation, and (4) life work. All of these are competency areas frequently mentioned in documents that represent the opinions of employers. For purposes of this report, these four subgroups are sometimes discussed as two subgroups: (1) thinking and reasoning and (2) work skills (which includes working with others,

[2] McREL's efforts to address the first two issues are described in depth in *Content Knowledge: A Compendium of Standards and Benchmarks for K–12* Education (2nd Ed.) (Kendall & Marzano, 1997).

self-regulation, and life work). These categories are discussed in detail in *Content Knowledge: A Compendium of Standards and Benchmarks for K–12 Education* (2nd ed.) (Kendall & Marzano, 1997) and *A Comprehensive Guide to Designing Standards-Based Districts, Schools, and Classrooms* (Marzano & Kendall, 1996).[3]

When analyzing the documents for each subject area, McREL researchers selected a "reference report" whenever possible. In general, the reference document for a subject area was the document commonly considered to be the "official" document within that domain (see Table 1.1). For example, *National Science Education Standards* was selected as the reference report for the field of science since it is considered the official report for that domain. In general, the reference document provided the blueprint for the format in which standards and benchmarks within a given subject area were to be articulated.

Using the 116 documents listed in Appendix A, a composite set of standards and benchmarks was created. These standards and benchmarks have unofficially become known as the McREL standards database. The utility of this database resides in the fact that it contains the standards and benchmarks found in the 116 documents, all stated in a common format. To illustrate, eight documents were analyzed to construct the mathematics standards in the McREL database:

- National Council of Teachers of Mathematics. (1989). *Curriculum and Evaluation Standards for School Mathematics*. Reston, VA: Author.
- National Assessment of Educational Progress. (n.d.) *Mathematics Framework for the 1996 National Assessment of Educational Progress.* Washington, DC: Author.
- Project 2061, American Association for the Advancement of Science. (1993). *Benchmarks for Science Literacy.* New York: Oxford University Press.
- New Standards Project. (1997). *Performance Standards: English Language Arts, Mathematics, Science, Applied Learning, Volume 1, Elementary School.* Washington, DC: National Center on Education and the Economy.
- New Standards Project. (1997). *Performance Standards: English Language Arts. Mathematics, Science, Applied Learning, Volume 2, Middle School.* Washington, DC: National Center on Education and the Economy.

[3] Throughout the remainder of this report, the following definitions are used relative to these competency areas:

(1) The term *lifelong learning* is used when the areas of thinking and reasoning, working with others, self-regulation, and life work are discussed as a consolidated group.
(2) The term *work skills* is used when the areas of working with others, self-regulation, and life work are discussed as a consolidated group. In such cases, thinking and reasoning is discussed as a separate category.
(3) When appropriate, thinking and reasoning, working with others, self-regulation, and life work are discussed as four separate categories.

- New Standards Project. (1997). *Performance Standards: English Language Arts, Mathematics, Science, Applied Learning, Volume 3, High School.* Washington, DC: National Center on Education and the Economy.

- International Baccalaureate. (1993). *Group 5 Mathematics Guide* (Edition 1.2). Geneva, Switzerland: Author

- International Baccalaureate. (1995). *Middle Years Programme: Mathematics* (Edition 1.1). Geneva, Switzerland: Author.

The following mathematics standards were derived from McREL's analysis of these documents:

1. Effectively uses a variety of strategies in the problem-solving process
2. Understands and applies basic and advanced properties of the concepts of numbers
3. Uses basic and advanced procedures while performing the processes of computation.
4. Understands and applies basic and advanced properties of the concepts of measurement
5. Understands and applies basic and advanced properties of the concepts of geometry
6. Understands and applies basic and advanced concepts of statistics and data analysis
7. Understands and applies basic and advanced concepts of probability
8. Understands and applies basic and advanced properties of functions and algebra
9. Understands the general nature and uses of mathematics

For each standard, benchmarks are articulated at four levels: Level: K–2; Level 2: 3–5; Level 3: 6–8; and Level 4: 9–12. To illustrate, consider the Level I benchmarks for standard 4, "Understands and applies basic and advanced properties of the concepts of measurement." These are reported in Table 1.4.

It is important to note that each benchmark is accompanied by a detailed *citation log.* (For ease of discussion here, we have not included all the information contained in the citation log for each benchmark. For a detailed discussion, see Kendall & Marzano, 1997.) The citations in the log specify the documents in which the benchmark appears and whether the knowledge is stated explicitly or implicitly within those documents. To illustrate, consider the citation for the first benchmark (ME,51;2E,290;PE,24;S1E,61). As the key at the bottom of Table 1.4 indicates, the letter *M* means that the content is found in *Curriculum and Evaluation Standards for School Mathematics* from the National Council of Teachers of Mathematics. The letter *E* indicates that it is explicitly stated and the number 51 designates the page on which it is found. The number *2* indicates that the content also is found in the document *Benchmarks for Science Literacy* by Project 2061. Again, the letter *E* indicates that it is explicitly stated and the number *290*

identifies the page on which that statement appears. The letter *P* indicates that the content is found in *The Mathematics Framework for the* 1996 *National Assessment of Educational Progress* by NAEP. The letter *E* and the number 24, respectively, indicate that the content is explicitly stated on page 24. Finally, *S1* indicates that the content is found in *Performance Standards: English, Language Arts, Mathematics, Science, Applied Learning, Volume 1* by the New Standards Project. The letter *E* and the number *61*, respectively, indicate that the content is explicitly stated on page 61.

Table 1.4
Level I Benchmarks for Mathematics Standard 4

(ME,51;2E,290;PE,24;S1E,61) Understands the basic measures length, width, height, weight, and temperature
(ME,51;2E,290;PE,24;SlE,61) Understands the concept of time and how it is measured
(ME,52;2E,290;PI,25;S1E,61,64) Knows processes for telling time, counting money, and measuring length, weight, and temperature, using basic standard and non-standard units
(ME,51;2E,290;PE,25;S1I,61,64) Makes quantitative estimates of familiar linear dimensions, weights, and time intervals and checks them against measurements

Source Codes (right side of page):

1st letter of each code in parentheses	*2nd letter of code*	*Number*
M = NCTM: Curric. & Eval. Standards for Math	E=Explicitly stated in document	Page number of cited document
2 = Project 2061: Benchmarks for Science Literacy	I=Implied in document	
P = NAEP: Mathematics Assessment Framework		
S I = New Standards: Elementary Level		

The standards in the McREL database are reported in Appendix B. For a complete listing of the benchmarks within each standard, the reader should consult *Content Knowledge: A Compendium of Standards and Benchmarks for K–12 Education* (2nd. ed.) (Kendall & Marzano, 1997). The complete database is also available on the World Wide Web (Uniform Resource Locator: www.mcrel.org).

There is a consistent level of generality across all benchmarks and all standards within the McREL standards database. Articulating the standards and benchmarks from the 116 documents in a consistent format (as shown in Table 1.4) was intended to solve the problem of the differing approaches to standards development used in the national documents. Apparently, this consistency in format has been appreciated by educators as evidenced by the fact that the McREL database has been used in numerous state- and district-level efforts as a resource for designing standards and benchmarks. In addition, the McREL database solves the problem of multiple documents in that it is a composite accounting of the information and skills identified in

all relevant standards documents. However, the database does nothing to alleviate another problem plaguing the efforts to design and implement standards-based education: too much content.

The Lingering Problem of Too Much Content

Although it can be argued that the McREL database addresses the issues of multiple documents and differing approaches, clearly it does not address the problem of too much content within and across content areas. Indeed, the database contains some 200 standards and 3,093 benchmarks.[4] The manner in which the 200 standards and their related benchmarks are distributed across various subject areas is summarized in Table 1.5.

As Table 1.5 shows, the 200 standards are not distributed evenly across the subject areas. In addition, standards for different content areas vary in the number of benchmarks they include. Language arts has the greatest number of benchmarks per standard (34.25); work skills has the fewest number of benchmarks per standard (9.89).

As discussed previously, one criticism of the national standards documents has been that they simply contain too much content. This criticism has been based largely on the perception that numerous pounds, inches, and pages in which the standards are reported represent a body of knowledge that is beyond the capacity of public education to address and, perhaps, is beyond the needs of K–12 students. However, to answer the question of whether 200 standards and 3,093 benchmarks are truly "too much content," one must answer two questions: How much time is available in K–12 education? and How much time does it take to adequately address the 200 standards and their 3,093 benchmarks? Quite obviously, if there is enough time available to adequately teach 200 standards and their related benchmarks, then this collective set of standards does not involve "too much" content for a K–12 system.

How Much Time Is Available in K–12 Education?

Presumably, one of the most stable aspects of time-usage is the number of days in the school year-probably because of state law mandates. The common assumption is that schools operate on a 180-day calendar. Studies have found some significant variations, however. For example, in a 1983. study of United States schools, Karweit found that the number of days scheduled for school ranged from 175 to 184 days, for an average of 179. A more recent study by the National Education Commission on Time and Learning, published as *Prisoners of Time* (1994), reported

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[4] The figures of 200 standards and 3,093 benchmarks are substantially different from the figures of 256 standards and 3,968 benchmarks actually contained in the McREL database. This is because the history standards in the database and their accompanying benchmarks are not intended to be addressed at each grade level. Rather, they are designed to be distributed across the various grade levels. Consequently, if a history standard that addresses "how political institutions and religious freedom emerged in the North American colonies" (see U.S. History standard 4 in Appendix B) is addressed at grades 5–6, this content would not be repeated at other grades even though benchmarks have been identified under this standard for other grade levels. Thus, *for the purposes of implementation,* the content in the McREL database can be thought of as covering 200 separate standards that address 3,093 benchmarks.

that as of 1994, 11 states permit school terms of 175 days or less and only one state requires more than 180 days.

Table 1.5
Summary of Standards and Benchmarks by Subject Area
(Classroom Implementation Set)

Subject Area	Number of Standards	N umber of Benchmarks	Benchmarks/ Standards
Mathematics	9	226	25.11
Science	16	265	16.56
History	31	407	13.13
Historical Understanding	2	48	24.00
K–4 History	4	54	13.50
U.S. History	10	135	13.50
World History	15	170	11.33
Language Arts	8	274	34.25
Geography	18	238	13.22
The Arts	25	269	10.76
Connections	1	13	13.00
Dance	6	62	10.33
Music	7	80	11.43
Theatre	6	72	12.00
Visual Arts	5	42	8.40
Civics	29	427	14.72
Economics	10	159	15.90
Foreign Language	5	84	16.80
Health	10	136	13.60
Physical Education	5	105	21.00
Technology	5	94	18.80
Behavioral Studies	4	100	25.00
Thinking & Reasoning	6	121	20.17
Work Skills	19	188	9.89
Working with Others	5	51	10.20
Self-Regulation	6	59	9.83
Life Work	8	78	9.75
Total	**200**	**3,093**	**15.47**

A number of studies also have been conducted concerning the length of the school day. These studies found that, although fairly stable, the amount of time students spend in school each day also varies. In 1963, Reuter found that the length of the school day varied from four to six hours. In the late 1970s, a large-scale study known as the Beginning Teacher Evaluation Study (BTES)

found that second graders were in school 5.5 hours, whereas fifth graders were in school for 6.0 hours (Fisher et al., 1978). Harnischfeger and Wiley (1978) found that the length of the school day within the same district could vary by as much as 45 minutes. A 1994 study by the National Education Commission on Time reported that, on the average, schools offer a six-period day with about 5.6 hours of classroom time per day.

If one accepts the estimate of 5.6 hours of classroom time per day and assumes that the school year is 180 days in length, then about 1,008 hours (5.6 x 180) of classroom time are available in a school year, and 13,104 hours (13 x 1,008) are available in 13 years of schooling — grades K–12. In all, then, teachers have a maximum of 13,104 hours to work with students to teach and reinforce the knowledge identified in the 200 standards and 3,093 benchmarks. One might assume that 3,093 benchmarks can easily be covered in 13,104 hours. However, not all classroom time that is *available* for instruction is *used* for instruction.

Those who study the use of school time commonly think of the school day as divided into two categories of time: instructional time and noninstructional time. Noninstructional time includes such activities as recess, passing between classes, and the like. Estimates of how much time is actually devoted to instruction vary widely. Conant (1973) reported that only 31 percent of the school day is devoted to instruction. Park (1976) reported that between 21 percent and 69 percent of the school day is used for instruction. Marzano and Riley (1984) found that 66 percent of the school day was used for instruction. The National Education Commission on Time and Learning (1994) reported that only 41 percent of the school day is devoted to core academic work in U.S. schools. (We should note that the commission defines core academic subjects as English and language arts, mathematics, science, civics, geography, the arts, and foreign language.)

If we take the highest estimate of 69 percent as the upper boundary of the amount of time that is typically allocated to instruction within the current system, then we can conclude that of the 13,104 hours involved in K–12 education, 9,042 hours (.69 x 13,104) are available for instruction in the best of circumstances, or about 695.6 hours per year. In the most optimistic scenario, then, educators have a total of 9,042 hours, spanning kindergarten through grade 12, within which to teach and reinforce the 200 standards and 3,093 benchmarks.

How Much Time Does It Take to Adequately Address 200 Standards and 3.093 Benchmarks?

Although there is a wealth of research one can access to answer the question of how much time is available in K–12 education, there is little, if any, that directly addresses how much time it takes to teach specific standards and benchmarks. To informally address this question, McREL researchers asked 350 practicing teachers to estimate the amount of time (rounded to the nearest hour) it would take to "adequately address" the content in a representative sample of benchmarks from the database (Marzano, 1998).

At least two estimates of time were obtained for each benchmark. The average number of hours estimated across all sample benchmarks was computed to be approximately five hours. This overall mean was considered an estimate of the average number of hours it would take to address

any given benchmark in the database. The estimated hours necessary to address each standard was computed by multiplying the number of benchmarks by the five hours estimated to teach each benchmark. Although we recognize that this crude method of estimation can result in a fair amount of error in the estimates of time, it does illustrate the general magnitude of the content volume issue. The estimates of the amount of time required for the various standards[5] in the various subject areas are reported in Table 1.6.

Table 1.6
Time Required to Address Subject-Area Standards and Benchmarks

Subject Area (Number of Benchmarks)	Time in Hours
1. Civics (427)	**2,135**
2. History (407)	**2,035**
Historical Understanding (48)	240
K–4 History (54)	270
U.s. History (135)	675
World History (170)	850
3. Language Arts (274)	**1,370**
4. The Arts (269)	**1,345**
Art Connections (13)	65
Dance (62)	310
Music (80)	400
Theatre (72)	360
Visual Arts (42)	210
5. Science (265)	**1,325**
6. Geography (238)	**1,190**
7. Mathematics (226)	**1,130**
8. Economics (159)	**795**
9. Work Skills (188)	**940**
Working With Others (51)	255
Self-Regulation (59)	295
Life Work (78)	390
10. Health (136)	**680**
11. Thinking and Reasoning (121)	**605**
12. Physical Education (105)	**525**
13. Behavioral Studies (100)	**500**
14. Technology (94)	**470**
15. Foreign Language (84)	**420**
Total (3093 benchmarks)	**15,465 hours**

As Table 1.6 illustrates, civics and history, if addressed comprehensively, would take the most amount of time to teach. In fact, together they would take 4,170 hours, or 46 percent of the available instructional time (4,170 divided by 9,042 hours available for instruction).

[5] The amount of time required was estimated by multiplying the number of benchmarks associated with each standard by five hours.

Perhaps of most interest to the question of the feasibility of addressing all 200 standards and 3,093 benchmarks is the total amount of time reported in Table l.6 — namely 15,465 hours. Simple deduction leads one to the conclusion that 15,465 hours of time *necessary* to teach 200 standards and 3,093 benchmarks do not fit into the 9,042 hours *available* for instruction. Stated differently, educators would have to increase the amount of time available for instruction by about 71 percent to accommodate all the standards and benchmarks in the McREL database. This means that within the current configurations of time-usage, schooling would have to be extended from kindergarten to grade 21, or 22 years of schooling. In short, the answer to the question of whether the standards documents considered as a group contain too much content, based on even the crude estimates used here, is an unqualified "yes."

Addressing the Problem

One method of addressing the problem of too much content is to increase the amount of time available for instruction. This is certainly a viable option, one that should seriously be considered at least as a partial solution. This option has been addressed in other works, such as *Prisoners of Time,* published by the National Education Commission on Time and Learning (1994). The study results reported here provide another option: decreasing the number of standards to be addressed in K–12 education based on the perceived importance of each standard.

Decreasing the breadth of what is taught is certainly an implication of the TIMSS findings. But how does one go about choosing from among the multiple standards and benchmarks in the McREL database? Asking subject-matter experts to rate or rank the importance or necessity of standards in these content areas might be one strategy for gaining insight into which standards to choose.[6] Another possible approach is to poll the American public at large about what should and should not be included in a K–12 educational experience. Certainly, the involvement of local community members in decisions about what should be taught in schools aligns well with the assumptions underlying public education. Indeed, education historian Diane Ravitch (1983) notes that local control has traditionally been a centerpiece of American education. Historian John Pulliam (1987) echoes Ravitch's comments, in addition noting that strong involvement of the local community in policy and curricular issues is imperative to effective education.

In an effort to provide a prototype of how schools and districts might approach local community members relative to the issue of which standards should be addressed in the curriculum, McREL procured the services of the Gallup Organization to survey the American public regarding the relative importance of the standards in the McREL database.

[6] McREL is considering implementing this approach as a companion study to the one reported here.

CHAPTER 2

METHODOLOGY

McREL contracted with the Gallup Organization in Princeton, New Jersey, to develop and administer a survey that would address all of the standards in the McREL database. This chapter describes the characteristics of the questionnaire and the general methodology used in the survey.

The Survey

To limit the number of standards anyone respondent would have to rate, a four-questionnaire design was used, with respondents randomly receiving one of the surveys. Each questionnaire addressed different subject areas as shown in Table 2.1. This table also shows the number of survey items used to obtain ratings on the set of standards from the McREL database.

Table 2.1
Subject Areas and Number of Items Covered by Questionnaires

Questionnaire	Subject Areas Covered	# of Items
Questionnaire #1	World History, Health, Mathematics, Foreign Language	81
Questionnaire #2	U.S. History, Physical Education, Science, Behavioral Studies, Technology	81
Questionnaire #3	Civics, Language Arts, Lifelong Learning, Economics	89
Questionnaire #4	Geography, The Arts, Historical Understanding	90
	Total	**341**[7]

[7] Readers should note that the total of 341 questions exceeds the totals of 256 and 200 standards previously mentioned. The reason for the difference between the figures of 200 standards and 256 standards was explained previously in the discussion concerning Table 1.5 (see footnote 4). Specifically, the figure of 256 is based on the inclusion of all history standards; the figure of 200 is based on the assumption that once a history standard is addressed at a given level, it will not be addressed at other levels. Since the figure of 256 is the accurate representation of how many topics are addressed in the McREL database, it was considered the starting point for the development of the questionnaire since the questionnaire was intended to elicit respondent opinion regarding all topics in the McREL database. The figure of 200 is the accurate representation of how many K–12 standards a district would have to address to include all topics in the McREL database.

The discrepancy between the figure of 256 standards in the database and the 341 questions on the surveys is a result of subdividing some of the standards. Specifically, some standards were addressed by more than one question on the survey because it was assumed that the standard, as stated, was too "dense" in content to be easily understood by the public at large. To illustrate, consider the following standard in mathematics: "Understands and applies basic and advanced concepts of statistics and data analysis." Because this standard involves a number of different concepts and skills, it was represented by the following two questions on the survey: (1) Ability to analyze data using concepts such as mean, median, and standard deviation (2) Ability to effectively present data in tables and graphs

The responses to these two questions were then aggregated to compute the overall response to this standard.

Within each questionnaire, subjects were asked to indicate if they thought a standard was *definitely, probably, probably not,* or *definitely not* one that students should know or be able to do by the time they graduated from high school. The directions in the questions were designed to make it clear to respondents that they were making recommendations as to what students should be taught in school as opposed to what should be taught at home or learned incidentally. Each item was rated independently of the others. The directions given to respondents were as follows:

> For each proposed standard please indicate with an "X" in the box if you think it is **definitely, probably, probably not or definitely not** a level of knowledge that students today should have by the time they graduate from high school. Mark **don't know** only if you really are in doubt whether or not it is an appropriate level of attainment for high school graduates.

The number of questionnaire items pertaining to anyone subject area ranged from 5 to 48. The total number of items addressed in each survey varied from 81 to 90 as shown in Table 2.1.

Selection of a Metric

The use of the four response categories *definitely, probably, probably not,* and *definitely not* allowed for the creation of a number of metrics that could have been used to analyze responses. Despite the many options available, based on the advice of Gallup, it was determined that the percentage of responses in each category (i.e., *definitely, probably, probably not,* and *definitely not)* would be the basic metric employed in the study. In addition, it was determined that the percentage of respondents who rated an item as *definitely* necessary would be used as the first line of analysis since it represented the strongest indication from respondents regarding what should be included in a school curriculum.

Population and Sampling

The U.S. population surveyed was adults ages 18 and over, living in the continental United States. A telephone recruitment/mail survey design was used for selecting the sample. This design first involved random-digit dialing to recruit respondents. Those agreeing to participate were mailed one of the four survey instruments. The random-digit aspect of the sampling was used to avoid "listing bias," based on Gallup's experience that households with unlisted telephone

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In other cases, standards were combined, rather than subdivided. For this reason, the survey addresses 248 standards as opposed to 256. Specifically, eight standards in the subject area of K–4 social studies (listed under history) were subsumed under appropriate standards in each of the social studies disciplines. It was determined that, owing to the greater specificity afforded by standards in each of the disciplines of history, civics, and geography, U.S. adults would already have an opportunity to express their opinions about the importance of these topics. Thus, separate standards for the K–4 social studies material were considered both unnecessary and redundant. Consequently, the survey was designed to address only 248 of the 256 standards in the McREL database. For the remainder of this report, the number 248 will be used in discussions of the total corpus of standards that were addressed in the survey.

numbers are different in important ways from listed households. The sample of telephone numbers produced using this methodology is representative of all telephone households within the continental United States.

Given the complexity of the mail survey and the absence of a financial incentive, a relatively low questionnaire completion and return rate was anticipated, even among those who agreed to participate. It was determined that an over sampling strategy was needed. Based on the fact that a sample of 2,400 adults (600 per questionnaire) was needed to attain the desired confidence level of 95% ± 5% and the assumption that about 33% of the questionnaires would be completed and returned, it was determined that about 7,400 willing participants would be identified.

The telephone recruitment phase of the study ran from November 10 through December 19, 1997. During this period, 7,418 adults, or 73 percent of the households, reached agreed to complete the mail survey. Those who did not return their survey in two weeks were called and reminded to do so. If they indicated they had misplaced their questionnaire, they were sent a second copy. A second reminder call was made after about two weeks.

Up to three calls were made to each selected telephone number. The time of day and the day of the week for callbacks varied in order to maximize the chances of finding respondents at home. All calls were conducted on weekends or on weekday evenings to include potential respondents among the working population.

Within each household contacted, commitment to do the mail survey was sought with the youngest male 18 years of age or older who was at home. If no male was home, commitment was sought with the oldest female at home. This method of respondent selection was employed based on Gallup's experience that it produces an age distribution by gender that closely approximates the age distribution by gender of the total population.

January 22, 1998 was set as the cut-off date for receiving surveys. As of that date, a total of 2,553 completed questionnaires were returned from a total of 7,418 adults across the country who agreed to participate in the study. This response rate of 34% (consistent with the expected return rate) yielded adequate sample sizes for each of the four questionnaires: 690 for Survey I; 667 for Survey II; 599 for Survey III; and 597 for Survey IV.

The final sample was weighted in terms of gender, age, and education so that the distribution of the sample matched current estimates derived from the U.S. Census Bureau's Current Population Survey (CPS). Stated differently, the [mal sample was weighted in such a way as to represent the differing distributions of U.S. adults relative to gender, age, and education.

Sampling Tolerances

All sample survey results are subject to sampling error — that is, the extent to which the results may differ from what would be obtained if the whole population (in this case the entire adult

population of the continental U.S.) had been surveyed. The size of such sampling error depends largely on the number of interviews. Again, this study was designed to limit sampling error to less than ±5% at the 95% confidence level. The sampling error tolerances for various response percentages, given the sample sizes in this study, are provided in Table 2.2.

Table 2.2*
Sampling Tolerances for Percentages

In Percentage Points (at 95 in 100 confidence level)** Sample Size							
Response %	**1,500**	**1,000**	**750**	**600**	**400**	**200**	**100**
Percentages near 10	2	2	3	3	4	5	8
Percentages near 20	3	3	4	4	5	7	10
Percentages near 30	3	4	4	5	6	8	12
Percentages near 40	3	4	5	5	6	9	12
Percentages near 50	3	4	5	5	6	9	13
Percentages near 60	3	4	5	5	6	9	12
Percentages near 70	3	4	4	5	6	8	12
Percentages near 80	3	3	4	4	5	7	10
Percentages near 90	2	2	3	3	4	5	8

* Provided by the Gallup Organization.
** The chances are 95 in 100 that the sampling error is not larger than the figures shown.

Table 2.2 indicates the range (reached by adding or subtracting the percentage shown to the original result) within which the results of repeated samplings in the same time period could be expected to vary 95% of the time, assuming the same sampling procedure, the same interviewers, and the same questionnaire. To illustrate how Table 2.2 is used, assume that 33 percent of the respondents to Survey I reported that students should "definitely" know the content of a given standard prior to high school graduation. Given that the number of respondents completing Survey I was 690, the sample size column of 750 in Table 2.2 — the column indicating a sample size closest to the actual sample size of 690 — would be consulted. Next, the row entitled "Percentages near 30" would be consulted since it is closest to the observed percentage of 33. The intersection of the identified row and column contains the number 4. This means that the figure of 33 percent obtained in the sample is subject to. a sampling error of plus or minus four points. In other words, 95 times out of 100 the true response rate would be between 29% and 37%, with the most likely rate being the 33% obtained.

In some instances, it is useful to compare percentages from different respondent groups or from different items. For example, assume that the overall percentage of respondents rating a particular item as "definitely" necessary for high school graduation was 24%; however, 28% of females rated it as "definitely" necessary, and only 20% of males rated it as "definitely" necessary. The question arises as to whether this difference of eight percentage points between

male and female respondents can be attributed to sampling error or to a true difference of opinion. To address this issue, a different approach to estimating sampling error is used. Table 2.3 is used to determine the sampling error for differences between percentages.

Table 2.3*
Sampling Tolerances for Differences Between Percentages

In Percentage Points (at 95 in 100 Confidence Level) **						
	Percentages near 20 or percentages near 80					
Size of Sample	**1,500**	**1,000**	**750**	**600**	**400**	**200**
1,500	4					
1,000	4	5				
750	5	5	5			
600	5	5	6	6		
400	6	5	6	7	7	
200	8	8	8	8	9	10
Percentages near 50						
Size of Sample	**1,500**	**1,000**	**750**	**600**	**400**	**200**
1,500	5					
1,000	5	6				
750	6	6	7			
600	6	7	7	7		
400	7	8	8	8	9	
200	10	10	10	10	11	13

* Provided by the Gallup Organization.
** The chances are 95 in 100 that the sampling error is not larger than the figures shown.

First it is necessary to determine whether the percentages being compared are nearer 20% or 80% or are nearer 50%. In this case, the percentages of 20 and 28 are nearer 20; therefore the top half of Table 2.3 is used. Next, the number of respondents for each group is located in the table. Assume that the number of females responding to the item was 320 and the number of males responding was 370. Considering the number of females first, the row (or column) that contains the number c1osestto the actual sample size is identified. In this case that row is 400. Next, the column that contains the number closest to the actual sample size of males is identified. Again this number is 400. The intersection of this row and column contains the number 7. This means that the allowance for error is seven percentage points and that 95% of the time, the percentage of female responses to this item will be between 1 and 15 points (i.e., subtracting or adding 7 to the original difference of 8 percentage points: 8-7 and 8+7) higher than the percentage of male responses. In other words, one could conclude with considerable confidence that a difference of opinion exists in the direction observed and that it amounts to at least one percentage point.

Respondent Demographic Information

In addition to responses on the various items representing standards in different content areas, each questionnaire sought demographic data about respondents. These demographic questions are summarized in Table 2.4.

Table 2.4
Demographic Questions

These last questions are for classification purposes. As with the other responses you have given, there will be no linkage of your answers to you personally. Gallup will keep all of your answers strictly confidential.

1. Please mark the box that corresponds to your age:

   - □ 18–24
   - □ 25–34
   - □ 35–44
   - □ 45–54
   - □ 55–64
   - □ 65–74
   - □ 75 or older

2. Please mark the highest level of formal education you have completed.

   - □ 8th grade or less
   - □ Some high school
   - □ High school graduate
   - □ Trade, technical or vocational training beyond high school
   - □ Some college, including community or junior college
   - □ Undergraduate college or university degree
   - □ Graduate school course work on degree

3. To which of the following race or ethnic groups do you primarily consider yourself to belong? (*Please mark one box only.)*

   - □ Black or African-American
   - □ Asian
   - □ Pacific Islander
   - □ Hispanic
   - □ Native America, including American Indian, Eskimo and Aleut
   - □ Origin in Indian sub-continent
   - □ Other

4. Currently, are you employed full-time, part-time, or not employed?

   - □ Full-time
   - □ Part-time
   - □ Not employed

5. Which of the following categories represents your total annual household income, before taxes:

   - □ Under $15,000 (Under $288 per week)
   - □ $15,000 to $24,999 ($289 to $480 per week)
   - □ $25,000 to $34,999 ($481 to $673 per week
   - □ $35,000 to $39,999 ($674 to $769 per week)
   - □ $40,000 to $49,999 ($770 to $961 per week)
   - □ $50,000 to $59,999 ($962 to $1,154 per week)
   - □ $60,000 to $74,999
   - □ $75,000 to $99,999
   - □ $100,000 to $124,999
   - □ $125,000 or more

6. Are you male or female?

   - □ Male
   - □ Female

7. In which state do you have your main residence?

   - □□ *(Example: "AZ" for Arizona)*
   - □ Main residence is outside of the 50 U.S. states

In addition, three questions were included in each questionnaire that dealt with respondents' perceptions of the basic purpose or goal of education:

1. A main goal of education should be to provide knowledge that helps individual students obtain meaningful employment.

2. A main goal of education should be to provide knowledge that helps individual students have a well-rounded, productive life.

3. A main goal of education should be to provide knowledge that allows our country to acquire and maintain a competitive edge.

For each of these three statements, respondents were asked to indicate whether it should *definitely, probably, probably not,* or *definitely not* be a main goal of education. These demographics and perceptions were included to allow analyses of various subpopulation viewpoints.

CHAPTER 3

OVERALL FINDINGS

This chapter presents and discusses the findings of the study when responses are considered as a whole — that is, when responses are not subdivided into various subpopulations. A number of questions were addressed in analyzing the data from this perspective. Specifically, this chapter summarizes the findings relative to subject areas and individual standards and addresses the issue of how we might decide which standards to keep in the curriculum and which to delete.

Which Subject Areas Received the Most Favorable Responses?

The four surveys considered as a group address the subject areas that most often represent traditional ways of organizing school curriculum. Consequently, data were analyzed to determine the relative importance of the standards in various subject areas as perceived by respondents, even though it was recognized that such analyses do not address many important distinctions. Specifically, aggregating the findings for the standards within the various subject areas masks the variance among standards within each subject area.

Table 3.1 lists subject areas in rank order by the average percentage of respondents who rated each standard within a subject area as "definitely" necessary. As can be seen in Table 3.1, the health standards had the highest overall rating with an average of 73.9 percent. The arts — dance, music, theatre, visual arts — had the lowest overall rating with a mean score of only 15.5 percent. If one uses 50 percent as the general indicator of acceptance by the majority of American adults, then only five subject areas would have the requisite level of overall support: health, work skills (i.e., working with others, self-regulation, and life work), language arts, technology, and mathematics

Table 3.1 notes the variation in responses to standards within each subject area. This is indicated by the columns "low," "high," and "range." The subject area with the widest range of responses relative to different standards was history. For one history standard, only 6.4 percent of respondents indicated that it "definitely" should be required for high school graduation, whereas for another history standard, 72.7 percent of respondents indicated that it "definitely" should be required. The difference (i.e., range) between these high and low responses is 66.3 percentage points. This indicates that respondents viewed individual history standards quite differently relative to the necessity of their inclusion in a K–12 curriculum. Behavioral studies, on the other hand, had the smallest range of "definitely" necessary responses across standards (12.0%), indicating that respondents generally assigned the individual standards in this subject area the same degree of importance to a K–12 education.

Which Standards Received the Most Favorable Responses?

As mentioned above, considering the standards in subject-matter categories does not address the variability within subject areas relative to the perceived importance of specific standards and can lead to erroneous conclusions about the importance of various content areas. It is interesting to note that 13 of the 15 subject areas listed in Table 3.1 include at least one standard for which 50% of respondents indicated that it should "definitely" be included in the curriculum. Table 3.2 lists the number of standards in each content area that were rated as "definitely" necessary by at least 50% of the respondents. In total, 102 (41 %) of the standards rated met this criterion.

Table 3.1
Ranking of Subject Areas by Average Percentage of "Definitely" Responses

Rank	Subject	Number of Standards	Average % of "Definitely" Responses	Low	High	Range
1.	Health	10	73.9	60.5	89.6	29.1
2.	Work Skills	19	62.6	52.6	72.2	19.6
3.	Language Arts	8	59.4	44.2	83.1	38.9
4.	Technology	5	57.4	44.8	76.5	31.7
5.	Mathematics	9	50.1	29.8	69.1	39.3
6.	Thinking and Reasoning	6	49.8	36.4	62.7	26.3
7.	Science	16	49.0	32.6	68.9	36.3
8.	Civics	29	48.7	27.6	68.5	40.9
9.	Behavioral Studies	4	48.2	41.9	53.9	12.0
10.	Physical Education	5	44.2	23.0	59.8	36.8
11.	Economics	10	42.5	27.7	56.9	29.2
12.	History	79	40.8	6.4	72.7	66.3
13.	Geography	18	38.8	25.0	74.2	49.2
14.	Foreign Language	5	26.7	14.3	35.7	21.4
15.	The Arts	25	15.5	5.2	33.2	28.0

It is interesting to note the pattern of standards that received high and low "definitely" necessary ratings by respondents. To illustrate, consider the top 25 standards (i.e., standards that occupy ranks 1 through 25) and the bottom 25 standards (i.e., standards that occupy ranks 224 through 248). As shown in Table 3.3, the percentages of "definitely" necessary responses relative to the standards in these groups represent dramatically different subject areas.

Table 3.2
Number of Standards by Subject Area
Rated as "Definitely" Necessary by 50% or more of Respondents

Subject Area	# of Standards in the Subject Area	# of Standards Rated "Definitely" Necessary by 50% or More of Respondents
Health	10	10
Language Arts	8	6
Life Work	8	8
History	79	28
Mathematics	9	4
Technology	5	2
Geography	18	4
Science	16	8
Civics	29	13
Self-Regulation	6	6
Working with Others	5	5
Thinking and Reasoning	6	3
Physical Education	5	2
Economics	10	2
Behavioral Studies	4	1
Foreign Language	5	0
The Arts	25	0
Total	**248**	**102**

Nine out of 25 standards, or 36 percent of the top 25 rated standards, are from the subject area of health. In addition, these nine standards represent 90 percent (i.e., 9 out of 10) of the total number of standards identified as essential by health experts. One might infer from these findings that American adults share a common view with health educators about what is important for students to know in the area of health education. Of equal interest is the fact that five life work standards are among the top 25. This represents 62.5 percent (i.e., 5 out of 8) of the total life work standards in the McREL standards database. Again, one might infer that those experts who developed the life work standards share the American public's view that work-related skills such as managing money and cultivating a strong work ethic should be taught and reinforced.

A review of the bottom 25 standards also reveals some interesting patterns. For example, 15 of the bottom 25 standards (i.e., 60 percent) are arts standards — dance, music, theatre, and the visual arts. Indeed, these 15 standards represent 60 percent (i.e., 15 of 25) of the total number of arts standards identified by arts educators.

Table 3.3
Summary of Top 25 and Bottom 25 Standards
Based on Percentage of "Definitely" Responses

Top 25 Standards		Bottom 25 Standards	
Subject Area	**Number of Standards**	**Subject Area**	**Number of Standards**
Health	9	World History	9
Life Work	5	Dance	5
Technology	3	Music	5
U.S. History	2	Theatre	4
Mathematics	2	Visual Arts	1
Language Arts	1	Foreign Language	1
Geography	1		
World History	1		
Civics	1		
Totals	**25**		**25**

One might infer that the American public does not agree with the importance of many of the arts standards as expressed by subject-matter experts in that field. Consider, for example, *National Standards for Arts Education: What Every Young American Should Know and Be Able to Do in the Arts,* the official national standards documents for arts (Consortium of National Arts Education Associations, 1994). The very title of the document communicates the authors' assumptions that the content identified within should be considered essential for all students. To illustrate, the arts educators provide the following rationale for their assertions:

> Arts education benefits both students and society. It benefits the *student* because it cultivates the whole child, gradually building many bonds of literacy while developing intuition, reasoning, imagination, and dexterity into unique forms of expression and communication....
>
> An arts education benefits *society* because students of the arts disciplines gain powerful tools for
>
> - understanding human experience, both past and present
> - learning to adapt to and respect others…
> - learning artistic modes of problem solving…
>
> (p. 6)

Clearly, arts educators do not perceive the content within their domain as ancillary to the education of K–12 students in America. Clearly, the population of U.S. adults do not perceive the' arts standards as essential to K–12 education. Again, however, it should be noted that

individuals responding to this survey were not asked to select anyone standard at the expense of another or to consider standards as a group.

The bottom 25 standards also include a disproportionate number of world history standards (9 of 25, or 36 percent). However, it is important to note that these nine standards represent only 19.6 percent (9 out of 46) of the total number of world history standards. Indeed, one world history standard (number 41) is included among the top 25. This standard deals with a topic that American adults probably consider essential to being able to function effectively in society — the causes and global consequences of World War II. More obscure world history topics, such as major developments during the Tang Dynasty from 600 to 900 CE and the rise of the Mongol empire between 1200 and 1350 CE, were not as highly valued by respondents to this survey.

What Do We Keep and What Do We Leave Out?

The results of this survey provide a ranking of subject-area standards in terms of the preferences of the American public at large. The complete set of standards listed according to the percentage of respondents rating them as knowledge that is "definitely" necessary for students to learn prior to high school graduation is provided in Appendix C. When these findings are considered in light of what is known about the amount of time available in school and estimates of the amount of time necessary to address standards (see discussion in Chapter 1), one can begin to identify which standards, in the opinions of American adults, should be addressed within the confines of the current education system. In other words, the information derived from this study, along with estimates of how long it would take to address the content inherent in each standard, allows for the identification of a "cut-point" for selecting the standards that would be included (and not included) in a K–12 curriculum.

To illustrate how such a cut-point could be established, consider the following process. As discussed in Chapter 1, research indicates that there are approximately 9,042 hours available for instruction during the course of a K–12 education. If one keeps a running total of the amount of time it takes to teach each standard beginning with the top-ranked standard, the 9,042-hour limit eventually is reached. Assuming the previous estimate of five hours per standard, the 9,042-hour limit is reached at the 133rd standard listed in Appendix C, which lists all 248 standards rank ordered in terms of the percentage of "definitely" responses.

Arguably, 133 is a very conservative estimate of the number of standards that could be accommodated in a K–12 curriculum because it is not likely that each standard would be addressed independently of all others in the classroom. An adjustment factor might be needed to account for the fact that the content of some standards overlaps from a teaching and learning perspective (e.g., mathematics, and thinking and reasoning). For purposes of this illustration, a 20% overlap was assumed in the teaching time associated with standards to be covered. Of course, the exact percentage of overlap will vary depending on the assumptions made. Using the 20% figure assumed here allows for the development of a K–12 curriculum that includes 160 standards within the allotted 9,042 hours. Appendix C includes a bolded line at standard 133 to indicate the cut-point that would he established using the ratings in this study without considering the 20% overlap and a hatched line at standard 160, which signifies the cut-point that

takes the 20% overlap into consideration. In the remainder of this report we refer to cut-points made under the assumption of a 20% overlap as the "20% overlap cut-point." Conversely, we refer to cut-points made under the assumption of no overlap as the "no overlap cut-point."

Clearly, the K–12 curriculum that would result from the process of utilizing cut-points based on estimates of time would have some interesting characteristics. Table 3.4 reports the comparative influence of the various subject areas on the curriculum using both the no overlap and 20% overlap cut-points.

Under the no-overlap assumption, the curriculum depicted in Table 3.4 is totally devoid of content in the arts or foreign languages. History (world history and U.S. history) accounts for 30 percent of the curriculum. Thinking and reasoning plus work skills (i.e., working with others, self-regulation, and life work) have been referred to as lifelong learning skills in previous discussions; together, these areas account for 16 percent of the curriculum. Civics accounts for 14 percent of the curriculum, and science and mathematics account for 12 percent.

Perhaps equally interesting is the percentage of the standards identified by various subject-matter experts that would be included in the curriculum using the no-overlap assumption. This is depicted in the fourth column of Table 3.4. Specifically, under the no-overlap assumption, all standards identified by subject-matter experts in health, technology, and work skills (i.e., working with others, self-regulation, and life work) would be included in the curriculum. In addition, 50 percent or more of the standards identified by experts in the following subject areas would be included in the curriculum: mathematics, science, history, language arts, civics, technology, behavioral studies, and thinking and reasoning. On the other hand, a number of subject areas would have no standards or a minority of standards included in the curriculum. Specifically, not a single standard in the arts or in foreign language would be included in the curriculum, and less than 50 percent of the standards in world history, economics, geography, and physical education would be included.

Under the assumption of the 20% overlap, the curriculum exhibits similar characteristics. The curriculum still would be devoid of content in the arts and foreign language. History still would account for 30 percent of the curriculum even though 20 percent more standards are addressed in that curriculum. Lifelong learning skills would account for 16 percent of the curriculum, civics for 15 percent of the curriculum, science and math for 12 percent. In addition, the curriculum would include all of the standards identified by experts in the subject area of language arts, health, technology, behavioral studies,

Under the assumption of the 20% overlap, the curriculum exhibits similar characteristics. The curriculum still would be devoid of content in the arts and foreign language. History still would account for 30 percent of the curriculum even though 20 percent more standards are addressed in that curriculum. Lifelong learning skills would account for 16 percent of the curriculum, civics for 15 percent of the curriculum, science and math for 12 percent. In addition, the curriculum would include all of the standards identified by experts in the subject area of language arts, health, technology, behavioral studies, thinking and reasoning, and work skills. In addition, 50 percent or more of the standards identified by experts in the following subjects would be

included in the curriculum: mathematics, science, history, civics, economics, and physical education. Geography would have less than 50 percent of its standards included in the curriculum. The arts and foreign language would have none.

Table 3.4
Comparative Influence of Various Subjects on the Curriculum

No Overlap Cut-Point 20% Overlap Cut-Point							
Subject Area	**Number of Standards Identified by Experts**	**Number of Standards that Would Be in Curriculum**	**Percentage of Standards Identified by Experts that Would Be Included in the Curriculum**	**Percentage of Curriculum**	**Number of Standards that Would Be in Curriculum**	**Percentage of Standards Identified by Experts that Would Be Included in the Curriculum**	**Percentage of Curriculum**
Mathematics	9	5	56%	4%	6	67%	4%
Science	16	11	69%	8%	13	81%	8%
History	79	40	51%	30%	48	61%	30%
Language Arts	8	7	88%	5%	8	100%	5%
The Arts	25	0	0%	0%	0	0%	0%
Civics	29	18	62%	14%	24	83%	15%
Economics	10	4	40%	3%	7	70%	4%
Foreign Language	5	0	0%	0%	0	0%	0%
Geography	18	6	33%	5%	6	33%	4%
Health	10	10	100%	8%	10	100%	6%
Physical Education	5	2	40%	2%	4	80%	3%
Technology	5	5	100%	4%	5	100%	3%
Behavioral Studies	4	3	75%	2%	4	100%	3%
Thinking and Reasoning	6	3	50%	2%	6	100%	4%
Work Skills	19	19	100%	14%	19	100%	12%
Total	**248**	**133**		**101%***	**160**		**101%***

* The result is greater than zero due to rounding.

The Dangers of Basing a Curriculum Solely on the Opinions of the General Public

It is important to note that the K–12 curriculum produced if one relies solely on the opinions of the general public (as indicated in this study) would have some strong, unintended, negative consequences. Specifically, some content would be excluded from the curriculum that is vital for students to learn. As described above, the curriculum would be totally void of foreign language and the arts under the assumption of no overlap and 20% overlap. This study also indicates that important standards, even within subject areas that one would assume are highly visible to the general public, might also be excluded from the curriculum. To illustrate, consider the areas of mathematics and science.

The Third International Mathematics and Science Study (TIMSS), briefly discussed in Chapter 1, generally is considered the most comprehensive comparison ever conducted of the achievement of US. students with those of students in other countries. In fact, according to Pascal Forgione (1998), Commissioner of the National Center for Educational Statistics, that study represents the "most rigorous international study of schools and student achievement ever conducted. . . .The scope of TIMSS is unprecedented in the annals of education research. The international project involved the testing of more than one-half million students in mathematics and science at three grade levels in 41 countries" (p. 5).

In addition to revealing that U.S. mathematics and science curricula cover more topics in less depth than those in other countries, the achievement of US. 8th- and 12th-grade students in mathematics and science ranked among the lowest across the countries compared. In particular, the TIMSS report on the twelfth-grade results (U.S. Department of Education, 1998) notes:

> U.S. twelfth graders performed below the international average and among the lowest of the 21 TIMSS countries on the assessment of mathematics general knowledge. U.S. students were outperformed by those in 14 countries, and outperformed those in 2 countries. Among the 21 TIMSS nations, our students' scores were not significantly different from those in 4 countries....
>
> US. twelfth graders also performed below the international average and among the lowest of the 21 TIMSS countries on the assessment of science general knowledge. U.S. students were outperformed by students in 11 countries. U.S. students outperformed students in 2 countries. Our students' scores were not significantly different from those of 7 countries….
>
> In all three content areas of advanced mathematics and all five content areas of physics, U.S. physics and advanced mathematics students' performance was among the lowest of the TIMSS nations. (pp. 13–14)

Although mathematics and science educators across the country have used the TIMSS findings as a mandate to make the mathematics and science curricula in the U.S. more rigorous, the curriculum that would be generated using the results of this study would exclude some of the

very topics the TIMSS study suggests should be emphasized. To illustrate, Table 3.5 lists the "advanced" mathematics and science topics on which U.S. students scored unfavorably when compared with students in other countries.

Table 3.5
TIMSS Advanced Mathematics and Science Topics with Poor U.S. Student Performances

Advanced Mathematics Topics
Numbers, Equations, and Functions: Complex numbers and their properties, permutations and combinations; equations and formulas, and patterns, relationships and functions.
Calculus: infinite processes, and change.
Geometry: Basic geometry, coordinate geometry, polygons and circles, and three-dimensional geometry.
Advanced Science Topics (Physics)
Mechanics: Dynamics of motion; time, space and motion, types of forces; and fluid behavior.
Electricity/Magnetism: Electricity; and magnetism.
Heat: Physical changes; energy types, sources and conversions; heat and temperature; and kinetic theory.
Wave Phenomena: Sound and vibration; light; and wave phenomena.
Modern Physics: Nuclear chemistry; quantum theory and fundamental particles; beyond the solar system; subatomic particles; and relativity theory.

Note: From *Pursuing Excellence: A Study of U.S. Twelfth-Grade Mathematics and Science Achievement in International Context* (pp. 40 and 48) by the U.S. Department of Education, National Center for Education Statistics, 1998. Washington, DC: U.S. Government Printing Office.

Some of the advanced topics in mathematics and science listed in Table 3.5 would not be addressed in the curriculum under the no-overlap assumption. For example, in mathematics, the advanced topics of complex numbers, permutations, functions, basic geometry, coordinate geometry, polygons and circles, and three dimensional geometry are addressed by standards that would not be included in the curriculum. Similarly, in science, much of what is covered in the topics of wave phenomena and modem physics are addressed by standards that would not be included. Even under the 20%-overlap assumption some of the content in Table 3.5 would be excluded from the curriculum. Specifically, much of the calculus and advanced geometry content would be excluded in mathematics. In addition, wave phenomena and much of the content in modem physics would still be excluded in science.

These observations certainly lead one to question the advisability of using the opinions of the American public at large as the primary determiner of what should be included in the K–12 curriculum. A more prudent strategy would likely be to devise a strategy for striking a balance between the suggestions of the general public and the nation's subject-matter experts.

CHAPTER 4

THE OPINIONS OF SUBPOPULATIONS

Limited respondent demographic information was obtained on the survey questionnaires. Respondent demographic data collected included age, education level, ethnicity, employment status, income level, gender, and state of residence.[8] Not all variables (nor all values of variables) produced findings that were significant in a practical sense in terms of differences regarding what should be included and excluded in the curriculum. The variables that produced the most interpretable results were educational level, age, and income.

Level of Education

For purposes of these analyzes, responses to the education level variable shown in Table 2.4 were dichotomized into the following two categories: (1) respondents whose educational experience included some type of formal study beyond high school (i.e., trade school, technical, or vocational training beyond high school; some college, including community college or junior college; undergraduate college or university degree; graduate school course work or degree) and (2) respondents whose formal educational experience terminated at high school or below. The rank-ordered standards produced by these two subgroups are reported in Appendices D and E, respectively.

Table 4.1
Number of Standards From Various Subject Areas in Top 25
Based on "Definitely" Responses by Respondent Education Level

Subject Area	More than High School	High School or Less
Health	6	10
Language Arts	2	1
Life work	1	6
Technology	1	2
Geography	1	1
Civics	3	2
Mathematics	2	1
Science	2	0
U.S. History	4	0
World History	2	1
Working with Others	1	1
Total	**25**	**25**

[8] The specific survey questions that addressed these variables are reported in Table 2.3.

Some substantial differences were found in the responses of these two groups. Although there are many similarities in the top 25 standards identified by the two groups, there also are some interesting differences in the subject areas emphasized. Table 4.1 displays the number of standards from different subject areas that made the top 25 standards for the two groups. Table 4.1 indicates that respondents who had more education included more standards in language arts, civic, mathematics, science, U.S. history, and world history. Those with less education included in the top 25 more standards from health, life work, and technology.

Table 4.2
Standards that Would Be Included in the Curriculum
Based on "Definitely" Responses by Respondent Education Level
(No Overlap Cut-Point)

Subject Area	Number of Standards and Percentage of Curriculum Using Highest Percentage of "Definitely" Responses			
	Respondents with More Than High School Education		Respondents with High School Education or Less	
	Number of Stds.	Percentage of Curriculum	Number of Stds.	Percentage of Curriculum
Mathematics	5	3.8	4	3.2
Science	13	9.8	10	7.9
U.S. History	29	21.8	19	15.1
World History	14	10.5	13	10.3
Language Arts	7	5.3	7	5.6
The Arts	0	0.0	0	0.0
Civics	16	12.0	18	14.3
Economics	4	3.0	5	4.0
Foreign Language	0	0.0	0	0.0
Geography	5	3.8	6	4.8
Health	10	7.5	10	7.9
Physical Education	2	1.5	3	2.4
Technology	2	1.5	5	4.0
Behavioral Studies	3	2.3	4	3.2
Thinking and Reasoning	4	3.0	3	2.4
Working With Others	5	3.8	5	4.0
Self-Regulation	6	4.5	6	4.8
Life Work	8	6.0	8	6.3
Total	**133***	**100.1%**	**126***	**100.2%**

*The difference in numbers of standards that would be included in the curriculum is due to the differing amounts of time required to address individual standards. (See discussion of time in Chapter 1.)

As can be seen in Table 4.2, if a curriculum were designed based on the opinions of Americans with a formal education background that goes beyond high school, it would include more standards in mathematics, science, world history, and thinking and reasoning. Conversely, the curriculum would include fewer standards in civics, economics, geography, physical education, technology, and behavioral studies.

Table 4.3
Standards From Core Subject Areas
that Would Be Included in the Curriculum
Based on "Definitely" Responses by Respondent Education Level
(No Overlap Cut-Point Assumption)

Subject Area	More Than High School	High School or Less	Both Groups Combined
Mathematics	5	4	5
Science	13	10	11
History (U.S. & World)	43	32	39
Language Arts	7	7	7
Geography	5	6	6
Total	**73**	**59**	**68**

Table 4.3 compares the relative emphasis on what might be considered "core academic subjects" — mathematics, science, history (U.S. and world), language arts, and geography — for these two groups based on the no-overlap assumption. This table shows that the ranking of standards using the responses of U.S. adults with more than a high school education produces a curriculum with more standards from the core subject areas (73 standards) than does the ranking of standards (59 standards) using responses from those whose formal education terminates at the high school level. In addition, the curriculum produced using the responses of those with more than a high school education includes more standards from the core subject areas than that produced by aggregating the responses of both groups (i.e., 73 versus 68).

Age

A second demographic variable that was used to disaggregate the data was age of respondents. For the purposes of these analyses, responses to the age variable shown in Table 2.3 were dichotomized into the following categories: (1) respondents 45 years of age or older, and (2) respondents less than 45 years old. The rank-ordered standards for these two subgroups of respondents are reported in Appendices F and G, respectively.

Again, there is considerable similarity between the two listings of individual standards; there are also some interesting differences in the content areas emphasized. Table 4.4 shows the number of standards from different subject areas that are included in the top 25 standards for the two groups.

Table 4.4
Top 25 Standards by Subject Area Based on
"Definitely" Responses by Respondent Age Group

Subject Area	45 or Older	Younger Than 45
Health	9	8
Language Arts	I	1
Life Work	6	4
U.S. History	3	3
Geography	1	1
Civics	3	0
Technology	1	2
Mathematics	1	1
World History	0	3
Science	0	2
Totals	**25**	**25**

An analysis of the top 25 standards from the two groups indicates that older respondents appear to value health, life work, and civics more than younger respondents do. Younger respondents appear to emphasize technology, mathematics, world history, and science more than older respondents do. Again, however, the differences in the top 25 standards identified by these two groups must be interpreted with caution.

Table 4.5 shows the results of an analysis of the number of standards from various subject areas that would be included in the curriculum for both age groups when the limitations of time are considered under the no-overlap assumption.

The patterns of preferences for older and younger respondents appear much more similar when one considers all standards that would be included in the curriculum. As Table 4.5 illustrates, the two groups of respondents identified an equal number of standards that address health, language arts, life work, working with others, self-regulation, physical education, and behavioral studies. Older respondents included more standards in U.S. history, geography, civics, and economics. Younger respondents included more standards in technology, mathematics, world history, science, and thinking and reasoning.

Table 4.6 lists the number of standards that would be included from the core subject areas for both groups under the no-overlap assumption. Again, the similarities between the two subgroups are more striking than the differences. However, whereas the curriculum organized around the opinions of respondents 45 or older would include more standards in history and geography, the curriculum organized around the opinions of respondents less than 45 would include more mathematics and science standards.

Table 4.5
Standards that Would Be Included in the Curriculum
Based on "Definitely" Responses by Respondent Age Group
(No Overlap Cut-Point Assumption)

Subject Area	45 or Older	Under 45
Health	10	10
Language Arts	7	7
Life Work	8	8
U.S. History	29	22
Geography	7	3
Civics	18	16
Technology	3	5
Mathematics	4	6
Working with Others	5	5
World History	12	14
Self-Regulation	6	6
Science	9	12
Physical Education	2	2
Economics	5	4
Thinking and Reasoning	3	4
Behavioral Studies	3	3
Historical Understanding	1	0
Totals	**132***	**127***

Table 4.6
Standards from Core Subject Areas that Would Be Included in the
Curriculum Based on "Definitely" Responses by Respondent Age Group
(No Overlap Cut-Point Assumption)

Subject Area	45 or Older	Under 45	Both Groups Combined
Mathematics	4	6	5
Science	9	12	11
History (U.S. and World)	41	36	39
Language Arts	7	7	7
Geography	7	3	6
Total	**68**	**64**	**68**

Income

Income was the third variable used to study responses of subgroups within the total population. For the purposes of these analyses, the responses to the income variable were dichotomized into the following categories: (1) $50,000 or more and (2) less than $50,000. The rank-ordered standards produced by these two groups are reported in Appendices H and I, respectively.

Table 4.7 compares the top 25 standards by subject area for respondents with income of $50,000 or more and respondents with income less than $50,000. Respondents with an income of $50,000 or more appear to value language arts, U.S. and world history, geography, science, and civics more than respondents who earn less than $50,000 annually. The less affluent respondents appear to favor health and life-work skills.

Table 4.7
Top 25 Standards by Subject Area Based on
"Definitely" Responses by Respondent Income

Subject Area	50K or More	Less Than 50K
Health	5	9
Language Arts	4	1
Technology	I	2
U. S. History	3	2
Geography	2	I
Science	2	0
World History	I	2
Life Work	2	6
Civics	4	1
Mathematics	1	1
Total	**25**	**25**

Table 4.8 shows the results of an analysis of the number of standards that would be included in the curriculum for both groups when the limitations of time are considered under the no-overlap assumption.

Table 4.8
Standards that Would Be Included in the Curriculum
Based on "Definitely" Responses by Respondent Income Level
(No-Overlap Assumption)

Subject Area	50K or More	Less Than 50K
Language Arts	6	7
Health	10	10
Technology	3	5
U.S. History	22	28
Geography	6	5
Science	13	11
World History	12	13
Life Work	8	8
Civics	16	16
Mathematics	5	5
Thinking & Reasoning	4	3
Working with Others	4	5
Self-Regulation	6	6
Economics	4	4
Physical Education	2	2
Behavioral Studies	3	3
Total	**124***	**131***

* The differences in numbers of standards that would be included in the curriculum are due to the differing amounts of time required to address individual standards.

Again, when all standards that would be included in the curriculum are considered, the responses of these two subpopulations are more similar than different. Respondents with an income of $50,000 or more exhibit slight preferences in the areas of geography, science, and thinking and reasoning; whereas respondents with an income of less than $50,000 exhibit slight preferences for language arts, technology, U.S. history, world history, and working with others. These similarities in responses are also reflected in the number of standards that would be included in the curriculum under the no-overlap assumption. These are shown in Table 4.9.

The most salient difference between the two subgroups appears to be the preference for science for those with an income of $50,000 or more, and the preference for history for those with an income of less than $50,000.

Table 4.9
Standards from Core Subject Areas that Would Be Included in the Curriculum Based on "Definitely" Responses by Respondent Income Level (No Overlap Cut-Point Assumption)

Subject Area	50Kor more	Less than 50K	Both Groups Combined
Mathematics	5	5	
Science	13	11	11
History (U.S. and World)	36	41	39
Language Arts	6	7	7
Geography	6	5	6
Total	**66**	**69**	**68**

Education, Age, and Income

Thus far, the three demographic variables of education, age, and income have been discussed separately. One might infer from the independent discussions of the preferences of respondents at different education, age, and income levels that the responses from the various subpopulations appear more similar than different. Although this is generally accurate, it is also true that basing a curriculum on the opinions of various subgroups would generate education systems that have some differences that for all practical purposes are significant. Table 4.10 summarizes the numbers of standards by subject area in the top 25, using the responses of the various subgroups examined.

Table 4.10 shows that standards from the arts, economics, foreign language, physical education, behavioral studies, thinking and reasoning, and self-regulation are not included in the top 25 standards ranked by highest percentage of "definitely" responses. There are noteworthy differences in the number of standards included in the top 25 for the various subgroups in the areas of US. history, world history, health, and life work. Finally, there is considerable similarity in the frequency of standards included in the top 25 for the subject areas of mathematics, geography, and technology; no group differed by more than one in the number of standards included.

However, within those subject areas for which a similar number of standards were identified within the top 25, there were some interesting differences. To illustrate, consider the subject area of mathematics, for which 1–2 standards were included in the top 25 based on analyzes of the responses of each of the subgroups examined in this report. Table 4.11 shows the standard or standards included in the top 25 based on the responses of different subgroups. As Table 4.11 shows, different mathematics standards were considered most important by different subgroups.

Some interesting patterns also are found when the number of standards that would be included in the curriculum, considering the limitation of time under the no-overlap assumption, are

compared from subgroup to subgroup. Table 4.12 shows that there are many similarities in the pattern of responses across subgroups.

Table 4.10
Top 25 Standards by Subject Area
by Respondent Education, Age, and Income Level

Subject Area	Education		Age		Income	
	More than High School	High School or Less	45 or Older	Under 45	50K or More	Less than 50K
Mathematics	2	1	1	1	1	1
Science	2	0	0	2	2	0
U.S. History	4	0	3	3	3	2
World History	2	1	0	3	1	2
Language Arts	2	1	1	1	4	1
The Arts	0	0	0	0	0	0
Civics	3	2	3	0	4	1
Economics	0	0	0	0	0	0
Foreign Language	0	0	0	0	0	0
Geography	1	1	1	1	2	1
Health	6	10	9	8	5	9
Physical Education	0	0	0	0	0	0
Technology	1	2	1	2	1	2
Behavioral Studies	0	0	0	0	0	0
Thinking and Reasoning	0	0	0	0	0	0
Working with Others	1	1	0	0	0	0
Self-Regulation	0	0	0	0	0	0
Life Work	1	6	6	4	2	6
Totals	**25**	**25**	**25**	**25**	**25**	**25**

Table 4.11
Mathematics Standards in the Top 25 Based on "Definitely" Responses By Respondent Education, Age, and Income Level

Topic of Mathematics Standard	Education		Age		Income	
	More than High School	High School or Less	45 or Older	Under 45	50K or More	Less than 50K
Measurement		X	X			X
General Nature of Mathematics	X				X	
Computation	X					

Table 4.12
Number of Standards that Would Be Included in the Curriculum Based on "Definitely" Responses by Respondent Education, Age, and Income Level (No Overlap Cut-Point Assumption)

Subject Area	Education		Age		Income	
	More than High School	High School or Less	45 or Older	Under 45	50K or More	Less than 50K
Mathematics	5	4	4	6	5	5
Science	13	10	9	12	13	11
U.S. History	29	19	29	22	22	28
World History	14	13	12	14	12	13
Language Arts	7	7	7	7	6	7
The Arts	0	0	0	0	0	0
Civics	16	18	18	16	16	16
Economics	4	5	5	4	4	4
Foreign Language	0	0	0	0	0	0
Geography	5	6	7	3	6	5
Health	10	10	10	10	10	10
Physical Education	2	3	2	2	2	2
Technology	2	5	3	5	3	5
Behavioral Studies	3	4	3	3	3	3
Thinking and Reasoning	4	3	3	4	4	3
Working with Others	5	5	5	5	4	5
Self-Regulation	6	6	6	6	6	6
Life Work	8	8	8	8	8	8
Totals	**133***	**126***	**131***	**127***	**124***	**131***

* The difference in numbers of standards that would be included in the curriculum are due to the differing amounts of time required to address individual standards.

Finally, the number of standards that would be included in the curriculum by the various subpopulations for the core subject areas are reported in Table 4.13. The number of standards from core subject areas that would be included in the curriculum range from a high of 73 to a low of 59. Notable differences across subgroups are found in the areas of science, history, and geography.

Table 4.13
Standards from Core Subject Areas that Would Be Included in the Curriculum Based on "Definitely" Responses by Respondent Education, Age, and Income
(No Overlap Cut-Point Assumption)

Subject Area	Education		Age		Income	
	More than High School	High School or Less	45 or Older	Under 45	50K or More	Less than 50K
Mathematics	5	4	4	6	5	5
Science	13	10	9	12	13	11
History (U.S. and World)	43	32	41	36	36	41
Language Arts	7	7	7	7	6	7
Geography	5	6	7	3	6	5
Total	**73**	**59**	**68**	**64**	**66**	**69**

Education Goals of Respondents

In addition to questions that address demographic variables, each survey contained three questions that addressed the overall goals of education:

1. A main goal of education should be to provide knowledge that helps individual students obtain meaningful employment.

2. A main goal of education should be to provide knowledge that helps individual students have a well-rounded, productive life.

3. A main goal of education should be to provide knowledge that allows our country to acquire and maintain a competitive edge.

Again, the scale used for these questions involved the following response options: *definitely, probably, probably not, and definitely not.* Table 4.14 indicates that there were some notable differences in the opinions of respondents as to the relative importance of these three education goals.

Table 4.14
Responses to Questions About the Goal of Education

		All Surveys Combined n=2553
Employment	Definitely	2009=78.72%
	Probably not or definitely not	72=2.82%
Well Rounded	Definitely	2270=88.95%
	Probably not or definitely not	127=4.98%
Competitive Edge	Definitely	1497=58.66%
	Probably not or definitely not	261=10.23%

Table 4.14 shows that nearly 90% of Americans surveyed believe that a goal of K–12 education should be to produce well-rounded individuals; nearly 80% believe that K–12 education should increase the probability that students gain employment after graduation; and nearly 60% believe that a goal of K–12 education should be to ensure a competitive edge for the United States. The reported differences between all combinations of respondent percentages (for definite responses) represent true differences of opinion at the 95% confidence level.

Table 4.14 also illustrates that there are some differences among respondents reporting that the three education goals identified should "probably not" or should "definitely not" be a goal of K–12 education. As Table 4.14 indicates, 10.23% of subjects responded that maintaining a competitive edge should "probably not" or should "definitely not" be a goal of K–12 education. However, only 4.98% indicated that a well-rounded education should "probably not" or "definitely not" be a goal of education, and only 2.82% indicated that employment should "probably not" or "definitely not" be a goal of education. It should be noted that these percentages cannot be considered significant at the .05 level if one uses the tolerance tables reported in Chapter 2.

To obtain another perspective on the preferences of respondents relative to the three goals for education, the data also were analyzed for those respondents who exhibited a clear preference among goals. Since anyone respondent could have rated all three purposes as "definitely" a goal of K–12 education, a useful way of looking at the data might be to consider only those respondents who had a clear preference for one education goal over the others. Table 4.15 indicates that 481 respondents (or 18.8 percent of the total sample of respondents) demonstrated a preference for one goal over the other two. Of these, 337 indicated a preference for the goal of helping students lead well-rounded lives, 103 for the goal of helping students obtain meaningful employment, and only 41 for the goal of helping our country to acquire and maintain a competitive edge. This is consistent with the previous conclusion that American adults support the goal of education fostering well-rounded individuals more strongly than they support the goals of preparing students for employment or using K–12 education to obtain or maintain a national competitive edge.

Table 4.15
Preferences for Various Education Goals

	Frequency	Percentage of Those Exhibiting a Preference	Percentage of All Respondents
Employment	103	21.4%	4.0%
Well Rounded	337	70.1%	13.2%
Competitive Edge	41	8.5%	1.6%
Total	**481**	**100.0%**	**18.8%**

Logically, the next question to address would be, What are the differences in the ranking of standards between those respondents with differing preferences relative to the goals of education? However, it was concluded that the number of respondents with clear preferences (i.e., 481) was too small to warrant the analyses of the data from this perspective.

CHAPTER 5

ANALYSIS OF "DEFINITELY NOT" RESPONSES

Chapters 3 and 4 reported the results of analyzing the data using the response category of "definitely" as the indicator of respondents' opinions. This response category is considered the strongest indicator of what respondents believe should be included in a K–12 curriculum. Conversely, it is arguably the case that the "definitely not" response category is the best indicator of what respondents believe should *not* be included in the curriculum. This chapter reports the findings and conclusions reached as a result of analyzing the "definitely not" category data.

General Findings

Appendix J lists the 248 standards ranked according to the percentage of "definitely not" responses. For comparison purposes, the percentage of "definitely" responses is also included in the appendix. It is certainly noteworthy that, overall, some percentage of respondents provided a rating of "definitely not" for every one of the standards in the database, indicating that there was some level of objection to virtually every piece of content identified by subject-matter experts. However, it is important to note that the percentages of "definitely not" responses were extremely small for the vast majority of the standards.

Table 5.1
Levels of "Definitely Not" Responses

	Frequency	Percentage of Total Number of Standards
≥35%	0	.00%
≥30%	2	.81%
≥25%	3	1.21%
≥20%	6	2.42%
≥15%	11	4.44%
≥10%	22	8.87%
≥9%	26	10.48%
≥8%	30	12.10%
≥7%	34	13.71%
≥6%	41	16.53%
≥5%	49	19.76%
≥4%	57	22.98%
≥3%	77	31.05%
≥2%	118	47.58%
≥1%	198	79.84%
>0%	248	100.00%

As Table 5.1 shows, five percent or more of respondents answered "definitely not" relative to only 19.76 percent of the standards; ten percent or more answered "definitely not" to only 8.87 percent of the standards, and 20 percent or more answered "definitely not" to only 2.42 percent of the standards. Given the large percentage of standards with a relatively low percentage of "definitely not" responses, it was determined that the most accurate picture of the "definitely not" opinions across the various subject areas would be obtained by considering only those standards with a percentage of "definitely not" responses greater than or equal to a cut-off point of five percent. Table 5.2 summarizes the number of standards within each subject area that had five percent or more "definitely not" responses.

Table 5.2
Standards in the Various Subject Areas
Identified as "Definitely Not" by Five Percent or More of Respondents

Subject Area	Number of Standards in Subject Area	Number of Standards Identified as "Definitely Not" by Five Percent or More of Respondents	Percentage of Standards With a "Definitely Not" Response
World History	46	23	50.00
The Arts	25	21	84.00
Foreign Language	5	2	40.00
Science	16	1	6.25
Geography	18	1	5.56
Physical Education	5	1	20.00

The vast majority of standards with five percent or more "definitely not" responses are from the subject areas of world history and the arts, with world history having the most. However, these "definitely not" standards represent 84 percent of the total number of standards in the arts and 50 percent of the total number of standards in world history. This result corroborates the findings discussed in Chapters 3 and 4: There is little support for mandating instruction in the arts and a fair amount of sentiment against incorporating this content area into a K–12 curriculum.

Analysis by Subpopulations

As is the case with the "definitely" responses, the "definitely not" responses were analyzed relative to the following subpopulations:

1. respondents with more than a high school education versus those with a high school education or less

2. respondents 45 or older versus those younger than 45

3. respondents whose income is $50,000 or more versus those whose income is less than $50,000

The standards that received a "definitely not" response for these subgroups are listed in Appendices K through P. Table 5.3 compares the number of standards in each subject area with five percent or more "definitely not" responses for each of the subpopulations mentioned above.

Table 5.3
Number of Standards Within Subject Areas Identified as "Definitely Not" by Five Percent or More of Respondents by Subpopulation

Subject Area	More Than High School	High School or Less	45 or Older	Under 45	50K or More	Less Than 50K
	N	N	N	N	N	N
The Arts	18	24	24	19	17	25
World History	11	27	25	20	17	24
Foreign Language	2	3	2	2	3	2
Science	1	1	1	1	1	1
Geography	1	2	0	1	0	1
Physical Education	1	1	1	1	1	1
Thinking & Reasoning	0	1	0	0	0	0
Civics	0	1	1	0	0	1

As Table 5.3 shows, the pattern of responses across various subgroups is relatively consistent. Respondents from the various subgroups had similar reactions to the standards in foreign language, science, geography, physical education, thinking and reasoning, and civics. However, there are some noteworthy differences between respondents' reactions to the arts and world history. Respondents with more than a high school education, those under 45 years of age, and those earning $50,000 or more were somewhat more positive toward the arts than other subgroups. A similar pattern can be observed relative to the world history standards.

CHAPTER 6

CONCLUSIONS AND NEXT STEPS

This report summarizes the findings of a survey of the American public's opinions as to the necessity of incorporating into the K–12 curriculum those standards identified by national groups of subject-matter experts. It is the first collective rating of K–12 standards across disciplines. The findings suggest that although the American public believes that most of the content areas traditionally viewed as components of the United States' public education system have a place in the nation's K–12 curriculum, they also believe that these areas should not be equally emphasized. Some differences are noted in preferences relative to specific standards and content areas for respondent subgroups created on the basis of education level, age, and income level; nonetheless, there are far more similarities among the views of these subgroups than differences.

This survey offers a number of new insights that can help guide curriculum developers as they work to refine existing K–12 curricula or to develop new curricula based on these standards. The findings suggest those content areas that should be emphasized as well as standards that might be selected within content areas. In addition, the survey results point to a number of standards that should be virtually ignored in the view of the American public.

In addition to providing ratings for each of the standards included in the McREL standards database, this report also offers guidance in creating a comprehensive curriculum given the constraints of "available" instructional time in a typical K–12 education system. A general process for estimating the number of standards that can be covered in 13 years of schooling is offered. The assumptions made in this report about education systems and how the selection of standards might be guided are only illustrative. Curriculum developers will need to make similar assumptions based on the context of their local systems. In addition, the estimation process involved in conducting a time audit will be much improved by a careful analysis of the amount of time required to teach various standards.

Finally, the findings related to the differing opinions of various subgroups can be used to make minor adjustments in the selection of standards to be addressed based on the general education level, age, and income level of the local community in question.

Certainly this study is only a beginning step in helping educators design standards-based education systems in their communities. As always, the utility of the findings are limited by the resources available, the study design choices made, and the survey population targeted. Nevertheless, the data sets provided in the appendices to this report offer a rich set of information that can be analyzed further to guide a host of specific state and local curriculum-related decisions. Beyond that, it is clear that it would now be beneficial to engage the national groups that developed the content-specific standards in a unified discussion of how the individual sets of standards might be effectively combined to create strong, integrated K–12 curricula in communities across the nation. The conversation might begin with the simple question, Which of the standards identified in a discipline are essential and which could be

viewed as optional? The conversation might conclude with the more complex question, Given the time available to educate children, given the public's view that all children should have access to a quality education, as well as and the general goal of providing a "well-rounded" educational experience, what are the options for selecting standards across discipline areas? It is McREL's hope that this report will stimulate the thinking of America's educators, guide their selection of educational content, and set the stage for a discussion among the nation's content experts and education leaders regarding the future shape of American education.

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APPENDIX A

DOCUMENTS TO CONSULT FOR COMPREHENSIVE REVIEW OF SUBJECT AREAS

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APPENDIX B

McREL *COMPENDIUM* STANDARDS

Standards for Mathematics

1. Effectively uses a variety of strategies in the problem-solving process
2. Understands and applies basic and advanced properties of the concept of numbers
3. Uses basic and advanced procedures while performing the process of computation
4. Understands and applies basic and advanced properties of the concept of measurement
5. Understands and applies basic and advanced properties of the concepts of geometry
6. Understands and applies basic and advanced concepts of data analysis and distributions
7. Understands and applies basic and advanced concepts of probability and statistics
8. Understands and applies basic and advanced properties of functions and algebra
9. Understands the general nature and uses of mathematics

Standards for Science

Earth and Space

1. Understands basic features of the Earth
2. Understands basic Earth processes
3. Understands essential ideas about the composition and structure of the universe and the Earth's place in it

Life Sciences

4. Knows about the diversity and unity that characterize life
5. Understands the genetic basis for the transfer of biological characteristics from one generation to the next
6. Knows the general structure and functions of cells in organisms
7. Understands how species depend on one another and on the environment for survival
8. Understands the cycling of matter and flow of energy through the living environment
9. Understands the basic concepts of the evolution of species

Physical Sciences

10. Understands basic concepts about the structure and properties of matter
11. Understands energy types, sources, and conversions, and their relationship to heat and temperature
12. Understands motion and the principles that explain it
13. Knows the kinds of forces that exist between objects and within atoms

Science and Technology

14. Understands the nature of scientific knowledge
15. Understands the nature of scientific inquiry
16. Understands the scientific enterprise
17. Understands the nature of technological design
18. Understands the interactions of science, technology, and society

Standards for Historical Understanding

1. Understands and knows how to analyze chronological relationships and patterns
2. Understands the historical perspective

Standards for Grades K-4 History

Topic 1: Living and Working Together in Families and Communities, Now and Long Ago

1. Understands family life now and in the past, and family life in various places long ago
2. Understands the history of the local community and how communities in North America varied long ago

Topic 2: The History of Students' Own State or Region

3. Understands the people, events, problems, and ideas that were significant in creating the history of their state

Topic 3: The History of the United States: Democratic Principles and Values and the People From Many Cultures Who Contributed to its Cultural, Economic, and Political Heritage

4. Understands how democratic values came to be, and how they have been exemplified by people, events, and symbols
5. Understands the causes and nature of movements of large groups of people into and within the United States, now and long ago
6. Understands the folklore and other cultural contributions from various regions of the United States and how they helped to form a national heritage

Topic 4: The History of Peoples of Many Cultures Around the World

7. Understands selected attributes and historical developments of societies in Africa, the Americas, Asia, and Europe
8. Understands major discoveries in science and technology, some of their social and economic effects, and the major scientists and inventors responsible for them

Standards for United States History

Era 1: Three Worlds Meet (Beginnings to 1620)

1. Understands the characteristics of societies in the Americas, Western Europe, and West Africa that increasingly interacted after 1450
2. Understands cultural and ecological interactions resulting from early European exploration and colonization

Era 2: Colonization and Settlement (1585–1763)

3. Understands how the early Europeans and Africans interacted with Native Americans in the Americas
4. Understands how political institutions and religious freedom emerged in the North American colonies
5. Understands how the values and institutions of European economic life took root in the colonies and how slavery reshaped European and African life in the Americas

Era 3: Revolution and the New Nation (1754–1820s)

6. Understands the causes of the American Revolution, the ideas and interests involved in shaping the revolutionary movement, and reasons for the American victory
7. Understands how the American Revolution involved multiple movements among the new nation's many groups to reform American society
8. Understands the institutions and practices of government created during the revolution and how these elements were revised between 1787 and 1815 to create the foundation of the American political system

Era 4: Expansion and Reform (1801–1861)

9. Understands the United States territorial expansion between 1801 and 1861, and how it affected relations with external powers and Native Americans
10. Understands how the industrial revolution, the rapid expansion of slavery, and the westward movement changed American lives and led to regional tensions
11. Understands the extension, restriction, and reorganization of political democracy after 1800
12. Understands the sources and character of reform movements in the antebellum period and what the reforms accomplished or failed to accomplish

Era 5: Civil War and Reconstruction (1850–1877)

13. Understands the causes of the Civil War
14. Understands the course and character of the Civil War and its effects on the American people
15. Understands how various reconstruction plans succeeded or failed

Era 6: The Development of the Industrial United States (1870–1900)

16. Understands how the rise of big business, heavy industry, and mechanized farming transformed American society
17. Understands massive immigration after 1870 and how new social patterns, conflicts, and ideas of national unity developed amid growing cultural diversity
18. Understands the rise of the American labor movement and how political issues reflected social and economic changes
19. Understands federal Indian policy and United States foreign policy after the Civil War

Era 7: The Emergence of Modern America (1890–1930)

20. Understands how progressives and others addressed problems of industrial capitalism, urbanization, and political corruption
21. Understands the changing role of the United States in world affairs through World War
22. Understands how the United States changed between the post-World War I years and the eve of the Great Depression

Era 8: The Great Depression and World War II (1929–1945)

23. Understands the causes of the Great Depression and how it affected American society
24. Understands how the New Deal addressed the Great Depression, transformed American federalism, and initiated the welfare state
25. Understands the origins and course of World War II, the character of the war at home and abroad, and its reshaping of the U.S. role in world affairs

Era 9: Postwar United States (1945 to early 1970s)

26. Understands the economic boom and social transformation of post-World War II America
27. Understands how the legacy of the New Deal in the post World War II period
28. Understands the Cold War and the Korean and Vietnam conflicts in domestic and international politics
29. Understands the struggle for racial and gender equality and for the extension of civil liberties

Era 10: Contemporary United States (1968 to the present)

30. Understands developments in foreign and domestic policies between the Nixon and Clinton presidencies
31. Understands the major social and economic developments in contemporary America

Standards for World History

Era 1: The Beginnings of Human Society

1. Understands the biological and cultural processes that shaped the earliest human communities
2. Understands the processes that contributed to the emergence of agricultural societies around the world

Era 2: Early Civilizations and the Rise of Pastoral Peoples, 4000–1000 BCE

3. Understands the major characteristics of civilization and the development of civilizations in Mesopotamia, Egypt, and the Indus Valley
4. Understands how agrarian societies spread and new states emerged in the third and second millennium BCE
5. Understands the political, social, and cultural consequences of population movements and militarization in Eurasia in the second millennium BCE

Era 3: Classical Traditions, Major Religions, and Giant Empires, 1000 BCE–300 CE

6. Understands technological and cultural innovation and change from 1000 to 600 BCE
7. Understands how Aegean civilization emerged and how interrelations developed among peoples of the eastern Mediterranean and Southwest Asia from 600 to 200 BCE
8. Understands how major religious and large-scale empires arose in the Mediterranean basin, China, and India from 500 BCE to 300 CE
9. Understands how early agrarian civilizations arose in Mesoamerica

Era 4: Expanding Zones of Exchange and Encounter, 300–1000 CE

10. Understands the Imperial crises and their aftermath in various regions from 300 to 700 CE
11. Understands the causes and consequences of the development of Islamic civilization between the 7th and 10th centuries
12. Understands major developments in East Asia in the era of the Tang Dynasty from 600 to 900 CE
13. Understands the political, social, and cultural redefinitions in Europe from 500 to 1000 CE
14. Understands state-building in the Northeast and West Africa, and the southward migrations of Bantu-speaking peoples

15. Understands the rise of centers of civilization in Mesoamerica and Andean South America in the first millennium CE

Era 5: Intensified Hemispheric Interactions, 1000–1500 CE

16. Understands the maturation of an interregional system of communication, trade, and cultural exchange during a period of Chinese economic power and Islamic expansion
17. Understands the redefinition of European society and culture from 1000 to 1300 CE
18. Understands the rise of the Mongol empire and its consequences for Eurasian peoples from 1200 to 1350
19. Understands the growth of states, towns, and trade in Sub-Saharan Africa between the 11th and 15th centuries
20. Understands patterns of crisis and recovery in Afro-Eurasia between 1300 and 1450
21. Understands the expansion of states and civilizations in the Americas between 1000 and 1500

Era 6: Global Expansion and Encounter, 1450–1770

22. Understands how the transoceanic interlinking of all major regions of the world between 1450 and 1600 led to global transformations
23. Understands how European society experienced political, economic, and cultural transformations in an age of global intercommunication between 1450 and 1750
24. Understands how large territorial empires dominated much of Eurasia between the 16th and18th centuries
25. Understands the economic, political, and cultural interrelations among peoples of Africa, Europe, and the Americas between 1500 and 1750
26. Understands transformations in Asian societies in the era of European expansion
27. Understands major global trends from 1450 to 1770

Era 7: An Age of Revolutions, 1750–1914

28. Understands the causes and consequences of political revolutions in the late 18th and early19th centuries
29. Understands the causes and consequences of the agricultural and industrial revolutions from1700 to 1850
30. Understands how Eurasian societies were transformed in an era of global trade and the emergence of European power from 1750 to 1850
31. Understands patterns of nationalism, state-building, and social reform in Europe and the Americas from 1830 to 1914
32. Understands patterns of global change in the era of Western military and economic domination from 1850 to 1914
33. Understands major global trends from 1750 to 1914

Era 8: The 20th Century

34. Understands global and economic trends in the high period of Western dominance
35. Understands the causes and global consequences of World War I
36. Understands the search for peace and stability throughout the world in the 1920s and 1930s
37. Understands the causes and global consequences of World War II
38. Understands how new international power relations took shape in the context of the Cold War and how colonial empires broke up

39. Understands the promises and paradoxes of the second half of the 20th century

Standards for Language Arts

Writing

1. Demonstrates competence in the general skills and strategies of the writing process
2. Demonstrates competence in the stylistic and rhetorical aspects of writing
3. Writes with a command of the grammatical and mechanical conventions of composition
4. Effectively gathers and uses information for research purposes

Reading

5. Demonstrates competence in the general skills and strategies of the reading process
6. Demonstrates competence in general skills and strategies for reading literature
7. Demonstrates competence in the general skills and strategies for reading information
8. Demonstrates competence in applying the reading process to specific types of literary texts
9. Demonstrates competence in applying the reading process to specific types of informational texts
10. Demonstrates competence in using different information sources, including those of a technical nature, to accomplish specific tasks

Listening and Speaking

11. Demonstrates competence in speaking and listening as tools for learning

Language

12. Demonstrates an understanding of the nature and function of the English language

Literature

13. Demonstrates a familiarity with selected literary works of enduring quality

Standards for Geography

The World in Spatial Terms

1. Understands the characteristics and uses of maps, globes, and other geographic tools and technologies
2. Knows the location of places, geographic features, and patterns of the environment
3. Understands the characteristics and uses of spatial organization of Earth's surface

Places and Regions

4. Understands the physical and human characteristics of place
5. Understands the concept of regions
6. Understands that culture and experience influence people's perceptions of places and regions

Physical Systems

7. Knows the physical processes that shape patterns on Earth's surface
8. Understands the characteristics of ecosystems on Earth's surface

Human Systems

9. Understands the nature, distribution, and migration of human populations on Earth's surface
10. Understands the nature and complexity of Earth's cultural mosaics
11. Understands the patterns and networks of economic interdependence on Earth's surface
12. Understands the patterns of human settlement and their causes
13. Understands the forces of cooperation and conflict that shape the divisions of Earth's surface

Environment and Society

14. Understands how human actions modify the physical environment
15. Understands how physical systems affect human systems
16. Understands the changes that occur in the meaning, use, distribution, and importance of resources

Uses of Geography

17. Understands how geography is used to interpret the past
18. Understands global development and environmental issues

Standards for the Arts

Art Connections

1. Understands connections among the various art forms and other disciplines

Dance

1. Identifies and demonstrates movement elements and skills in performing dance
2. Understands choreographic principles, processes, and structures
3. Understands dance as a way to create and communicate meaning
4. Applies critical and creative thinking skills in dance
5. Understands dance in various cultures and historical periods
6. Understands connections between dance and healthful living

Music

1. Sings, alone and with others, a varied repertoire of music
2. Performs on instruments, alone and with others, a varied repertoire of music
3. Improvises melodies, variations, and accompaniments
4. Composes and arranges music within specified guidelines
5. Reads and notates music
6. Knows and applies appropriate criteria to music and music performances
7. Understands the relationship between music and history and culture

Theatre

1. Demonstrates competence in writing scripts
2. Uses acting skills
3. Designs and produces informal and formal productions
4. Directs scenes and productions
5. Understands how informal and formal theatre, film, television, and electronic media productions create and communicate meaning

6. Understands the context in which theatre, film, television, and electronic media are performed today as well as in the past

Visual Arts

1. Understands and applies media, techniques, and processes related to the visual arts
2. Knows how to use the structures (e.g., sensory qualities, organizational principles, expressive features) and functions of art
3. Knows a range of subject matter, symbols, and potential ideas in the visual arts
4. Understands the visual arts in relation to history and cultures
5. Understands the characteristics and merits of one's own artwork and the artwork of others

Standards for Civics

What Is Government and What Should It Do?

1. Understands ideas about civic life, politics, and government
2. Understands the essential characteristics of limited and unlimited governments
3. Understands the sources, purposes, and functions of law and the importance of the rule of law for the protection of individual rights and the common good
4. Understands the concept of a constitution, the various purposes that constitutions serve, and the conditions that contribute to the establishment and maintenance of constitutional government
5. Understands the major characteristics of systems of shared powers and of parliamentary systems
6. Understands the advantages and disadvantages of federal, confederal, and unitary systems of government
7. Understands alternative forms of representation and how they serve the purposes of constitutional government

What Are the Basic Values and Principals of American Democracy?

8. Understands the central ideas of American constitutional government and how this form of government has shaped the character of American society
9. Understands the importance of Americans sharing and supporting certain values, beliefs, and principles of American constitutional democracy
10. Understands the roles of voluntarism and organized groups in American social and political life
11. Understands the role of diversity in American life and the importance of shared values, political beliefs, and civic beliefs in an increasingly diverse American society
12. Understands the relationships among liberalism, republicanism, and American constitutional democracy
13. Understands the character of American political and social conflict and factors that tend to prevent or lower its intensity
14. Understands issues concerning the disparities between ideals and reality in American political and social life

How Does the Government Established by the Constitution Embody the Purposes, Values, and Principles of American Democracy?

15. Understands how the United States Constitution grants and distributes power and responsibilities to national and state government and how it seeks to prevent the abuse of power
16. Understands the major responsibilities of the national government for domestic and foreign policy, and understands how government is financed through taxation
17. Understands issues concerning the relationship between state and local governments and the national government and issues pertaining to representation at all three levels of government
18. Understands the role and importance of law in the American constitutional system and issues regarding the judicial protection of individual rights
19. Understands what is meant by "the public agenda," how it is set, and how it is influenced by public opinion and the media
20. Understands the roles of political parties, campaigns, elections, and associations and groups in American politics
21. Understands the formation and implementation of public policy

What is the Relationship of the United States to Other Nations and to World Affairs?

22. Understands how the world is organized politically into nation-states, how nation-states interact with one another, and issues surrounding U.S. foreign policy
23. Understands the impact of significant political and nonpolitical developments on the United States and other nations

What Are the Roles of the Citizen in American Democracy?

24. Understands the meaning of citizenship in the United States, and knows the requirements for citizenship and naturalization
25. Understands issues regarding personal, political, and economic rights
26. Understands issues regarding the proper scope and limits of rights and the relationships among personal, political, and economic rights
27. Understands how certain character traits enhance citizens' ability to fulfill personal and civic responsibilities
28. Understands how participation in civic and political life can help citizens attain individual and public goals
29. Understands the importance of political leadership, public service, and a knowledgeable citizenry in American constitutional democracy

Standards for Economics

1. Understands that scarcity of productive resources requires choices which generate opportunity costs
2. Understands characteristics of different economic systems, economic institutions, and economic incentives
3. Understands the concept of prices and the interaction of supply and demand in a market economy
4. Understands basic features of market structures and exchanges
5. Understands unemployment and income distribution in a market economy

6. Understands the roles government plays in the United States economy
7. Understands aggregate supply and aggregate demand
8. Understands basic concepts of United States fiscal policy and monetary policy
9. Understands how Gross Domestic Product and inflation and deflation provide indications of the state of the economy
10. Understands basic concepts about international economics

Standards for Foreign Language

1. Uses the target language to engage in conversations, express feelings and emotions, and exchange opinions and information
2. Comprehends and interprets written and spoken language on diverse topics from diverse media
3. Presents information, concepts, and ideas to an audience of listeners or readers on a variety of topics
4. Demonstrates knowledge and understanding of traditional ideas and perspectives, institutions, professions, literary and artistic expressions, and other components of target culture
5. Recognizes that different languages use different patterns to communicate and applies this knowledge to the native language

Standards for Health

1. Knows the availability and effective use of health services, products, and information
2. Knows environmental and external factors that affect individual and community health
3. Understands the relationship of family health to individual health
4. Knows how to maintain mental and emotional health
5. Knows essential concepts and practices concerning injury prevention and safety
6. Understands essential concepts about nutrition and diet
7. Knows how to maintain and promote personal health
8. Knows essential concepts about the prevention and control of disease
9. Understands aspects of substance use and abuse
10. Understands the fundamental concepts of growth and development

Standards for Physical Education

1. Uses a variety of basic and advanced movement forms
2. Uses movement concepts and principles in the development of motor skills
3. Understands the benefits and costs associated with participation in physical activity
4. Understands how to monitor and maintain a health-enhancing level of physical fitness
5. Understands the social and personal responsibility associated with participation in physical activity

Standards for Behavioral Studies

1. Understands that group and cultural influences contribute to human development, identity, and behavior
2. Understands various meanings of social group, general implications of group membership, and different ways that groups function

3. Understands that interactions among learning, inheritance, and physical development affect human behavior
4. Understands conflict, cooperation, and interdependence among individuals, groups, and institutions

Standards for Lifelong Learning

Thinking and Reasoning

1. Understands and applies basic principles of presenting an argument
2. Understands and applies basic principles of logic and reasoning
3. Effectively uses mental processes that are based on identifying similarities and dissimilarities (compares, contrasts, classifies)
4. Understands and applies basic principles of hypothesis testing and scientific inquiry
5. Applies basic trouble-shooting and problem-solving techniques
6. Applies decision-making techniques

Working With Others

1. Contributes to the overall effort of a group
2. Uses conflict-resolution techniques
3. Works well with diverse individuals and in diverse situations
4. Displays effective interpersonal communication skills
5. Demonstrates leadership skills

Self-Regulation

1. Sets and manages goals
2. Performs self-appraisal
3. Considers risks
4. Demonstrates perseverance
5. Maintains a healthy self-concept
6. Restrains impulsivity

Life Work

7. Makes effective use of basic tools
8. Understands the characteristics and uses of basic computer hardware, software, and operating systems
9. Uses basic word processing, spreadsheet, database, and communication programs
10. Manages money effectively
11. Pursues specific jobs
12. Makes general preparation for entering the work force
13. Makes effective use of basic life skills
14. Displays reliability and a basic work ethic
15. Operates effectively within organization