Chapter I

The Need for High Student Performance

Why this Resource Kit?

The combined sum of all the various state-mandated tests does not come close to the breadth and depth of a rigorous and relevant education.

The International Center for Leadership in Education was founded in 1991 on the belief that what students need to succeed in the 21st century is an education that is both academically rigorous and relevant to their personal and professional lives. Despite the changing context of school reform, helping schools provide a rigorous and relevant education remains the International Center's mission. Although states have made strides in developing quality assessments, many teachers and administrators believe that the combined sum of all the various state-mandated tests does not come close to the breadth and depth of a rigorous and relevant education.

With all of the pressure to focus on these assessments, however, how can today's educators maintain an appropriate balance and teach that which they know is essential? Thinking of the longer term, how can educators continue to provide a rigorous and relevant education in an atmosphere where new reform initiatives are constantly being proposed, where new trends and philosophies pull them in different directions, and where they are constantly given new responsibilities but are never relieved of old ones? The purpose of this resource kit is to answer those questions.

Leadership and Accountability

In school communities throughout the country, parents, business leaders, and members of the general public are expressing concerns about student performance and demanding that schools be accountable for it. In response, many schools are working diligently to raise test scores and do well on their state report cards.

While administrators and teachers have become more accountable for the achievement of their students, they have also become more confused by the maze of directives about what should be taught. This publication describes data teachers can use to guide their instructional planning.

Improving instruction is not about selecting someone else's lesson plan and teaching the lesson; it is about teachers making good decisions about instruction and continually adding, subtracting, and modifying their teaching to bring those instructional activities into alignment with the standards that are tested and those that are deemed essential.

School leaders must set direction for students' success by helping teachers to focus on a list of knowledge and skills that are critical for students to acquire. An approach that concentrates on the critical skills is most likely to prepare students for success in a complex world.

A Complex World Demands High-level Skills

Recent advances in science and technology have been mind-boggling. Two areas of technological change that will have far-reaching implications for the future are information technology and biotechnology.

Over the last 35 years, the explosion in information technologies has affected many aspects of our daily lives. For the first time, a majority of U.S. households has at least one mobile phone. According to a survey by Dataquest, a unit of the Gartner Group, some 52 million U.S. households, or about 51 percent of the total, owned a mobile phone in February 2001, up sharply from 32 percent in October 1999. Appliances and hand-held devices continue to gain computing power, and "smart" machines will soon be integrated in the fabric of our lives.

We are increasingly turning to the Internet for shopping and other financial transactions, entertainment, research, education, communication, and work. In 1997, a UCLA study reported that some 19 million Americans were using the Internet. That number *tripled* in 1998 and then passed 100 million in 1999. The technology that supports the Internet is expanding with virus-like speed. The Internet's capacity to carry information doubles every 100 days. In 2000, the number of online, indexable documents passed the one billion mark. Every 24 hours, the content of the World Wide Web increases by more than 3.2 million new pages and 715,000 images.

E-mail, perhaps the most basic of online services, continues to grow beyond all expectations, and with its expansion come intriguing new questions about how interpersonal communication and commerce are changing. The number of electronic mailboxes worldwide jumped 84 percent to almost 570 million in 1999. While the U.S. Postal Service delivered 101 billion pieces of paper mail in 1998, estimates of the number of e-mail messages transmitted in that year range as high as four trillion.

It is impossible to forecast exactly where these trends will take us, but it is becoming obvious that as information technology continues to evolve, it will alter not only the workplace of the future, but also our homes, personal lives, and education systems.

In *The Power of the Internet for Learning: Moving from Promise to Practice*, the Web-Based Education Commission, sponsored by the U.S. Department of Education, gave examples of how the Internet is reshaping learning. South Dakota, for example, a largely rural state, has 127 school districts with fewer than 600 students. Under innovative state leadership, South Dakota wired all of its school buildings and provided nearly one-third of its teachers 200 hours of training. The Internet is also improving the quality of education for migrant students, enabling them to pass state tests through online learning. This avenue is open to students enrolled in a Texas high school or middle school who travel with their families to one of the three "receiving" states: Illinois, Montana, or New York. The Commission summarized its analysis of these innovations by stating:

> The question is no longer if the Internet can be used to transform learning in new and powerful ways. The Commission has found that it can. Nor is the question should we invest the time, the energy, and the money necessary to fulfill its promise in defining and shaping new learning opportunity. The Commission believes that we should.

As information technology continues to evolve, it will alter not only the workplace of the future, but also our homes, personal lives, and education systems.

Even more radical than the changes brought about by connecting machine to machine will be the advances made as technology is harnessed to understand and alter our brains and bodies. Our growing knowledge of the role that genes play in our physical and mental health combined with our ability to manipulate those genes will enable us to conquer many of today's debilitating and deadly diseases and conditions. For problems outside the realm of the genetic code, pharmaceuticals will be developed to treat them. Where surgical intervention is required, advances in robotics and nanotechnology will make it more effective and less invasive.

Without a doubt, advances in biotechnology mean that lives will be improved and prolonged. But just because we *can* change who we are does not mean that we *should*. While most people would not hesitate to say that eliminating cancer would be good, consensus would be more elusive with respect to other potentially alterable conditions, such as low intelligence, aggressiveness, or shortness. What conditions and traits should society seek to alter, if any? Who should pay for such procedures? When is a procedure too risky or too expensive to justify? In cases of limited resources, what gives one person's life priority over another's? Finally, when is it appropriate to let nature "take its course" — or to allow science to speed it along? These are questions society faces, with few clear-cut answers. In the absence of collective decisiveness, individuals are grappling with these questions on a personal level. As advances in science continue, the questions will become even more complex.

A World of Choices

As a result of a trend toward empowering the population with choices, people are now responsible for many decisions that used to be made for them, such as how their retirement savings are invested and where their children go to school. In addition, the ready availability of detailed information means that people can become far more informed on virtually any topic and "take control" of more aspects of their lives, if they so choose. Simply living in the 21st century will require an unprecedented level of information management and decision-making skills.

Consider the explosion in marketing that has accompanied the information explosion. Advertising can now be found almost anywhere: at the movies and on videotapes; as inserts in bills; on the backs of store receipts; in e-mail in-boxes; as banners on Websites; on telephone "hold" messages; and piped into elevators, airport gates, waiting rooms, and even some classrooms. Then there are the more subtle methods, such as indirect marketing through product placement in television programs and movies. Advertising is information presented with the intent of influencing human behavior. Students must learn to distinguish objective information from marketing strategies being used on them, to evaluate claims, and to come to thoughtful decisions as educated consumers.

An economy where the majority of people are self-employed may be far off, but an economy where individuals must actively manage their own professional lives is already upon us. There was a time when people could see clearly the future based on their experience and their current job. A large number of jobs came with security and career ladders offering regular promotions and raises. Although this type of job still exists today, people are increasingly creating their own career ladders by changing jobs, employers, and even careers, returning for more education as necessary.

The set of skills necessary for employment is changing.

Further complicating career planning and personal management is the fact that the set of skills necessary for employment is changing. The traditional view of employment skills is based on specific jobs, such as doctor, mechanic, salesperson, or social worker. Employers are recognizing, however, that success in any job depends upon a common set of essential skills and competencies. We are witnessing a gradual broadening of skills needed for all jobs. Technology is also influencing the skills required of workers, not just because more employees are using it, but because changes are taking place so rapidly that the ability to adapt to new technology on the job is becoming more important than initial familiarity with any one piece of technology.

The end result is that jobs that may appear quite different on the surface may indeed be very similar in terms of the skills required. The ability to learn new technology and skills, to solve problems, and to work in a team can be found in the descriptions of jobs as diverse as investment banker, nurse, restaurant manager, and air traffic controller. While each of these jobs also involves highly specialized skills, today's students must realize that they need to acquire a broad set of skills in addition to skills specific to their occupation of interest.

Implications for Schools

The immediate implications for schools of our high-tech economy are both good and bad. On the one hand, they have available to them an ever-expanding array of technology-based tools, including distance learning and computer-based instruction and assessment, which gives them the potential to reach students any time of day and any time of year. On the other hand, schools will find themselves facing increased competition as entrepreneurs seek to harness these technologies to develop new educational opportunities that draw students away from traditional learning environments.

Perhaps the most important implications of these changes have to do with curriculum. It is easy to point to the ever-increasing knowledge base resulting from an explosion of scientific and technological developments, the broadening of necessary job skills, and the increased responsibilities placed on individuals as arguments for adding content to the K-12 curriculum. For example, "technological literacy" is rightfully becoming a fundamental component of curricula throughout the country because all students must have a basic familiarity with computers and the ability to conduct research on the Internet.

Information — the primary commodity of the new economy — can be made available anyplace, anytime.

Although some additions to the curriculum are warranted, we have reached the point where the knowledge base is so large and is expanding so rapidly that adding content to the curriculum is neither feasible nor sufficient. Moreover, many of the choices and responsibilities being shifted onto individuals as well as most of

the scientific breakthroughs involve such specialized knowledge that there simply is not enough time to cover all the relevant material. Furthermore, the pace of change is so great that it is not possible to predict the complete set of knowledge and skills students will need as adults, let alone provide it. What is important, then, is ensuring that students are able to adapt to new developments, apply their knowledge to new situations, and acquire new knowledge and skills as necessary.

The National Commission on Mathematics and Science Teaching for the 21st Century, chaired by former U.S. Senator John Glenn, echoed the need for improving student achievement in mathematics and science in *Before It's Too Late*.

> In an age now driven by the relentless necessity of scientific and technological advance, the current preparation that students in the United States receive in mathematics and science is, in a word, unacceptable. Recent reports of the performance of our country's students from both the Third International Mathematics and Science Study (TIMSS) and the National Assessment of Educational Progress (NAEP) echo a dismal message of lackluster performance, now three decades old; it's time the nation heeded it — *before it's too late.* Four important and enduring reasons underscore the need for our children to achieve competency in mathematics and science: (1) the rapid pace of change in both the increasingly interdependent global economy and in the American workplace demands widespread mathematics- and science-related knowledge and abilities; (2) our citizens need both mathematics and science for their everyday decision-making; (3) mathematics and science are inextricably linked to the nation's security interests; and (4) the deeper, intrinsic value of mathematical and scientific knowledge shape and define our common life, history, and culture. Mathematics and science are primary sources of lifelong learning and the progress of our civilization.

Another component of a vision of change is to view high school graduation not as the end of learning, but as the jumping off point for a lifetime of learning, involving both acquiring new knowledge and applying existing knowledge to new situations. Taking this view, preparing students for the future requires developing their skills of inquiry, analysis, synthesis, decision-making, and evaluation. This does not mean the level of rigor in academic subjects should be reduced — it actually needs to be increased. But it is these application skills that will help students to make informed and intelligent decisions regarding the direction and limitations of technological developments, the use of technology to alter their own lives, and other major financial, professional, and personal questions with which they will undoubtedly be faced.

Breadth at the Expense of Depth

When everything in the curriculum is a priority, nothing is really a priority. American schools have relied too heavily on presenting students with an abundance of knowledge-driven material. The massive volume of content to be covered leaves little time to teach students the process skills needed to apply their knowledge to practical situations. As a result, students are generally ill prepared to succeed in today's technological society, especially in the workplace.

> When everything in the curriculum is a priority, nothing is really a priority.

Several large-scale studies have confirmed the many anecdotal claims that the curriculum in the majority of U.S. schools is overcrowded, including studies conducted as part of the Third International Mathematics and Science Study (TIMSS) and by the International Center. In the most comprehensive effort to quantify the extent of the problem, researchers at the Mid-continent Regional Educational Laboratory (McREL) compiled a comprehensive list of standards and benchmarks found in the major national standards documents. Across all subjects and grades, they identified 200 unique standards with 3,093 related benchmarks. They then obtained estimates from teachers on how long it would take to teach each benchmark adequately. The researchers calculated that it would take 15,465 hours to cover all of the standards and benchmarks. Yet, the most generous estimate of the instructional time students have during their academic careers was 9,042 hours.

Based on these findings, it would appear that although the standards and assessments being put into place across the country are intended to bring about structure and clarity to school curricula, they are often doing just the opposite. In an effort to be comprehensive, far too many topics are labeled "essential," blurring the distinction between high- and low-priority topics. In this situation, schools and districts must make this distinction themselves and filter the topics that are truly essential from those that are simply nice to know.

To zero in on what is essential for students, the International Center encourages districts to develop and analyze data to answer two questions: "What do students need to know to succeed on the test?" and "What do students need to know to succeed in life?" If a topic fulfills either of these needs, it can rightfully be labeled a high priority. If it meets neither, schools and districts need to reexamine whether it is worth the investment of scarce instructional time.

To zero in on what is essential for students, answer two questions:
1. What do students need to know to succeed on the test?
2. What do students need to know to succeed in life?

In its report, "Quality Counts 2001," *Education Week* reinforces the notion that state standards are too voluminous. Seven in 10 teachers said there is not enough time to cover everything in their state standards, a problem that is worse for elementary and middle school teachers.

Surveys Point to Knowledge with Utility

In 1997, McREL contracted with the Gallup Organization to develop and administer a survey on the standards in the McREL database, which covers all subject areas. Survey participants were asked to indicate whether each standard was "definitely," "probably," "probably not," or "definitely not" a skill that students should have by the time they graduate from high school. Health standards received the highest overall rating, with an average of 73.9 percent. Next was Work Skills, ahead of Language Arts. Foreign Language and The Arts received the lowest percentage of definite responses at 26.7 and 15.5 percent, respectively. We can conclude from this that the public wants children to acquire knowledge that possesses some utility.

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

Rank	Subject Area	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

Source: Marzano, Kendall, and Cicchinelli. *What Americans Believe Students Should Know: A Survey of U.S. Adults*, Chapter 3, page 2.

Not surprising, the results of the McREL survey and the results of the International Center's Curriculum Survey of Essential Skills (discussed in Chapter II) reveal the same phenomenon. The top-rated topics by the public consist mainly of application-based skills that are relevant to real-world situations (e.g., health and work-related skills) or related to practical understanding of every-day life (e.g., environmental/atmospheric phenomena, concepts of measurement). The topics ranked at the bottom of the list are typically content-based and, in many cases, fall into the category of information for information's sake.

The data in the McREL survey appear to conflict with the empha-sis by parents and others on getting students ready for college (i.e., good test scores) as well as with the "back-to-basics" move-ment, which has urged schools to avoid teaching applied knowl-edge and skills. The individuals who advocate these agendas are typically the most vocal at school board meetings and parent groups. The data on public expectations also seem to conflict with many states' testing initiatives, which continue to focus on knowledge with little, if any, assessment of students' ability to apply that knowledge. Thus, school administrators and teacher leaders are faced with an increasing need to balance these con-flicting demands. In doing so, they must be sure that they never lose sight of the ultimate purpose of education – doing what is best for the students.

Accountability, State Standards, and Test-ing Requirements

In theory, the goals of the standards and assessment movement do not conflict with what educators believe is important. Rather, there is an incomplete fit; that is, state-level standards and as-sessments may fail to include knowledge or skills deemed essen-tial by a district, school, or teacher, and vice versa. In the past, when there were relatively few external mechanisms for monitor-ing what students were learning, teachers did not have to be particularly concerned if they did not cover all of the state curricu-lum, especially if they believed that what they taught in its place

was more important. With the current emphasis on accountability, however, even though teachers still have the final say regarding what they teach, statewide assessments and report cards exert a great deal of influence upon them. The increased public attention on assessment results can shake the balance of a school or district's priorities, challenging educators' ability to deliver what they believe to be a complete education.

As states were in the process of developing, revising, or implementing their content area standards, a concept that had gained popularity in other areas of government spread to education: accountability. In the accountability model, schools, as recipients of public funds, have an obligation to prove that they are doing their job, that in fact their students are learning. If they fail to show good student performance, it is not unreasonable for the public — parents and legislators in particular — to demand change. Because standardized tests are familiar to the public, they have become the accepted means of demonstrating student learning. Many states have had statewide tests in place for years, but often for only a limited number of grades and subjects. These tests were not necessarily linked to the state curricula for those subjects, and there were few, if any, repercussions for poor performance.

Now, in response to the demand for accountability, statewide testing programs have expanded. In some cases the tests have been developed in conjunction with the state standards, but in many cases there are no direct linkages. According to "Quality Counts 2001," of the 27 states that now rate schools based on their performance, 11 do so based entirely on test scores. Eighteen states require students to pass state tests to receive a high school diploma, and six more plan to do so. Three states require children to pass state tests to be promoted in certain grades. That number will rise to seven by 2003. "Quality Counts 2001" suggests that states also need to strike a better balance within their testing programs, so they more fully reflect the standards and provide a richer portrayal of student work.

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Conflicting Expectations

It is not uncommon to hear teachers and administrators express frustration that the current focus on accountability may be just the latest in a series of reforms that arrive with much fanfare, only to lose momentum and then disappear completely. The progression from graduation requirements to goals, standards, assessments, and report cards may sound like a straightforward one; but during the same period of time, other forces also exerted an influence on the direction of education reform. Among the reform initiatives of the past several years have been brain-based research, inquiry-based learning, and the infusion of technology. Some of these innovations clash with the philosophy of more traditional instruction and have led to conflict, as evidenced in the recent "math wars" and "reading wars."

For schools and teachers, the challenge becomes one of meeting the requirements imposed from the outside while still providing their students with a complete education.

One can argue that these various initiatives have been neither random nor necessarily conflicting and that they share the same aim, namely, higher standards. From the viewpoint of teachers, however, the influence of these initiatives on their day-to-day work may cause them to feel as if they are being pulled in different directions. Each new initiative brings its own jargon, committees, and meetings. Since the accountability movement has focused squarely on measurable student achievement, responding to it has meant placing preparation for externally developed examinations above whatever content the teacher would normally teach. For those schools and teachers whose students do well on the tests or who find the standards and tests consistent with what they believe is important, the loss of instructional control is not particularly great. But for those teachers whose students struggle on the tests or who must administer tests that address only a limited portion of what they believe is important, the loss of control can be substantial. For schools and teachers, the challenge becomes one of meeting the requirements imposed from the outside while still providing their students with a complete education.

**What Action
Is Needed?**

The forces of improved student performance and increased school accountability simultaneously prompt educators to act and to become fearful of taking too much risk. In the following chapters, we encourage educators to act, but to do so in a thoughtful manner based on data.

The actions that education leaders should take are as follows.

- **Understand the Accountability System and Its Purpose**
  We cannot ignore the call for increased school accountability. It is part of the politics of publicly funded education. Educators must understand the purpose of accountability in maintaining public confidence in education. Accountability must be kept in perspective, however, because it is only one of the important driving forces in education.

- **Focus on Student Needs**
  When everything happening in public education seems like a complex maze with no way out, educators should focus on the students. Frequently reminding others and reflecting oneself on the needs of students will point to the right solution.

- **Establish Critical Results**
  One of the recommendations of this publication is for school leaders to identify a short list of critical results for students. Narrowing the focus will contribute to greater success for students and schools.

- **Have a Clear Definition of Results and What's Needed to Get There**
  An effective process begins with the end in mind. Leaders need to continually remind staff of the end results and encourage practices that will achieve those results.

- **Recognize that Results Not Activities Count**
  When trying to take a different approach, teachers will need to reflect on current practice, seek out new solutions, be creative, and use their professional judgment. In this change process, it is not sufficient to work harder or to increase the number of instructional activities. Teachers must focus on results and be content only with activities that achieve the desired results.

- **Rethink Leadership Roles**
  Education reform research continues to reaffirm the importance of leadership for achieving school change. However, this leadership can come from many individuals in the school community. In addition to administrators, teacher leaders, parent leaders, and community leaders can all contribute to moving an organization from the status quo to innovation and high performance.

- **Support Professional Judgment and Creativity**
  Schools are unique among organizations because of the professional expertise of teachers. Effective change in schools comes not from placing rigid instructional procedures on school staff but by encouraging teachers to grow and contribute to better schools and better student achievement through good use of their decision making, professional judgment, and creativity.

Resources

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Chapter II   Data-driven Achievement

Using Data

Educators can improve the quality of instruction by focusing more on concrete, objective data.

One of the trends emerging from school reform and the implementation of learning standards is data-driven instruction and achievement. Often, the only data considered are the students' scores on standardized achievement tests. If the numbers are low, then schools and districts place tremendous emphasis on trying to improve instruction in order to "get the numbers up." This narrow focus on test results misses the broad range of data that teachers must take into account when planning instruction.

True data-driven achievement involves much more than merely reacting to low test scores. There are many other fundamental pieces of data that schools and teachers must acquire and analyze in order to improve student performance.

By training and experience, educators are most comfortable making decisions based upon subjective judgments rather than statistics. This method is often appropriate because of the enormous number of variables that can influence teaching in any school or classroom. Teachers must be prepared to adapt to a variety of classroom situations and be flexible in accommodating the learning needs of a diverse student population. At the same time, educators can improve the quality of instruction by focusing more on concrete, objective data. This influence of a variety of data is what we mean by data-driven achievement.

Teachers should not be fearful that an emphasis on data-driven decisions about curriculum will lead them to distort their teaching and eliminate instructional activities that they feel contribute significantly to student achievement. Or worse, that focusing on data will lead to rigid standardized teaching from a short list of lesson plans or content topics.

Think of buying shoes. Shoes vary by function, material, color, and style. Even within a single function, such as sneakers, there are hundreds of choices to suit personal preferences and anatomical features. But underlying all shoe purchases are numbers: shoe size and cost.

Such is the case in data-driven instruction. Certain underlying quantifiable data determine what is important to teach. The data do not define the whole scope of teaching, but they are fundamental to everything that happens in the classroom.

Much of what teachers do is to attempt to move a group of students to acquire the necessary skills and knowledge that will enable them to be lifelong learners and successful adults. While student test scores are one measure of progress toward those goals, other important data sets are the match of instruction (1) to the actual standards, (2) to the standards that are tested, and (3) to the essential skills needed by high school graduates as identified by educators and the wider public.

In order to plan instruction that gives students the best possible education, teachers must know what the standards are, which standards are tested, and which are deemed essential. The next sections describe these data sets.

The notion of standards in education is not new. What **is** new is the role of states and national curriculum groups in setting those standards.

Every teacher who has ever worked with a group of students has had standards. He or she had expected levels of performance, and students were judged according to that individual teacher's standards.

The challenge for today's teachers is that they must align their personal standards with state or national standards. To do so, they must look beyond the classroom and district. They must invest time to understand the state standards and decide how to reflect them in instruction. That understanding is not arrived at simply by reading through the standards. First comes interpretation of the standards through discussions with colleagues. Next comes alignment, as teachers analyze each of their teaching activities to determine the degree to which it aligns with the standards. Then comes the planning of new activities that will deliver any missing content as delineated in the standards.

> The data do not define the whole scope of teaching, but they are fundamental to everything that happens in the classroom.

State Standards

All of this places a greater planning burden on teachers in addition to their instructional role.

In order to understand the importance of the "external" standards, it is useful to recall how we arrived at the great emphasis on standards and accountability that we have in education today.

Brief History of the Standards Movement

In 1989, President George Bush met with the governors of each state in an Education Summit where they adopted a set of national education goals in such areas as preparation for school, graduation rates, and academic achievement. This national-level action was soon mirrored in many states as they moved to adopt similar goals.

In the same year as the Education Summit, the National Council of Teachers of Mathematics (NCTM) published *Curriculum and Evaluation Standards for School Mathematics*, a document intended to help schools, districts, and states improve their mathematics curricula. Widespread positive reaction to the NCTM standards, combined with the heightened national interest in student learning brought about by the summit, set in motion a series of national activities aimed at defining what students should know and be able to do in each academic subject.

A listing of all Websites related to standards for English language arts, mathematics, science, and social studies/history is maintained by Charles Hill, Putnam Valley (N.Y.) School District **http:/www.putnamvalleyschools. org/Standards.html**

Although the idea of a national curriculum met with stiff opposition, the idea that classroom instruction should be guided externally by a set of essential topics and well defined benchmarks resonated with the public and policymakers alike. Currently, 49 states either have in place or are developing content standards in at least three of the four core subject areas (English language arts, mathematics, science, and social studies/history).

One of the most comprehensive searchable databases of state and international standards in English language arts, mathematics, science, and social studies has been developed by Achieve, Inc, (http://www.achieve.org). The database is organized conveniently by subject, state or country, grade level, topic, and keyword. This

allows for sophisticated searches and side-by-side comparisons. For example, users can search their state's math standards for all references to geometry and then compare the results with geometry standards in other states and countries.

Achieve organized the database according to the structure developed by Mid-continent Regional Educational Laboratory (McREL) and presented in *Content Knowledge: A Compendium of Standards and Benchmarks for K-12 Education*.

What Makes a Good Standard?

In order for standards to be useful in providing a complete education, they must meet the following criteria:

- **Comprehensive** – They must cover all important aspects of the subject.
- **Clear** – They must be understandable to educators and the public.
- **Measurable** – It must be possible to measure the student performance required to meet the standards.
- **Rigorous and Relevant** – They must challenge students to think in complex ways and to apply their skills and knowledge to real-world situations.

Most state standards fall short of satisfying these criteria. It is difficult to write a manageable list of comprehensive yet broad standards without using language that is vague and immeasurable. To compensate for this problem, most states have delineated two, three, or more subcategories of each standard in an attempt to add more meaning and measurability. These subcategories of standards are variously referred to as performance indicators, benchmarks, or topics. Educators must work at this greater level of detail to derive some indication of what the student performance might be or what instructional activities could relate to this standard.

A snapshot of the status of standards implementation in the various states can be found in the report "Quality Counts 2001,"

published by *Education Week*. This report is based on a nationally representative survey of 1,019 public school teachers. It also includes the most comprehensive survey to date of what states are doing to set academic standards, to create testing and accountability systems linked to those standards, and to provide support for students and educators to reach the higher expectations.

Many of the teachers surveyed reported that standards have had an impact on their behavior and on their students. When asked to compare the current situation with three years earlier:

- Almost eight in 10 teachers said the curriculum was "somewhat" or "a lot" more demanding of students.
- More than six in 10 said the expectations for what students would learn were "somewhat" or "a lot" higher.
- Nearly seven in 10 said teachers in their schools were collaborating more.
- More than six in 10 said students were writing more; nearly half reported students were reading more.

Of those teachers who said the curriculum was more demanding, more than six in 10 attributed the change to statewide academic standards. Elementary teachers were far more likely to report changes in curriculum and expectations than middle or high school teachers. Teachers in states that require students to pass exit tests to graduate also reported more changes than those in states without such exams.

Test Data

Test scores get all the headlines, and the local media are quick to post the numbers and compare them to other schools. This attention tends to distort the proper balance achieved by looking at many types of data as well as other components of student achievement. As we have already outlined, teachers need first to know what the standards are and incorporate the topics into instruction. Results on state tests can then give an indication of whether students are developing competence in the standards if three assumptions are met.

1. The state tests must be aligned with the standards.
2. The tests must be comprehensive enough to cover all of the standards.
3. The tests must reliably and consistently assess student competence.

Before educators jump to respond to test scores by changing instruction, it is essential to examine the reality of these assumptions.

"Quality Counts 2001" indicates that the match between state standards and tests is not close enough. In particular, state tests measure some standards but not others. They also tend to emphasize the less demanding knowledge and skills in the standards and test that knowledge through simple questions. The report stated:

> Forty-nine states include multiple-choice questions on their exams, 38 include short-answer items, and 46 ask students to compose essays as part of writing tests. But only seven require students to write essays or engage in performance tasks in subjects other than English. Two states use portfolios, compilations of students' classroom work.

For schools and districts, state tests may not be the most appropriate vehicles for judging student performance, and they do not address the full range of local beliefs about what a student should know and be able to do. This does not imply that schools should ignore these tests, but rather that simply doing well in state-defined report card categories is not enough to guarantee that students are truly prepared with skills for success. Therefore, it is crucial that schools and districts define their curriculum priorities for themselves and use broader measures than just tests to assess learning.

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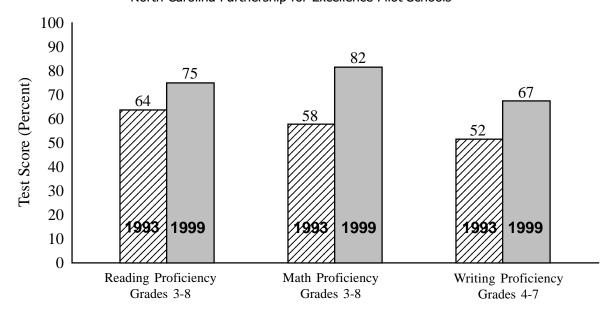
Establishing Critical Results

At the International Center, we have seen evidence that districts are more likely to be successful in achieving reform if they establish critical results. For example, we worked with the North Carolina Partnership for Excellence (NCPE) to assist 34 school districts to establish their critical results. For the NCPE, the key concern was academic achievement; thus, the critical results were expressed in terms of improvement of scores on state tests. In part because of this focus, the NCPE and the districts involved have achieved consistent and significant progress toward their critical results.

Figure 1 illustrates the NCPE's success in helping the six pilot school systems achieve their critical results in the areas of reading, mathematics, and writing. In addition to gains in test scores, the school systems also made substantial improvement in reducing dropout rates, increasing attendance rates, and reducing behavior referrals – other areas in which it is productive to set critical result numerical goals.

Figure 1
Gains in Achievement on End-of-Grade Tests

North Carolina Partnership for Excellence Pilot Schools

It is important to bear in mind that each critical result, e.g., a 10 percent improvement in test scores, is tied to a broader goal, e.g., an increase in knowledge and skills. Ideally, attaining the percentage improvement specified should indicate progress toward the goal, but it is possible to reach a target without making true progress. Using the example of test score improvements, scores may go up because students have become more savvy test-takers through practice rather than more knowledgeable. Teachers may eliminate important curriculum topics to focus on test items. Low-achieving students may become discouraged and drop out. Districts may also exclude the scores of some students from the data reported or exclude the students themselves from the testing altogether. Any of these practices and conditions can result in higher test scores, so when districts use numerical targets to reflect on student achievement, they must keep these intervening circumstances in mind and judge their progress accordingly.

Schools and districts should attach numerical goals to assessment data and a time frame for reaching them. For example, a critical result regarding achievement may be expressed as "90 percent above the state reference point." In setting numerical goals, districts must recognize that some critical results will take longer to realize than others. If this fact is not clearly stated, the public may expect results too quickly and may label the effort a failure prematurely. Therefore, districts need to be realistic when identifying critical results.

Schools must also analyze the numbers in a disaggregated fashion in two directions. First it is necessary to look at subgroups of students. Improvement in average scores will not occur by focusing only on instruction. Schools need to look at selected students with low performance and explore the root causes of their poor achievement. For example, attendance or health issues may play a more significant role than the quality of teaching. Secondly, subscores on different parts of the test will reveal areas of student strengths and weaknesses. Rather than trying to address all aspects of the curriculum, improvement efforts will be most productive if they concentrate on areas of greatest weakness.

Schools and districts should attach numerical goals to assessment data and a time frame for reaching them.

Essential Skills

The International Center believes that a curriculum needs to prepare students for the world beyond school, not just for the next level of education. To accomplish this objective, the curriculum must reflect what the community believes students should know and be able to do when they graduate form high school.

The International Center developed the Curriculum Survey of Essential Skills to help districts identify what educators and the community believe is the most important English language arts, mathematics, and science content in terms of the rigor and relevance needed to prepare students for post-school, real-world experiences. Since the Curriculum Survey was introduced in 1998, nearly 20,000 people across the U.S. have participated, generating a national database on the skills and knowledge deemed most essential for students to possess.

The Curriculum Survey asks participants to identify what they believe are the 35 most important topics in each of the three subject areas. The topics were compiled following a comprehensive review of the national standards established by the National Council of Teachers of Mathematics (NCTM), the National Science Teachers Association (NSTA), and the National Council of Teachers of English (NCTE) as well as various state standards. The lists of topics then went though an intensive editing process by International Center staff and Master Teachers and other leading educators. In all, 101 English language arts, 87 mathematics, and 113 science topics were identified and incorporated into the Survey. Three science topics were added after the Survey was administered because they had been inadvertently omitted and were deemed essential by the content specialists.

Tables IV, V, and VI in Chapter III list the top 10 topics in each subject.

Key Findings of the Curriculum Survey

In general, the public and educators found the math topics the most difficult to understand and, therefore, to rank. The English language arts topics were the easiest to understand and rank. Science topics fell somewhere in between.

The top-ranked topics are typically skill-based. In English language arts, for example, they typically depict the application of knowledge. These topics traditionally have been considered by many, especially non-educators, as the basic skills within the discipline.

A comparison of the high-ranked topics in the Curriculum Survey with the highest-ranked English language arts, math, and science standards from the McREL study revealed comparable findings. This is a definitive signal of the nationwide consensus on the importance of practical, skill-based standards that involve the application of knowledge.

The low-ranked topics, especially in English language arts, can be classified as content-based methodologies that have been part of curricula for a long time. These topics were introduced as a means to teach some of the top-ranked skills, but they may not be as relevant in today's society as other skills and knowledge. These topics are being taught today as ends in and of themselves rather than as a means to teach the more basic and higher-ranked topics.

Some of the lowest ranked topics in the English language arts survey are:

- Use response journals to jot down ideas from reading literary texts.
- Contrast the reading of a Shakespearean or other play with a live or filmed performance.
- Assess several works by the same author.

Rankings of topics by educators and the general public, which included the business community, correlated highly to each other, indicating that these groups have similar priorities. This may be surprising to some, who perceive the public, especially the business community, to have different priorities from educators in general. However, the rankings by subject-matter teachers of topics within their respective disciplines are often substantially different from those of the general public and other educators. This is significant because curriculum and assessment committees are typically comprised primarily of subject-matter specialists, who appear to have a unique perspective on what should be included in

Marzano, Kendall, and Cicchinelli.
What Americans Believe Students Should Know: A Survey of U.S. Adults

Rankings of topics by educators and the general public, which included the business community, correlated highly to each other, indicating that these groups have similar priorities.

the curriculum and on the tests. This finding suggests the need to reassess the composition of these committees.

Topics that are typically considered "basic" skills and knowledge in a discipline are ranked as high priority by all segments of the population with the exception, in some cases, of the educators in that discipline. This is alarming because the teachers who must deliver those basics appear to believe either that these skills are not important or that they are not the responsibility of the discipline. The result is that these basic skills may not be receiving the attention they deserve. Table II gives examples of basic skills that are ranked high by non-educators and educators in general but low by the subject-matter educators.

These data allow districts to make informed judgments about the relevance of each topic as it relates to today's standards.

The complete Curriculum Survey of Essential Skills national rankings for English language arts, mathematics, and science topics are provided in the Appendix.

Setting Curriculum Priorities

Data on standards, essential skills, and state tests can be used to set curriculum priorities. The International Center's Curriculum Matrix is an analytic model that helps districts do so. It compares state standards in English language arts, math, and science with findings from the Curriculum Survey of Essential Skills and a review of the state's mandated assessments in up to four grades in each of the three subject areas.

Table III provides a sample page from the report for South Dakota. The first column lists the standards used by the state. The second column provides the related essential skill and its rank from the Curriculum Survey. The third column indicates how many questions on the relevant assessment were related to the standards in the first column, categorizing the standards as appearing with high (H), medium (M), or low (L) frequency. The fourth column indicates whether each standard in the first column was considered high (H), medium (M), or low (L) priority by the respondents to the Curriculum Survey. Finally, the fifth column gives an overall priority rating for the standard based on both frequency on the assessment and the opinion of the public as to its importance.

Table II
Breakdown of National Rankings
by Various Subgroups

English Language Arts Topic	National Rank	Business Leaders	Other Non-educators	English Teachers	Other Educators
Understand rules of grammar, usage, punctuation, paragraphing, and spelling.	7	7	2	28	8
Develop processes for understanding and remembering information.	9	8	6	29	10
Use dictionary, grammar books, and thesaurus to aid in editing.	23	tie 20	15	44	27
Understand the nature and purpose of a variety of technical formats such as business letters, memos, instructions, policy statements, technical proposals, user manuals, lab reports, etc.	29	tie 20	24	45	30
Understand and use graphs, charts, and visuals to enhance information writing.	30	18	30	57	28
Mathematics Topic	**National Rank**	**Business Leaders**	**Other Non-educators**	**Math Teachers**	**Other Educators**
Understand basic algebraic properties.	3	4	2	20	5
Analyze the truth value of simple sentences by stating whether a simple objective statement (closed sentence) is true or false, or whether a statement containing pronouns or variables (open sentence) becomes true or false upon replacement of those pronouns or variables.	12	8	13	34	11
Understand the characteristic differences between theoretical and empirical probability.	21	12	23	37	18
Use geometric methods to complete basic geometric constructions.	28	31	22	50	28
Science Topic	**National Rank**	**Business Leaders**	**Other Non-educators**	**Science Teachers**	**Other Educators**
Know the structure and function of roots, stems, and leaves.	11	8	10	19	10
Know the relationships between local atmospheric variables.	14	6	17	25	14
Understand muscles and skeleton and how their interaction produces support and locomotion.	20	25	18	37	20
Identify and comprehend factors that affect climate patterns such as latitude, elevation, large water bodies and ocean currents, mountain barriers, wind belts, and storm tracks.	27	37	29	51	24

Please see Chapter VI for the Curriculum Matrix for your state.

This type of analysis is a powerful tool for districts as they try to sort through the numerous state standards. Without it, districts must choose between trying to cover all the standards by diluting or condensing them and eliminating some, which runs the risk of leaving students unprepared for the assessments or without the skills considered essential by the community. With it, however, districts can make decisions to place more or less emphasis on a standard or to delete it completely, confident in the knowledge that the decisions will help students succeed on the assessments and that they are consistent with public expectations. In addition, this analysis can serve as the starting point for planning staff development activities.

Although districts may wish to incorporate supplemental criteria in making decisions to emphasize, add, or delete topics, using Curriculum Matrix data in this manner provides a clear indication of the impact of such decisions.

Table III
Excerpt from South Dakota Curriculum Matrix

Description of Columns

Column 1	Column 2	Column 3, 4, 5
A Sample of Communications/ Language Arts Content Standards - Grades 9-12 Reading	Curriculum Survey of Essential Skills national data crosswalked to South Dakota's standards. The essential skills ranking is identified on left side of column.	**3** - Crosswalk of standards to Stanford Achievement Test, Edition 9: One question on standard = medium priority More than one question = high priority No questions = low priority
		4 - Standard crosswalked to essential skill ranking in Survey: 1 - 35 = high priority 36 - 70 = medium priority 71- 101 = low priority *The highest ranking takes precedence.*
		5 - Summary of priority rankings in Columns 3 and 4

Column 1		Column 2		Column 3	Column 4	Column 5
South Dakota Communication/ Language Arts Content Standards **9-12 Reading**		**Curriculum Survey of Essential Skills** Rank		**SAT 9 Tested**	**Curriculum Survey**	**Priority**
1	Use etymology (word origin) to determine meaning of words.	9	Know how to decipher unfamiliar words.	H	H	H
2	Apply various context clues to determine word meaning.	9	Know how to decipher unfamiliar words.	H	H	H
3	Discern the relationship between word pairs in analogies, e.g., synonyms/antonyms, connotation/denotation.	80	Understand ways an author uses language and text characteristics to aid comprehension.	L	L	L

Chapter III   Crosswalk to the Critical Skills – The Curriculum Matrix

Defining What to Teach

In today's schools, educators struggle to answer the question: What should we teach? There are so many considerations involving national, state, and district standards and goals. Teachers and administrators often feel overwhelmed by the numerous and sometimes conflicting standards that they are held responsible for teaching. Most curricula have more content than can be taught in the time allotted in a school year.

Along with the challenge of teaching the standards, educators are feeling the pressure of having all students meet state testing requirements. All the while, schools are being asked to do more to prepare students to participate effectively in the complex world in which they will live and work.

Then there is the significant impact of past practice. Teachers are used to teaching based on their own vision of a well educated student. Sometimes this vision is compatible with state standards and assessments and students' post-secondary aspirations; however, this vision is almost never completely covered by them.

There is no simple answer to the question of what to teach in an overcrowded curriculum, but districts can begin with a clear statement of the vision of a quality education based on what is critical for students to know and be able to do. Content is considered critical either because students need those skills and that knowledge for future success or because they will be tested on those skills and that knowledge, or both. This vision must be shared by everyone. It then serves as the guiding force behind all district efforts.

To assist educators in determining what should be taught and to improve student performance on state-mandated tests, the International Center, in partnership with EdGate, has developed a Curriculum Matrix, which does a crosswalk of state standards to selected state tests and the essential skills. This resource kit contains everything needed by a district to determine what to teach and how to raise scores on the test included in the crosswalk. Another component of the Curriculum Matrix, available separately, is a set of Gold Seal Lessons that help teach the critical skills.

Along with the challenge of teaching the standards, educators are feeling the pressure of having all students meet state testing requirements.

EdGate has an Internet version of the Gold Seal Lessons, available through its Copernicus Learning Communities.

State Standards

The Curriculum Matrix is based on a state's standards in English language arts, mathematics, and science. Those standards are divided into general categories and subcategories that help to define the standards. These categories are called by various names from state to state. The general category is stated as a broad goal or outcome statement or identified content area. The subcategories are variously referred to as key ideas, performance indicators or benchmarks or topics. We will use the word "topic" to refer to the subcategories that lend definition to the standards.

The topics have the greatest impact on instructional decision making since they give more detail regarding what the student must know or be able to do to meet the standard. Often, the topics suggest appropriate instructional activities and may even provide a sample activity. Figure 2 shows an excerpt from a standard with topics and performance objectives (PO).

Components of the Curriculum Matrix

We will use the word "topic" to refer to the subcategories that lend definition to the standards.

Figure 2
Example of a Standard with Subcategories

Science Standard 4

Life Science

Students understand the characteristics of living things, the diversity of life and how organisms change over time in terms of biological adaptation and genetics. Students understand the interrelationships of matter and energy in living organisms and the interactions of living organisms with their environment.

READINESS (Kindergarten) Students know and are able to do the following:

Topic: Distinguish living from non-living things
    PO 1. Identify living things
    PO 2. Identify non-living things
    PO 3. Describe differences between living and non-living things
Topic: Describe the basic needs of living organisms
    PO 1. Describe the basic needs of living organisms for survival
Topic: Recognize and distinguish similarities and differences in diverse species
    PO 1. Identify observable similarities among diverse species (e.g., number of legs, body coverings, size)
    PO 2. Identify observable differences among diverse species
    PO 3. Compare the observable similarities and differences among diverse species

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Educators need to become familiar with the categories and topics in their state standards. It is not enough to read them or be able to recite them. Educators must be able to express them in words that students and parents can understand. In many schools where student performance has improved, educators have rewritten the standards and provided examples of what the standard means in terms of student performance.

Dialogue among teachers on what the standards mean often reveals different interpretations or a lack of understanding of the intent of the standard. It is important for schools to entertain this type of discussion around the standards.

State Assessment System

The second component of the Curriculum Matrix is selected state assessments. Up to four K-12 state-mandated tests in each subject — English language arts, mathematics, and science — are crosswalked in the Curriculum Matrix.

The topics in the relevant standards are correlated to the testing specifications (blueprints), test item analysis, or released test items. Topics are rated as a high (H), medium (M), or low (L) priority based on the extent to which they are tested.

State testing specifications are not always organized the same. Some states indicate in percentages the degree to which a topic is tested and others may indicate a number of questions per item. Still others may provide sample test item booklets with an analysis of the sample test items in relation to the standards addressed.

In the crosswalk of the topics to the test, the priority rating is determined by the topic's emphasis on the test. A low rating is given only to topics that do not appear on the state's testing specifications. A medium or high rating means the topic is tested, with a high rating designating a greater number of questions or more weight given to questions on that topic. Using this correlation, teachers can match their state standards to what is tested. Figure 3 shows the testing specifications for a state math exam.

Figure 3
Testing Specifications for New York State
Mathematics A Regents Exam

Key Ideas	
Aspect	**Range***
Mathematical Reasoning	5-10%
Number and Numeration	5-10%
Operations	15-20%
Modeling/Multiple Representations	15-25%
Measurement	15-25%
Uncertainty	5-10%
Patterns/Functions	15-25%

Cognitive Process	
Aspect	**Range***
Procedural Knowledge	25-40%
Conceptual Knowledge	25-40%
Problem Solving	25-40%

Item Types and Tasks	
Aspect	**Number of Items**
Multiple-choice	20
Short Constructed Responses	5-2 pts.
	5-3 pts.
Extended Constructed Responses	5-4 pts.

The percentage of the assessment that will be an application or be given in a contextual setting is 50-60%.

* The percents indicated are in terms of the total number of points available on the test.

Curriculum Survey of Essential Skills

The third component of the Curriculum Matrix is the significance of the topics in the standards in relation to the results of the International Center's Curriculum Survey of Essential Skills (described in Chapter II). The Curriculum Survey elicits the expectations of educators and the general public of skills and knowledge students should have when they graduate from high school. Tables IV, V, and VI show the top 10 nationally ranked topics in English language arts, mathematics, and science, respectively. The complete list of Curriculum Survey topics can be found in the Appendix.

A topic in the state standards is designated as high (H), medium (M), or low (L) priority based on the crosswalk to the Curriculum Survey and the ranking of the comparable essential skill on the Survey results. Essential skills ranked 1-35 are considered high; those ranked 36-70, medium; and above 70, low. A low rating is also given if there is no corresponding essential skill for the topic.

In many instances, a topic matches more than one essential skill. The priority designation relates to the highest ranked essential skill matched. The crosswalk enables teachers to identify topics in their state standards that are consistent with the skills and knowledge the public believes are essential for students' success in their adult lives.

Table IV
Top 10 Curriculum Survey of Essential Skills Rankings
for English Language Arts Topics

Rank	English Language Arts Topics
1	Apply in writing the rules and conventions of grammar, usage, punctuation, paragraphing and spelling.
2	Give oral or written directions that are clear and are understood by another person.
3	Gather information from a variety of sources, including electronic sources, and summarize, analyze, and evaluate its use for a report.
4	Follow oral or written directions.
5	Identify, collect and/or select pertinent information while reading.
6	Follow written directions carefully and accurately.
7	Understand rules of grammar, usage, punctuation, paragraphing and spelling.
8	Develop processes for understanding and remembering information.
9	Know how to decipher unfamiliar words using such strategies as context cues, word structure analysis, letter-sound relationships, and word histories.
10	Prepare and deliver individual speeches by gathering information, rehearsing, making eye contact, speaking loudly enough, delivering information in a well-organized fashion, and appealing to the needs of the target audience.

Table V
Top 10 Curriculum Survey of Essential Skills Rankings
for Mathematics Topics

Rank	Mathematics Topics
1	Perform operations with signed (positive and negative) numbers, including decimals, ratios, percents, and fractions.
2	Understand the characteristics of parallel, perpendicular, and intersecting lines.
3	Understand basic algebraic properties (i.e., commutative: ab = ba; associative: ab(c) = a(bc); and distributive: a(b+c) = (ab)+(ac)).
4	Understand the characteristics and terminology of angles, e.g., degree measure, classification of angles by measure (acute, right, obtuse, and straight), supplementary and complementary angles, and vertical angles.
5	Understand the best procedures for statistical data collection, organization, and display including making estimates and predictions and drawing inferences.
6	Understand the characteristics and applications of the undefined terms of geometry (i.e., point, line, and plane).
7	Understand the use of variables in expressions such as 4x, x+2, and 2x-1, solve for the variable, and know how to represent expressions such as "twice the number" or "four more than the number" using variables.
8	Understand the correct order of operations for performing algebraic computations.
9	Know how to compute the distance between two points (i.e., length of a line segment) on a coordinate plane.
10	Understand the properties of circles (e.g., radius, arc, diameter, chord, secant, tangent, etc.).

Table VI
Top 10 Curriculum Survey of Essential Skills Rankings
for Science Topics

Rank	Science Topics
1	Understand how and why the rotation and revolution of the earth around the sun affects the length of night and day, the changing of seasons, and weather patterns.
2	Identify and understand the structure and parts that comprise the systems (i.e., cardiovascular, nervous, lymphatic, muscular, etc.) and regions (i.e., head and neck, upper limb, thorax, abdominopelvic, back, and lower limb) of the human body.
3	Understand nutrition - the need for food and a good diet, ingestion, digestion, egestion and related disorders such as ulcers, appendicitis, etc.
4	Know the metric system and the units of metric measure and convert metric units to English units.
5	Make observations using senses and instruments. Inferences and interpretations are arrived at based on observations. Classify observable properties and organize observations in a meaningful and logical way.
6	Understand how humans, through technology, cause environmental change by disrupting the equilibrium or balance of nature by introducing pollutants into the environment.
7	Know the processes involved in the water cycle, (i.e., evaporation, condensation, precipitation, surface runoff, percolation) and their effects on climate patterns.
8	Know that reproduction is a characteristic of all living things as a function of cell division and species survival.
9	Identify the cell as a common unit between living things; understand cell structure and the functions they perform.
10	Understand the human impact on the environment through pollution (air, water, and soil), and ways to improve it through education, research, laws, and conservation.

Priority Ratings

The final step in the Curriculum Matrix crosswalk is to assign an overall priority rating to the topic. This rating is determined based on the topic's correlation to the test and the essential skills. An item is rated low if it is not included on the test and is correlated to a low-priority essential skill or none at all.

Educators can use the priority ratings to make informed decisions about whether to place more or less emphasis on individual topics in a standard. Teachers gain confidence that their instructional decisions will help students succeed on tests and that they are consistent with what educators and the community believe a high school graduate should know and be able to do.

The puzzle over what is critical to teach and the dilemma over how much time to spend on one topic versus another is eliminated with the Curriculum Matrix. The topics found in the state's standards are prioritized for instruction.

Table VII shows a section of Arizona's Curriculum Matrix for English Language Arts, Grade 3. The topics beneath each standard are crosswalked to the essential skills and to Arizona's Instrument for Measuring Success (AIMS) and assigned a rating for each crosswalk. Finally, an overall priority rating is given based on the topic's rank on the Curriculum Survey of Essential Skills and its emphasis on the state test.

Gold Seal Lessons

An additional component of the Curriculum Matrix is Gold Seal Lessons, which focus on the high priority topics. These performance tasks, written by teachers who have used them successfully in their classrooms, suggest ways the topics can be taught using real-world applications.

Using Gold Seal Lessons to Improve Instruction, available from the International Center, is a collection of 360 K-12 performance tasks in English language arts, math, and science keyed to the highest-priority topics in the standards.

Table VII
Excerpt from Arizona Curriculum Matrix

Column 1	Column 2		Column 3	Column 4	Column 5
Arizona English Language Arts Standards Essentials – Grade 8	International Center for Leadership in Education's Curriculum Survey of Essential Skills	Rank	AIMS Test	Curriculum Survey	Priority
Standard 2: Writing Students effectively use written language for a variety of purposes and with a variety of audiences.					
W-E1 Use correct spelling, punctuation, capitalization, grammar and usage, along with varied sentence structure and paragraph organization, to complete effectively a variety of writing tasks.	e1	Apply in writing the rules and conventions of grammar, usage, punctuation, paragraphing and spelling.	M	H	H
	e7	Understand rules of grammar, usage, punctuation, paragraphing and spelling.			
	e14	Use editing and revising skills to improve effectiveness and accuracy of drafts.			
	e33	Understand the importance of accuracy in final drafts.			
W-E2 Write a personal experience narrative or creative story that includes a plot and shows that reader what happens through well-developed characters, setting, dialog, and themes and uses figurative language, descriptive words and phrases.	e1	Apply in writing the rules and conventions of grammar, usage, punctuation, paragraphing and spelling.	M	H	H
	e7	Understand rules of grammar, usage, punctuation, paragraphing and spelling.			
	e11	Present information in well-organized fashion that will be clear to the target audience.			
	e31	Use writing as a way of expressing personal creativity.			

Using the Curriculum Matrix

The Curriculum Matrix provides opportunities for educators to extend and enhance curriculum and instructional improvement efforts. The Matrix gives form and substance to the alignment of state standards with state assessments and community expectations. As a resource to guide instruction and instructional decisions, the Matrix assists educators in raising student performance.

Deciding What Standards to Emphasize in Instruction

Teachers can use the Curriculum Matrix to make better choices about what to teach and how much instructional time to spend on each topic in the standards. Whether or not the topic is tested on a state exam is determined easily by referring to the testing priority rating assigned to the topic. This match between the topics and what is tested gives the teacher a blueprint of the content on the state test. If the item is rated high, then it would likely demand more instructional time than one rated medium or low. Knowing what is on the test enables the teacher to plan instruction around the tested items; thus, students have more likelihood of demonstrating competence on the test.

The Curriculum Matrix also relates state standards to the essential skills students need as defined in the International Center's Curriculum Survey of Essential Skills. The teacher has a summary of what community expectations are for what students should know and be able to do to succeed in adult life. The topic is rated high, medium, or low depending upon the ranking of corresponding skills on the Curriculum Survey. As with the testing correlation, topics rated high should receive more instructional emphasis than those items rated medium or low. Providing students with instruction in these priority areas gives them the preparation which business, industry, community leaders, and parents believe is essential for high school graduates to have.

These two priority ratings — the topic's frequency on state tests and its rank on the community survey, point the way to the "must teach" content that so many educators struggle to identify in an overcrowded curriculum.

Teachers can use the Curriculum Matrix to make better choices about what to teach and how much instructional time to spend on each topic in the standards.

New Teacher Mentoring

Many schools assist new teachers in their initial teaching efforts by providing them with a mentor to guide the development of quality instruction. One aspect of mentoring is helping teachers develop an understanding of what must be taught. The Curriculum Matrix can provide a resource to these beginning teachers as they incorporate standards and testing priorities into their instruction. At the beginning of a teaching career is an excellent time to introduce this resource. The Curriculum Matrix could be a departure point for dialogue among beginning teachers and their mentors on how to determine instructional priorities.

Developing Standards-based Lessons

In an effort to ensure that students are working toward state standards, many districts are engaged in having teachers write and submit lessons directly linked to various state standards. The Curriculum Matrix is a vehicle for facilitating teacher efforts to designate specific standards related to their existing lessons. The Curriculum Matrix also is an opportunity for teachers to select standards that must be addressed or identify weaknesses in student achievement on state assessments. Starting with the topics in a standard, teachers can develop lessons by grade level or course instructional program.

For information on an electronic version of the Curriculum Matrix, which is a part of EdGate's Copernicus Learning Communities, please see the back pocket of this binder.

Chapter IV   Setting Instructional Priorities

Examining Student Achievement

Reviewing State Reports, Test Results, and Classroom Measures

To assess how well students are doing, educators must look at multiple sources of evidence of student performance. This evidence can take many forms. Classroom-based measures include profiles, diagnostic assessments, early reading/literacy assessments and subject skill, and concept and knowledge assessments. Another form is norm-referenced or criterion-referenced standardized tests. These are state tests or possibly commercial tests that districts use to supplement the statewide testing program if it is not annual. A third form of evidence of student performance can be found in a review of classroom performance (participation, class work, and homework), report card grades, student performance/demonstration, and student records.

Teachers need to identify what student achievement data should be collected and analyzed. Then, they need to be familiar enough with this information to be able to draw some conclusions about district and individual achievement. Basically, this process becomes a "taking stock" activity followed by a "gathering data" activity. The data are then analyzed and used to focus school improvement efforts. This becomes the "model design" activity.

Today, all 50 states require statewide tests in at least one subject. Test results are made public through a school report card, which is issued by the state's department of education. School report cards serve as an accountability instrument. They answer the public's question: How well is our school doing? The process of identifying, understanding, and analyzing the report card's information is essential to knowing how well students are doing.
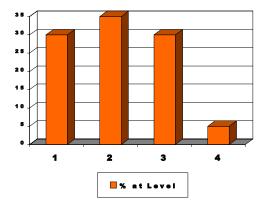
Information on a school's report card may include such items as the dropout rate, percentage of students scoring at various levels on state assessments, and a comparison of the school's performance with other local schools or similar schools statewide. Some states set goals that fix desired percentages of students at or above

state reference points. Other states make comparisons with similar schools or have a formula for calculating "value added" by the school over an expected increase in achievement. Report card data may also reflect the number of diplomas awarded and the type, if distinctions are made. Other areas that might be represented include attendance rates, number of students enrolled in special education programs, and the economic status based on the number of students on free or reduced lunch.

Figure 4 shows a school's performance on an elementary English language arts (ELA) state test. The minimum competency is level 3. Students performing below level 3 are not meeting the state's expectations.

**Figure 4
Performance of School A
on Grade 4 ELA Test**

"A picture is worth a thousand words."
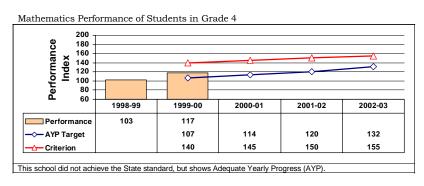
A review of Figure 4 would lead to a number of questions. Why are there so many students below minimum competency? How close or far away are the level 2 students from level 3 and level 1 students from 2? Why are so few at level 4?

Many states have designed some type of formula for determining a statewide benchmark and a school benchmark or, as it is called in some states, the school accountability performance index. The school accountability performance index shows the individual building's performance in relation to the statewide minimum performance. Financial incentives and resources are often tied to this score.

In addition, schools may be given Adequate Yearly Progress targets to strive toward. Figure 5 shows one school's performance index and Adequate Yearly Progress target in one subject area. The figure also indicates the criterion, which is the statewide minimum performance target. In this figure, the performance index used to measure elementary school performance is computed using aggregate results of the state grade 4 assessments.

Figure 5
School Report Card

Mathematics Performance of Students in Grade 4

	1998-99	1999-00	2000-01	2001-02	2002-03
Performance	103	117			
AYP Target		107	114	120	132
Criterion		140	145	150	155

This school did not achieve the State standard, but shows Adequate Yearly Progress (AYP).

This system of accountability for student success is based on students' performance at varying levels on statewide assessments. Teachers need to know how the school's score is determined as well as the corresponding reward, sanctions, or resources that the school can anticipate as a result of its performance index.

Report card data analyses can lead to many points of further data collection. Districts or schools may ask: How did individual students perform on state tests? Is the dropout rate within the state limit? How did individual students' performance on eighth grade tests, for example, correlate with their performance on state tests required for graduation? What more besides test scores do we know about low-performing students? What instructional improvement and programmatic modifications may be needed? Where should efforts focus?

Another public data source on student performance is results on commercial tests. For students' scores on these tests to predict accurately their performance on statewide tests, the commercial tests must be similar to the state tests. Both should measure the same concepts. The key ideas and performance indicators should be the same across the tests, and the percentages of each test devoted to each key idea and performance indicator needs to be similar. These tests help teachers determine how students are doing and assist teachers in identifying which students will need academic support to succeed on the state tests.

Local assessment measures also serve as performance indicators. These assessments must reflect the same levels of difficulty as the state tests.

Data analysis, local assessment development, local reporting, and subsequent instructional and programmatic modifications focus a school's efforts toward improved student achievement. When the analysis of test data is completed, teachers face the familiar refrain: No matter how well students are doing, they can always do better. If a test were given that all students passed with flying colors, there would be no big congratulations, no acknowledgment that teachers are doing a great job. Instead, the cry would go out that the test was too easy.

Rather than worrying too much about absolute scores, schools need to set individual benchmarks and develop progress indica-

Rather than worrying too much about absolute scores, schools need to set individual benchmarks and develop progress indicators.

tors. It is this comparison to specific benchmarks and progress over time which contributes to more meaningful data analysis.

Looking at Individual Student Performance

A closer look at student achievement goes deeper than overall reported test scores. Teachers need to review students' completed test papers. These can be grouped by lowest to highest scores. Then, in a collaborative dialogue, teachers discuss the test items, the students' work, and the results. Trends and patterns will surface in this form of analysis. Once these are identified, teachers can discuss the instructional implications and identify academic intervention services for students in need.

See Chapter V

20 **Analyzing Students' Performance on the Test**

As the saying goes, "If you continue doing what you have always done, you'll get what you have always got." Thus, after analyzing students' performance on test items, teachers need to develop a process for action research. Based on the information gathered, teachers identify, define, and "try out" new instructional approaches and strategies. Teachers collect evidences of the differences that result, particularly noting the progression of student achievement under these new teaching approaches.

Developing Academic Intervention Services

See Chapter V

21 **Identifying Academic Intervention Strategies**

Knowledge and analysis of various reports and assessment results build teachers' capacity to identify students' learning needs and teach to those needs. Students who are identified as low performing or at risk should, and in most states are required to, receive some degree of academic support. This support used to be known as remediation, which was often limited to repeating grades or pull-out instruction, methods which have proved ineffective. Today, it is called "academic intervention services." As the new terminology indicates, these services are provided as soon as a student begins to evidence difficulty in meeting expectations. Teachers intervene before a student falls behind rather than waiting for failure and then remediating.

5

The scope of academic intervention services has broadened to include not only additional time for focused instruction or extra staff for increased student-teacher contact time, but also student support services. Support services can consist of guidance, counseling, study skills development, and attendance improvement activities.

The frequency, intensity, and duration of academic intervention services vary depending on what the student needs to assist him or her to meet standards within a reasonable amount of time. Schools have set up extra instructional periods within the regular school day, extended day programs and after-school sessions, summer school programs, and co-teaching learning environments where students get more attention due to additional staff.

Degree of intensity may vary from large group instruction to small group sessions to one-on-one assistance. Duration of services may be measured in days per week, hours per day, or time per semester.

Districts have developed support guidelines that describe district-level procedures to determine the need for academic intervention services, what instructional services will be provided, what support services will be offered, when services will be made available, criteria for entry/exit, and variations among schools, grade levels, and courses of study. In the most successful academic intervention services, teachers have moved away from the "drill and kill" sessions where all students receive the same instruction regardless of their needs. Instead, metacognitive learning strategies aimed at helping students become independent learners have replaced the boilerplate review classes.

Appropriate Use of Data

Using Test Data

With the emphasis on accountability and statewide test results, test data have become agenda items for many district planning

sessions and curricular-instructional meetings. Purposeful use of these data leads to the comprehensive improvement of the entire learning organization. The obvious use of test data is to describe conditions of student achievement. Typically, this analysis leads to:

Identify programs that are working well.

1. Identification of those programs that are working well; these are the strengths of the curriculum. Know which programs are bringing satisfactory student achievement results and which are not. Test data can lead to those programs that are not working. Schools need to analyze this information in order to evaluate programmatic effectiveness and to make decisions about program modifications at various grade levels and in specific courses.

Know what quality is.

2. Understanding what quality student performance is and matching a student's performance against these criteria.

Provide feedback to students.

3. Providing students with feedback on their performance. Teachers also have the opportunity to analyze low-performing students' mistakes and omissions. The patterns that are discovered in this process become the springboard for modifications in instruction. This analysis can get to the root causes of a student's inadequate performance.

Match instructional strategies to students.

4. Designing academic intervention strategies to meet the needs of low-performing students. To ensure that these students "do not fall through the cracks," teachers need to identify individual student needs. Careful analysis of a student's performance on test questions provides insight into where the student requires academic assistance.

Prepare students for the test.

5. Developing curriculum and resources to prepare students for test demands. A thorough knowledge of the test and types of questions, along with students' performance, gives the teacher sample test items to replicate in instruction and to use as guides in developing parallel tasks. Students need opportuni-

ties to perform on tasks that are similar to test items. This not only gives them practice on test questions, but also builds a degree of confidence about the test since students are now familiar with the types of questions asked.

6. Developing action research. Based on test performance and the analysis of students' papers, teachers employ different instructional strategies to improve learning. These strategies are tried out and evaluated in terms of their effect on student achievement.

Use new strategies to bolster student achievement.

7. Promoting accountability. In the good sense of the word, accountability becomes more important. Teachers and districts focus on results versus activities as an outcome of analyzing test data. The data provide real evidence of student performance.

Focus on results.

Inappropriate Use of Test Data

It is important to align the uses of the data with the purposes for gathering them. A "misconnect" exists and data are used inappropriately under the following circumstances:

•   Teachers who teach an on-test grade or a course with an end-of-course test are held solely accountable for students' performance. These teachers are often blamed for low scores when the reality is that myriad factors may contribute to student performance. Also, many on-test grades have a test that measures several years of learning in an academic area. For example, a grade 4 test will typically assess student competency on the standards and performance indicators over grades 1-3.

•   In their eagerness to get students ready for tests, teachers will sometimes rely too much on parallel tasks or similar test questions in their instruction. Students experience "overkill" in completing test tasks. This type of instructional activity can lead to meaningless busy work and neglect of other important learning.

Multiple measures of assessment must be used to enable students to exhibit their competencies.

- Focusing on one type of test question or one area of competency may lead to de-contextualized and isolated skill development lessons. The students lose the benefit of a holistic approach to the subject. When lessons place too much emphasis on test success, the instruction has lost the challenge of providing lifelong learning opportunities.

Using Other Data Sources

Looking at test results gives useful information; however, these data alone are insufficient if a school truly wants to understand its purpose and know whether or not it is meeting its goals and its students are achieving theirs. Multiple measures of assessment must be used to enable students to exhibit their competencies. Students should have several opportunities to demonstrate their abilities. Then data on these multiple assessment occasions are collected and added to the true profile of a student's performance.

Multiple measures must also be used if a school desires to know if it is achieving its purpose and wants to make a commitment to engage in continuous improvement. These measures need to come from various sources to give a true collective perspective of the school and its capacity to enable students to learn. Learning does not take place in isolation. Students bring past experiences, values, present life priorities and interests, and family and home background to the learning moment. Any of these can have a positive or negative impact on learning.

Analysis of student achievement needs to include factors other than test scores. The most significant of these are:

Student Learning
- Test scores
- Dropout rate
- Graduation rate
- Employment rates
- Longitudinal data on student achievement
- Graduate follow-up
- Enrollment in advanced courses
- Students requiring remediation in college

School Processes
- Attendance rates
- Student grades
- Rates of special population participation
- Participation in extracurricular activities and athletics
- School programs and services
- Discipline referrals
- Teacher-student ratio
- Uncertified teachers
- Teacher turnover

Demographics
- Enrollment
- Ethnicity
- Poverty levels
- Parent education levels
- Language proficiencies
- Non-public enrollment trends
- Tax base
- Economic wealth
- Property taxes
- Sources of revenues

Perceptions of School Quality
- Public expectations of essential skills and knowledge
- Attitudes toward school
- Business perceptions of school quality
- Parent opinions of school
- Student satisfaction surveys
- Focus groups on quality of school

Be Careful What You Count

The data that are collected convey what is important. This sounds simple enough, but problems can occur when emphasis is placed on process data rather than achievement data. For example, one school tried to improve reading scores by rating teachers on the

Suggestions for Analyzing Student Data

number of minutes per day their students spent reading. This was taken to extreme, and classrooms were ranked on the number of minutes of reading, with rewards for the highest numbers. This emphasis led to a disproportionate amount of time spent on reading without real improvement in reading ability.

The data collected forces people to focus on that variable, so it is best to collect data on results. If data measure process rather than results, be sure to determine that the data correlate well to achievement.

Look at Distribution Rather Than Averages

Averages are the most frequently used and abused statistics. Averages give us a single number that makes comparison easy – too easy. For example, the average SAT score in school A is 1050, and the average in school B is 1100. On the surface it appears that students in school B perform at a higher level. However, there may be many more students in school A who achieve at high levels than in school B. Averages do not reveal this information. The total distribution of actual scores gives a better picture of the achievement of all students. Looking at distribution reveals the number of high performing students, who could be a source of information on effective learning practices. In addition, looking at the students at the low end of the distribution will reveal those students who need the most attention.

Disaggregate

Disaggregation of subgroups reveals a more accurate picture of total student performance and can expose groups of students who require extra help.

Just as distributions provide more revealing statistics, disaggregation of subgroups reveals a more accurate picture of total student performance and can expose groups of students who require extra help. Dividing total student scores into subgroups by such categories as gender, teacher assignment, ethnic group, number of years in district, and attendance rate can help to pinpoint the needs of subgroups of students.

Look at Trends

One of the other dangers of relying on any single data source is that these numbers are "snapshots in time." Many factors can distort one simple average, for example, so it is much better to look at changes in averages over time. Trends provide a more accurate picture than isolated numbers. Never place a great deal of emphasis on a single number.

Collect Data to Answer Questions

Too often schools collect some data and then try to decide what to do with them. The most useful data are collected to answer specific questions. For example, a district planning committee that wants to assess writing achievement might ask the question, "How well do our students write?" The first step is to look for existing data elements on students writing. Then the committee should develop additional measures, such as feedback from former students, scores on writing exams, number of students participating in writing contests, or amount of time spent on writing.

Make Data Understandable

People can become overwhelmed when confronted by large groups of numbers. When organizing data for education planning groups, fewer is better, and pictures tell more than numbers. Keep the quantity of numbers limited to what is absolutely needed. Also convert numbers into charts to show trends. A pie chart, bar graph, or line drawing is more meaningful to many people than a table full of numbers.

Analyze Deeper

Looking at initial data should lead to the posing of further questions and a deeper analysis to get to greater levels of understanding of student achievement or processes of education. Schools that begin to use data regularly in making decisions continue to expand the breadth and depth of data collected and thereby know much more about the learning that takes place.

Understanding Standards

See Chapter V

3

Understanding Standards

What Are Standards?

The term "standard" refers to an expected degree of quality. For example, if we know an organization has high standards for customer service, we are inclined to transact business with that organization. On the other hand, if an organization falls below expectations in its products or services, we consider it below standards and may choose not to do business there.

Standards are often used in the workplace. Employees base their work performance on the expectations that are the employer's standards.

Teachers have always set standards for their students' performance and had particular expectations in mind when they designed instructional activities. The teacher's role is to decide what the student is to define, comprehend, apply, analyze, synthesize, or evaluate and to discern when the students meet that expectation. Over the past decade, however, through various national and state initiatives, standards have received a new and more pronounced emphasis in education.

All states are engaged in standards-based reform to improve student achievement through rigorous expectations, or standard setting, for performance in academic disciplines. In many instances, districts develop local standards that supplement state standards. A key aspect of the standards-based movement is the inclusion of all students. No longer is it considered desirable or permissible by the public to have different tracks and levels of competencies for students to achieve.

The standards form a basis for everyone, including students and parents, to understand what needs to be learned. Teachers look to standards to identify the content to teach. Standards reinforce the purpose of schooling and provide school boards, superintendents, and building principals with a guide to direct and support decisions on school improvement initiatives.

Examples of Standards

Two key concepts emerge in setting standards. **Academic content standards** define what every student should know and be able to do in academic areas such as English, mathematics, and science. **Performance standards** define how students demonstrate competency in the skills and knowledge contained in the states' academic content standards. The content standard is the expectation and the performance standard includes the characteristics of achievement (product or process) which meets the expectation. In many states these terms are synonymous with benchmarks or performance indicators.

Here is an example in English language arts:

Standard

Students will read, write, listen, and speak for information and understanding. As listeners and readers, students will collect data, facts, and ideas; discover relationships, concepts, and generalizations; and use knowledge generated from oral, written, and electronically produced texts. As speakers and writers, they will use oral and written language to acquire, interpret, apply, and transmit information.

Indicator

Students gather and interpret information from children's reference books, magazines, textbooks, electronic bulletin boards, audio and media presentations, oral interviews, and from such forms as charts, graphs, maps, and diagrams.

To take this to the performance level, students will then use the information they gathered in writing and/or speaking for information.

Another example, from science, would be:

Standard (Academic Content)
Physical Science/Energy and Its Transfer: Magnetism

Performance Standard
Students will demonstrate how a compass can be used to find direction. Students will show how magnetism is used to create a compass and how compasses tell direction.

.

The key components in standards-based education are the standard and its topics, indicators, and benchmarks. These indicate what should be taught.

Standard
This is what the expectation is for the end of instruction. It is usually described in very broad terms.

> Example: In English language arts, the standard might be that students will read, write, listen, and speak for information and understanding.

Topics/Indicators
These give the content to be covered and/or behaviors or actions that show that the standard has been meet.

> Example: Given a fiction/poetry test to read silently, students will demonstrate understanding of language and elements of fiction/poetry.

Benchmark
This is the expectation. It defines clearly what the student must do to meet the standard.

> Example: Students will summarize the text or retell the story/poem in writing in their own words.

Resources Related to Standards

Typically, states have printed versions of standards, sometimes called frameworks or implementation guides, which contain additional information, such as time lines, corresponding testing requirements, and examples of lessons to teach the standard. The standards may be listed by content topics with corresponding benchmarks, or they may contain performance indicators and benchmarks. State standards are often found on the state education department's Website as well.

Along with standards, some states also have lists of essential skills, core competencies, or goal statements. Teachers need to know whether the standard, goal, or essential skill is to be tested. Most states have gone to state assessment systems that parallel state standards.

Resource guides also provide additional instructional background and ideas to teach to the standards. However, teachers need to know the difference between standards, competencies, and resource materials. Again, it is what is tested that is important to instruction.

Teachers should be familiar with state standards in subject areas they teach as well as core subjects such as English and mathematics, which all teachers should reinforce in their teaching. State education departments have useful resources for learning more about standards. The information is available to the public.

Local standards are another consideration. Some districts have added to state standards areas that their communities value enough to be included in the education program. An example of this is volunteerism. In one local district, for example, students are required to complete a specified number of hours in community service activities as part of graduation requirements.

A general reference for standards is: http://www.ed.gov/Programs/bastmp/SEA.htm.

Importance of Standards

2 Matching Standards to Current Curriculum

On the national and state educational agendas, standards hold a highly significant place. Standards drive instruction. National, state, and local standards are the expectations for students, defining what students must know and be able to do and how well they must demonstrate their competence. Thus, the standards become the central input in curriculum planning, lesson design, and professional development activities. Entire programs of study, K-12, should be aligned with the standards.

In most states, the state assessment system is designed to assess students' achievement of the state standards. Thus, it is essential for students to be given instruction that emphasizes the state standards. Standards are one of the essential instructional priorities. On the Curriculum Matrix, the state standards topics are listed as the first points of reference. This is what it is expected that students will be taught. Instruction has become focused, professional development has become more focused, and meeting individual students needs has become essential in order to ensure student success in demonstrating competency in state standards.

State Tests

Review Priority Ratings

To meet with success on state tests, students need to learn skills and knowledge related to standards that are emphasized on the tests as well as become familiar with the types of questions that are asked. Teachers must make sure that the curriculum covers those topics that are high priorities on state tests. Is this teaching to the test? Yes, to some extent. But the purpose of state testing programs is to ensure that all students acquire a common set of skills and knowledge. Students cannot be expected to reach high achievement levels if teachers do not prepare them on the material tested. Of course, this is not all a teacher teaches.
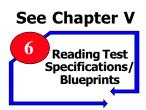
The first data item teachers need is the testing design characteristics, often referred to as "test specifications" or "test blueprints." Determining testing priorities requires analysis of testing specifications prepared by the state education department. The portion of the test allotted to each standard or performance indicator defines the content area emphasis. It is important for teachers to know whether the test contains one or 21 questions related to a particular standard. Obviously, if the test contains 10 items on Standard A and only one item on Standard B, then Standard A deserves more instructional attention.

The Curriculum Matrix shows the relationship of state standards to state tests at elementary, intermediate, and high school, or commencement, levels. Standards are matched to testing specifications and given a priority rating of high, medium, or low based on the extent to which they are tested. The Curriculum Matrix serves as a resource for identifying those standard areas which are emphasized in state testing programs.

Teachers and administrators are often surprised at what they find when a comparison is drawn between state standards and what is actually on state assessments. For example, with the help of McREL, educators in South Dakota found that a majority of the state standards are not tested by the statewide standardized assessment, the Stanford Achievement Tests, Ninth Edition (Stanford 9). In the four grades analyzed, grades 2, 4, 8, and 11, the percentage of the state's Communication/Language Arts Content Standards addressed on the assessments ranged from 21 to 29 percent. At the same time, in some cases, large numbers of test questions were based on a relatively small number of standards.
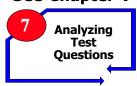
Knowing the priority rating helps a teacher answer the questions: Should I teach this topic? How much time should be spent on it? Teachers still have the flexibility to choose other areas for instruction. However, with a standards-based state assessment system, there is no decision to make about whether to teach the standards or not. The decision lies in determining the amount of time to expend and the instructional strategies and techniques to employ in teaching the standards.

See Chapter V
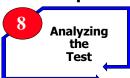
6 Reading Test Specifications/ Blueprints

For a comparison of your state standards to what is found on your state assessments and to learn the priority ratings of your standards in relation to your state tests, refer to Chapter VI, State Curriculum Matrix.

Review the Test and Scoring Guide

The real power of assessment lies in its ability to guide instruction. The test specifications do this by providing teachers with the analysis of emphasis on the content areas. The test itself does this, too. To know what is on the test, the teacher must study past tests and sample test questions and become familiar with testing implementation guidelines. Sample test questions and implementation guidelines are available in many states from the state education department. These give teachers an idea of the types of questions and tasks the student will find on the test. Knowing the types of questions is important for test preparation. Teachers need to inform students about the kinds of questions — multiple choice, extended response, constructed response, essay. Students need to know the time limitations and have an opportunity to respond to similar questions in the same time frame. All procedural information and strategies should be shared with students prior to the test.

The scoring guide describes what the students need to demonstrate to achieve success. Teachers need to understand the design of the test's scoring guide, which is usually available as part of the test administration materials. Simple multiple-choice tests do not have guides.

See Chapter V

7 **Analyzing Test Questions**

See Chapter V

8 **Analyzing the Test**

Three Types of Scoring Guides

Holistic captures the whole product, as is commonly the case in judging athletic or musical performances. There are a few broad categories, each with a maximum point value. The evaluator assigns a certain number of points to each category.

The **checklist** usually has a longer list of items to be evaluated than the categories contained in holistic scoring. The evaluator checks off items that are completed satisfactorily. Typically, no qualitative values are given to a performance, only a record of which items were completed.

The **analytic** scoring guide contains a description of each aspect of a task and rates the level of performance from high to low with several levels in between. It is the most commonly used scoring guide for performance tasks.

The scoring guide should be shared with students prior to the test so that they have opportunities to "try out" similar tasks and analyze their performance in relation to the guide. In many instances, schools have used the generic guide from the state test as the classroom scoring guide. One way to help students understand the scoring guide is to give them unidentified student work and have them use the guide to score the work.

Point values assigned to various questions should be explained. Students need to be aware of the types of questions that carry 25 points as opposed to those worth only 2 points. When students are clear about what they need to do, the chances of them meeting expectations are greater. Thus, teachers need to provide tasks that are similar to those on the test, along with exemplars of each of the guide's scoring categories. Students' anxiety over test-taking diminishes greatly with practice. Making the test common conversation and parallel tasks common classroom activities reduces fear. The more students know about the test, the more prepared they will be. On testing day, nothing should come as a surprise.

See Chapter V

19 **Designing Parallel Tasks**

Review Completed Test Booklets to Analyze Items and Student Work

Review the tasks and corresponding student work grouped by lowest scores and highest scores. Patterns and trends within these groupings typically emerge and provide additional information for academic intervention programs, program modifications, and most important, action research.
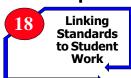
An excellent professional development activity to help teachers understand student expectations and performance better is moderated scoring. In a moderated scoring session, a group of teachers studies a specific task or question on a state test. The teachers are already familiar with the task and scoring guide. Each teacher scores the task individually. The group then discusses their scores and attempts to reach consensus on a grade or rating for the sample student work. It is amazing to see teacher variations on test scores. Discussion on why a certain score was given leads to

The best way to know a test is to take the test. Working through and responding to the test questions and tasks give teachers a better picture of what the student is thinking, interpreting, referencing, and inferring when responding.

a shared, clearer understanding of the guide and student work. Experiences like this are rich in professional development because they center on the school setting, a school goal (academic achievement), dialogue on student work, and scoring guide interpretation.

Once the teachers can agree on student work samples that are "expert" (or however the top level is designated), then they can discuss what specific evidence of student knowledge and skills makes that work "expert." Next, they look through the work that represents "competent" performance and describe the specific evidence accepted at that level. Typically, as teachers continue down through the levels, they modify the descriptions previously written. Thus, anchor papers, or model student work, result at each scoring level and provide guidance in recognizing expected criteria.

Here are some additional questions to address when analyzing students' work from state tests.

1. When is the standard topic contained in the test task taught? How is it taught? Is it taught only once or reinforced over multiple times?
2. How much instructional time is devoted to the key idea contained in the test item?
3. How well does classroom evaluation match the format and structure of the state assessment?
4. How is feedback provided to the student? Does the student have additional opportunities to demonstrate mastery?
5. Once students' work is grouped into different levels of performance and patterns and trends are identified, what triggers additional student support? How is academic intervention determined?

Understanding the test and analyzing patterns on student papers provides essential information to direct instruction. Students must have an opportunity to learn the topics that are tested, and teachers must identify areas of academic deficiency in order to provide additional academic support and intervention.

Moderated scoring provides an excellent opportunity for professional development as teachers study student work to inform teaching and learning.

See Chapter V

18 **Linking Standards to Student Work**

Essential Skills

Along with standards and test specifications, schools need to pay attention to community expectations. Essential skills and local priorities, identified through community surveys and comprehensive planning processes, are significant resources to analyze in prioritizing content areas for instruction. In school districts where surveys seeking data on desired knowledge and skills for graduates have been administered, teachers can look to this information when outlining instructional priorities. Also, if the district has engaged in a comprehensive planning process, then the district's vision, goals, and priorities identified through this process also need to be included in instructional priorities. The school belongs to its community; thus, it must address the community's desired instructional goals.

When goals are broadly stated, such as "All students will be effective communicators," teachers need to break the goals down into specific benchmarks that convey what this means in instruction.

The Curriculum Matrix correlates a state's standards with the results of the International Center's national survey of 20,000 educators and community members, who identified the most essential curricular content for students in English language arts, mathematics, and science. The Curriculum Matrix further indicates which state standards and performance indicators are high priorities based on whether they were rated high in the Curriculum Survey of Essential Skills, which solicited the public's expectations for high school graduates. The ratings, based on the national survey results, assigned the standards and benchmarks in your state can be found in Chapter VI. Obviously, the higher a topic in the standards ranked on the survey, the higher is its instructional priority.

Districts need to be clear in identifying the critical results they wish their students to achieve. Results in the area of curriculum and instruction must be driven by data on which topics are critical because they are essential skills identified by the public and they are emphasized on state tests. These become the critical instructional priorities, which translate into desired critical results in student achievement and schoolwide instructional success.

See Chapter V

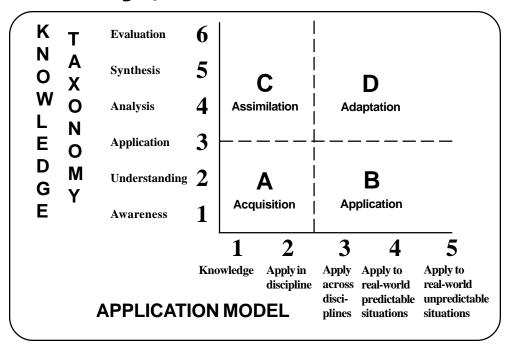**4** **Analyzing the Curriculum Survey of Essential Skills**

Districts need to be clear in identifying the critical results they wish their students to achieve.

Levels of Student Performance

The Rigor/Relevance Framework (see Figure 6) is a tool developed by staff of the International Center to examine curriculum, instruction, and assessment. The framework is based on a continuum of knowledge (Bloom's Taxonomy) and on the Application Model.

Figure 6
Rigor/Relevance Framework

KNOWLEDGE TAXONOMY			
Evaluation	6		
Synthesis	5	**C** Assimilation	**D** Adaptation
Analysis	4		
Application	3		
Understanding	2	**A** Acquisition	**B** Application
Awareness	1		

1	2	3	4	5
Knowledge	Apply in discipline	Apply across disciplines	Apply to real-world predictable situations	Apply to real-world unpredictable situations

APPLICATION MODEL

The knowledge taxonomy describes increasingly complex ways in which we think. The low end of this continuum is simply acquiring knowledge and being able to recall or locate that knowledge in a simple manner (acquisition level). Just as a computer completes a word search in a word processing program, a competent person at this level can scan through thousands of bits of information in their brain to locate that desired knowledge. The high end of the continuum is the complex ways individuals use knowledge. At this level, knowledge is fully integrated into one's brain, and individuals can do much more than locate knowledge. They can use sev-

eral pieces of knowledge and combine them in both logical and creative ways. Assimilation of knowledge is a good way to describe this high level of the thinking continuum. This assimilation level is often referred to as higher thinking skills. The individual performing at this level can solve multistep, complex problems and create unique work and effective solutions.

The second continuum, the Application Model, is one of action. While the thinking continuum can be passive, the application continuum describes putting knowledge to use. At the low end (acquisition level) is knowledge acquired for it own sake. At the high end is action — the use of that knowledge to solve complex problems, particularly from the real world, and to create projects, designs, and other works.

In Figure 6, quadrant A represents simple recall and basic understanding of knowledge for its own sake. Quadrant C represents more complex thinking but still knowledge for its own sake. Examples of quadrant A are knowing that the world is round and that Shakespeare wrote Hamlet. Quadrant C embraces higher levels of knowledge, such as knowing how the U.S. political system works and analyzing the benefits and challenges of the cultural diversity of this nation versus other nations.

The second type of knowledge/skills also comprises two quadrants. Quadrants B and D represent action, or high degrees of application. Quadrant B would include knowing how to use math skills to make purchases and count change. The ability to access information in wide-area network systems and to gather knowledge from a variety of sources to solve a complex problem in the workplace is an example of quadrant D knowledge.

Here is an example involving technical reading and writing.

Quadrant A: Recall definitions of various technical terms.
Quadrant B: Follow written directions to install new software on a computer.
Quadrant C: Compare and contrast several technical documents to evaluate purpose, audience, and clarity.
Quadrant D: Write procedures for installing and troubleshooting new software.

For a more extensive discussion of the Rigor/Relevance Framework, please refer to the *Planning Rigorous and Relevant Instruction: A Resource Kit*, which also includes activities for understanding how to use the Framework in planning instruction and assessment.

Each of these four quadrants can also be labeled with a term that characterizes the learning or student performance.

Quadrant A

Acquisition - Students gather and store bits of knowledge and information. Students are primarily expected to remember or understand this acquired knowledge.

Quadrant B

Application - Students use acquired knowledge to solve problems, design solutions, and complete work. The highest level of application is to apply knowledge to new and unpredictable situations.

Quadrant C

Assimilation - Students extend and refine acquired knowledge to be able to use that knowledge automatically and routinely to analyze and solve complex problems and create unique solutions.

Quadrant D

Adaptation - Students have the competence to think in complex ways and also apply knowledge and skills they have acquired. Even when confronted with perplexing unknowns, students are able to use their extensive knowledge and skills to create solutions and take action that further develops their skills and knowledge.

This notion of the level of rigor and relevance has not received adequate recognition in the United States. We place more emphasis on ensuring that topics are covered than on assisting students to acquire depth of understanding.

Many state standards fail to address the aspect of levels of rigor and relevance. This leaves a great deal of interpretation and judgment to the teacher. If, for example, a teacher assumes that one level of student performance is adequate and the state test is written at a higher level, then students will be in for a discouraging performance come state test time.

Table VIII shows examples of how a standard can be interpreted to different levels.

Table VIII
Levels of Rigor and Relevance

Standard:	Find and use a variety of information sources
Rigor/Relevance Quadrant	**Student Performance**
A	Locate and summarize information on sport of snowboarding.
B	Locate and discuss a current article on biotechnology breakthroughs.
C	Read and analyze three original newspaper articles from World War II and identify reasons for opposition to US entry into the war.
D	Research information on the El Nino weather pattern and propose possible family vacation destinations.

The Rigor/Relevance Framework describes education content's level of difficulty. In general, the subject name or topics are no indication of difficulty. English, reading, mathematics, and algebra are found at many levels of schooling, yet we generally assume, for instance, that the content of subjects in high school is more difficult than in elementary school. But what makes it more difficult? The level of thinking is often used to describe difficulty – as listed in a knowledge taxonomy. The knowledge taxonomy is a hierarchy, with the process skills of analysis, synthesis, and evaluation considered higher levels of cognitive skill than is application, which is a procedural skill and which, in turn, is at a higher level than comprehension and awareness. Thus, we might expect the difference in difficulty between elementary and high school subjects to be in the type of cognitive skill required. This is not always the case.

Even though the process skills of analysis, synthesis, and evaluation are higher order cognitive skills, students at any age can develop them. First graders can be asked just as easily as twelfth graders to state what they think of something and why, tell how they would respond to a certain situation, or tell how they might find an answer to a problem. There are many good elementary school teachers who recognize this and seek to nurture these higher-order skills in their students.

Unfortunately, as grade levels increase, we often find a tendency to define difficulty not by sophistication of cognitive skill, but by the amount of detail and specialization. That is, we make things more difficult primarily by requiring students to learn more declarative and procedural knowledge: more formulas, more facts, more definitions, more theories, and more vocabulary words. Or, we ask them to produce more, for example, by writing longer reports and essays. Students at higher grade levels *should* have more declarative and procedural knowledge (who would trust a doctor familiar only with one or two types of illness?), but there should be a simultaneous development of process skills.

One damaging effect of equating rigor with the amount of declarative and procedural knowledge is that the connections between subjects become less important than the level of detail of information within topics. We create "rigorous" biology curricula not by requiring students to synthesize biology's interrelationships with chemistry and physics, but by requiring them to remember the names of cell parts, organ functions, specialized vocabulary, and diagrams of processes. In the following year, students move on to a new area of specialization, typically chemistry, where the focus is on learning, in as much detail as possible, a new set of declarative and procedural knowledge. Those students who continue on to physics rarely integrate knowledge they acquired in either biology or chemistry, but instead embark on a totally separate path filled with new terms, theories, processes, and equations.

Linking Standards and Instruction

Once teachers understand the standards and know which topics are essential and which are on the test, what are the next steps? Does each topic become a separate lesson plan? Is it necessary to teach anything differently? What if the topics don't really seem to be a good match with what is currently being taught? These are the questions that teachers often ask when trying to relate this notion of data-driven curriculum to their own teaching.

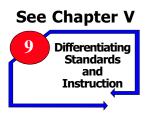## Taught vs. Learned Curriculum

In translating standards into student learning experiences, teachers should shift the focus from "What shall I teach?" to "What must the students learn?" Teachers from the same grade level or high school department should identify the skills and knowledge that students need to learn at that grade level or within a specific discipline. If it is not accomplished as part of curriculum mapping, it should be done as part of planning with other teachers. Students build skills over time. Teachers should fully discuss the articulation of skills that students are expected to learn across grades or in a particular subject. This list of skills and knowledge or student competencies is usually more detailed than the standards and topics.

When considering the standards at a specific grade, it is helpful for the teacher to ask: "What is it that I want students to know and be able to do?" Better instructional planning will occur if teachers focus on what students will learn rather than what they will teach.

Instructional planning is a complex process that involves more than simply picking out a work of literature or a textbook chapter and making it an instructional topic. In addition to standards, several other factors must be taken into consideration in order to make thoughtful decisions about instruction and assessment:

- teacher content knowledge
- community expectations
- student knowledge
- teacher self-knowledge
- assessment practices
- instructional strategies.

Each of these factors involves the professional judgment of the classroom teacher. Lesson plans can be built by others which relate directly to the standards. Teachers at the district level can develop curriculum maps and curriculum ideas. These other important factors, however, can be factored in only by the teacher at the school level. Each teacher must make those fine adjustments to make sure it is appropriate for a specific group of students.

See Chapter V

9 **Differentiating Standards and Instruction**

Better instructional planning will occur if teachers focus on what students will learn rather than what they will teach.

Instructional planning involves several steps, which generally should occur in sequence. Here is the ideal order:

Step 1 - Instructional Unit/Curriculum Connections

This planning step ensures that the design of student work, content, and instructional activities is not random but rather anchored in curriculum standards and in the instructional disciplines that make up the school curriculum. Teachers should also identify if this is a priority standard based on whether it is tested or the public places a high priority on it.

Step 2 - Expected Levels of Student Knowledge and Performance (Student Competencies)

This step has two important purposes. The first is to place more emphasis on student learning. By thinking about what students need to know and be able to do, the instructional planning process shifts its focus from the teacher to the student. The second purpose is to use the Rigor/Relevance Framework to analyze expected levels of skills and knowledge.

Step 3 - Student Work

Student work is at the heart of learning. Learning does not occur without effort. Too often, effort in school is measured by the hard work of the teacher rather than by the hard work of the students which results in learning. Focusing on student work is an excellent means to measure the quality of instruction. Teachers can improve learning in their classrooms by concentrating on student work as part of instructional planning and by identifying student work that meets expected skills and knowledge levels.

Step 4 - Content Knowledge

Performance planning emphasizes application of knowledge; however, without basic content knowledge, students have nothing to apply. One of the strengths of the Rigor/Relevance Framework is that it creates a connection and balance between content knowledge and application. Decisions about curriculum are not a forced dichotomy between knowledge and application. Students must learn both.
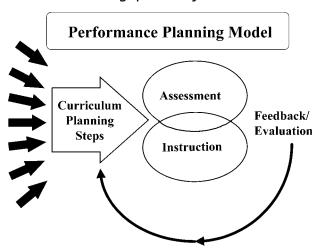
Step 5 - Essential Questions/Concepts

Posing an initial question is an excellent way to introduce an instructional unit. A broad, open-ended question will pique students' curiosity and focus interest on the main concept(s) to be introduced or expanded in the lesson. The question should never have a simple yes or no answer, nor does it necessarily need to be resolved in the lesson. If a question engages students in learning, then it has done its job.

Identifying essential concepts is the other part of Step 5. Concepts are those "big ideas" that connect bits of instruction. While teachers hope their students will remember the details of a lesson, their greatest expectation is that students will carry away the overarching concepts that are important for future understanding.

Step 6 - Assessment and Instruction

As the Performance Planning Model indicates, instruction and assessment should be planned together. Teachers should select and plan a series of varied activities for students that will enable them to develop and demonstrate the expected skills and knowledge for the instructional unit. As students engage in performance activities, their work should be evaluated using specific objective criteria.

A more extensive discussion of instructional planning can be found in *Planning Rigorous and Relevant Instruction,* published by the International Center, which also includes activities for understanding how to use the Rigor/Relevance Framework.

Performance Planning Model

Curriculum Planning Steps — Assessment — Instruction — Feedback/Evaluation

The sequence of instructional planning may vary. Teachers can start with a grouping of student competencies and move directly to student work that would relate to those competencies (Sequence A). Or teachers might start with an instructional theme, such as World Deserts or Mammals, and then identify related student competencies followed by student work (Sequence B). In Sequence C, teachers start with an inquiry question, such as "What causes weather?" and then identify related competencies and student work. In Sequence D, the student work is decided first. For example, the school might have a community service project. In order to tie this activity to standards, teachers link related student competencies that can be learned from this community service project.

Sequence A

Starting point: **Student Competencies**

1. Identify student work
2. Define required content knowledge
3. List essential questions/concepts
4. Design assessment and instruction

Sequence B

Starting point: **Instructional Theme**

1. List expected levels of knowledge and performance
2. Identify student work
3. Define required content knowledge
4. List essential questions/concepts
5. Design assessment and instruction

Sequence C

Starting point: **Inquiry Question**

1. List expected levels of knowledge and performance
2. Identify student work
3. Define required content knowledge
4. List essential questions/concepts
5. Design assessment and instruction

Sequence D

Starting point: **Student Work**

1. List expected levels of knowledge and performance
2. Define required content knowledge
3. List essential questions/concepts
4. Design assessment and instruction

Mapped vs. Operational Curriculum

The collection of instructional plans becomes the operational curriculum. This is what the student will experience in the classroom to work toward the mapped curriculum, which gives the standards that students will achieve. Some people naively assume that simply assigning a portion of the standards to a grade level is sufficient to identify a curriculum. It is a portion of the real curriculum — the mapped curriculum of what is to be learned — but the actual lesson plans describe the operational curriculum with which teachers and students are more familiar.

Student Work

Student work is an important concept in moving from taught curriculum to learned curriculum. Examples of student work are

group discussion, student research, reading, troubleshooting, and brainstorming. Tangible products of student work might include pieces of writing, science experiments, solutions to problems, tests, and project designs.

Student work provides the most tangible evidence of the learning process. The best way to judge the quality of teaching and learning is by looking at the work that students are doing in the classroom. Is it meaningful and challenging? Are all students actively engaged? Do students have a clear understanding of what constitutes outstanding work? Do students show commitment to and enthusiasm for their work? The answers to these questions provide rich evidence of the quantity and quality of learning taking place.

Teachers should spend time thinking about what significant pieces of work students will do and not limit themselves simply to defining the content and objectives of what students will learn. Taking the time to reflect on student work will also lead to more application in instruction and assessment.

As part of defining student work, teachers should have examples of exemplary work to share with students. Research shows that students perform best when they have a clear understanding of what constitutes high-quality work.

The Peer Review of Lessons activity is an excellent professional development experience as well as a way to improve instruction. The key to this process is its focus on teacher conversation about student work.

Student-centered Learning

A key aspect of good instructional planning is to collect feedback continually so as to evaluate the effectiveness of instruction. Through this feedback, instruction can be improved over time. One aspect of feedback is to assess the degree of student-centered learning. Student-centered learning means that classroom

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Teachers should have examples of exemplary work to share with students.

See Chapter V

22 Peer Review of Lessons

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activities are conducive to maximum student engagement. Characteristics of student-centered learning experiences include:

- self-direction
- working with others
- flexible time
- intrinsic rewards
- application.

Self-direction

Students devote more energy to learning when they feel they have some self-determination. The more that students are able to select their own learning path, the greater the level of interest. Obviously, it is not appropriate to go to an extreme and give students complete freedom to choose what they want to learn. Certain learning objectives are required of all students. But some self-determination in selection of a learning activity is an excellent way to engage students. This is where learning styles come into play. When teachers create conditions of self-determination and let students take the initiative, the students' level of involvement and ultimately their achievement increases.

Working with Others

While students are expected to develop their own competencies in school, one characteristic of student-centered learning is to learn together. Working with others allows for sharing of creative ideas, testing of solutions, and feedback as to performance and achievement. The more that teachers are able to structure joint learning activities, the more they will be able to increase the engagement of students. The application of cooperative learning techniques is very useful in increasing the scope of learning in groups.

The more that teachers are able to structure joint learning activities, the more they will be able to increase the engagement of students.

Flexible Time

One of the most difficult characteristics of student-centered learning to achieve is the flexible use of time. Allowing more time does

not mean simply extending time on tasks for students. Some students need more time; others need less. The challenge for teachers is to find creative ways to allow each student to move at an individual pace. This is difficult in classroom settings, but many teachers have found ways to do this by varying instructional activities, with time devoted to large group work, small group work, and individual work. During individual time, some students can review difficult material while others accelerate to more challenging tasks.

Once students become actively engaged in an interesting activity, it is counterproductive to "ring the bell" arbitrarily and tell them to move on to the next activity. Again, high levels of learning require more flexible use of time.

Intrinsic Rewards

Schools have long relied on external recognition systems, primarily the use of grades, to quantify student achievement. However, grades are not sufficient to motivate high levels of student learning. Teachers should also work to help students develop the ability to derive satisfaction from doing high-quality work. It is this sense of personal goal setting, commitment, and satisfaction that will drive individuals to continual learning.

Application

Application and practice are necessary aspects of student-centered learning. Application of knowledge is both an objective of student achievement and a way to practice and reinforce learning. Research consistently supports that practice and actual use of knowledge leads to the greatest retention and learning. In addition, many individuals have a preferred style of learning that involves concrete, practical applications. Instruction that includes a high degree of practice will result in higher levels of achievement. Application needs to play an important role in developing student-centered learning.

Inhibiting Learning
Teachers should take a self-inventory of the way they teach to be sure that they are not contributing inhibitors to learning. The assistance of peers can be helpful, but unfortunately, the culture of most schools is that teachers "go it alone."

Interdisciplinary Instruction

Education should increase students' understanding of the interconnectedness of the world. Unfortunately, the traditional subjects and courses taught in U.S. schools are separate and disconnected. As students move from class to class and grade to grade, they are exposed to bits and pieces of knowledge, but they are not taught how what they learn in one class is related to another.

Integrating subjects costs little — no new textbooks, no additional equipment, no bureaucratic reorganization or retraining of teachers. Often, all that is required is a change of attitude and the willingness to restructure education so that it prepares students for life, not just for more school. With a little vision of how skills are used outside the educational establishment, an interdisciplinary curriculum can be put in place that is vastly superior to the current regimen of separate curricula for subjects.

An interdisciplinary curriculum is a more natural way to achieve standards than a fragmented curriculum. Unfortunately, the efficacy of interdisciplinary instruction is not easily understood, especially by those whose perceptions of education have been structured by traditional schooling.

The problem is not that an interdisciplinary curriculum requires more effort to plan, but that it demands a paradigm shift in thinking. When change in the familiar is threatened, people often resist, because they are greatly attached to their perceptions of how things are "supposed to be." Moreover, teachers often find it difficult to plan interdisciplinary learning experiences because they have neither the information nor the planning time. Textbooks and teachers' guides rarely show relationships between subject areas.

Giving students opportunities to explore interconnections among the subjects they are studying has many advantages. Interdisciplinary instruction adds meaning and relevancy to learning as students discover applications between disciplines. New perspec-

> An interdisciplinary curriculum is a more natural way to achieve standards than a fragmented curriculum.

tives are developed which help students construct a more integrated web of knowledge. This integrated knowledge structure not only facilitates learning new information, but also helps students appreciate the wealth of information and ideas they already possess.

Implementation of standards should not discourage the continuing development of interdisciplinary instruction.

Aligning Instructional Strategies and Assessments

Teachers must contemplate the multiple ways to get to their destination — student achievement.

Selecting Strategies

If teachers have done their instructional planning effectively, they should have clear goals in mind for students. Teachers must then contemplate the multiple ways to get to their destination — student achievement. Frequently, the enthusiasm that surrounds the introduction of new instructional methods or techniques obscures the reality that there is no single best instructional strategy. Teachers need to select the most appropriate strategy, depending on the situation.

Teachers often teach from their own experience, replicating models of good teaching they have experienced. Increasingly, however, teachers are finding that this approach doesn't work for all students. To respond to the public call for increased accountability and higher achievement for all students, teachers must seek different solutions.

Here is an experience many teachers have had. They planned a lesson and thought they taught it very well. Each activity was executed flawlessly. In the end, though, the students didn't "get it." They didn't understand the concepts; they failed the tests; or they remained confused. What went wrong? Was it the students' fault? Do they need to take more responsibility for their own learning?

These challenging questions may confront teachers as they reflect on the success of their teaching. Teachers tend to judge the quality of their work on the delivery of the lesson, but the real measure of success is student learning. A lesson may work for some students in a particular setting and not for others in a different setting.

A lesson is only as effective as its reflection in the learning gains made by students. It is the teacher's responsibility to select, plan, and deliver content through instructional strategies that are likely to help students achieve. Teachers must constantly search for and apply strategies that work.

A lesson is only as effective as its reflection in the learning gains made by students.

In *Classroom Instruction that Works*, Marzano, Pickering, and Pollock report on meta-research on instructional strategies. The authors found that the following strategies were highly correlated with standard measures of student success.

1. Identifying similarities and differences
2. Summarizing and note-taking
3. Reinforcing effort and providing recognition
4. Homework and practice
5. Nonlinguistic representations
6. Cooperative learning
7. Setting objectives and providing feedback
8. Generating and testing hypotheses
9. Cues, questions, and advance organizers

See Chapter V

17 **Which Instructional Strategies Work Best?**

Figure 7 provides a description of numerous instructional strategies that teachers might use. Many of the strategies can be effective in developing more rigorous and relevant instruction and in motivating students to achieve at higher levels.

An extensive discussion of 17 instructional strategies and their correlation to the Rigor/ Relevance Framework and learning styles can be found in Instructional Strategies: How to Teach for Rigor and Relevance, published by the International Center.

Teachers can expand their repertoire of instructional strategies by participating in professional development, observing other teachers, and searching for new lesson plans. The Internet has thousands of lesson plans. The Copernicus Curriculum Matrix provides access to many lesson plans, rated by teachers and keyed to the Rigor/Relevance Framework. The companion kit to this resource, *Improving Instruction Using Gold Seal Lessons,* includes performance tasks that are rigorous and real-world relevant. The rigor and relevance rating is a good indication of lessons that could be used to raise student's level of complex thinking or real-world application. Lesson plans rated high often incorporate instructional strategies that require active learning.

Figure 7
Instructional Strategies

The following generic instructional strategies could be included in lesson plans.
Teachers might even use four or five strategies per lesson.

Brainstorming stimulates thinking and allows students to generate vast amounts of information and then sort that information in an engaging learning process.

Community service involves learning opportunities in which students do unpaid work that adds value to the community.

Compare and contrast learning activities require analysis to identify similarities and differences.

Cooperative learning places students in structured groups to solve problems by working cooperatively.

Creative arts are artistic products or performances that can also be used to develop skills in other curriculum areas.

Demonstration involves direct observation of physical tasks, such as the manipulation of materials and objects.

Games are exciting, structured activities that engage students in individual or group competition to demonstrate knowledge or complete an academic task.

Group discussion is any type of verbal dialogue among students used to explore ideas related to an instructional topic.

Guided practice refers to homework, worksheets, and computer practice wherein students solve routine problems to reinforce concepts or skills.

Inquiry engages students in posing questions around an intriguing investigation, making observations, and discussing them.

Instructional technology means a multimedia computer application that provides a choice of learning paths and enables tailoring of programs to student questions or interests.

Internship is a formal placement in an employment situation for additional learning while the student is still in school.

Lecture is a verbal presentation of knowledge by the teacher to the students, often supplemented by visuals and handouts.

Literature is reading to discover use of language; acquire information about people, history, cultures, and society; and develop skills of analysis, inquiry, logic, and recall.

Memorization is rehearsal for the recall of facts using techniques for remembering information, including mnemonic devices.

Note-taking/graphic organizers involves organizing logical notes for reference and using graphics, diagrams, and symbols to represent information.

Presentations/exhibitions are oral presentations by students requiring them to organize ideas and express them in their own words.

Problem-based learning introduces concepts through use of problem-solving skills on a real problem or investigation.

Project design requires students to integrate their skills and knowledge to create their own literary, technological, or artistic work, as individuals or in a group.

Recognition and **rewards** are motivational techniques used by teachers to provide positive feedback to students on their successful efforts and achievement.

Research means students locate and retrieve information from several sources, such as library references, textbooks, other individuals, and electronic databases via the Internet.

Review and **re-teaching** refer to teachers' planned efforts to review previously learned content and assist students who may not have fully acquired the knowledge.

Setting objectives and **advance organizers** are initiating techniques teachers use to engage students in learning, including emphasizing what will be learned and presenting engaging questions or activities.

Simulation/role playing replicates the way skills or knowledge are used outside school, ranging from role playing to computer-generated virtual reality.

Socratic seminar combines the elements of teacher questions, inquiry, and discussion around key topics, with the teacher asking probing questions as needed.

Teacher questions stimulate significant student thinking in response to thoughtful queries about connections with new information.

Total physical response requires students to engage in a physical activity as well as mental processes.

Video provides new information to students through visual presentation ranging from full-length commercial movies to short information or news segments.

Work-based learning presents opportunities for students to learn through on-the-job experiences ranging from job shadowing to full employment.

Writing makes students organize their knowledge and reinforces concepts in any form from a one-paragraph test-question response to a multi-page research report.

Aligning Assessment with Strategies

Various types of assessments are used to measure what a student knows and is able to do. Learning through a particular instructional strategy is best measured by an assessment type that parallels the strategy. A conscious effort to mirror instruction in assessment will enhance the students' ability to perform. Table IX correlates selected instructional strategies to their most appropriate form of assessment.

Table IX
Matching Assessments to Instructional Strategies

Strategies	Matching Assessment
Lecture Memorization	Multiple choice
Demonstration Teacher questions	Constructed response
Problem-based learning Note-taking	Extended response
Project design Work-based learning	Process performance
Inquiry Research	Product performance
Presentation/exhibitions Cooperative learning	Portfolio
Inquiry Socratic seminar	Interview
Brainstorming Simulation/role playing	Self-reflection

Aligning Assessments with State Tests

Parallel assessments — local assessments that mirror questions used in state assessments in both style and substance — are often developed by teachers on a grade-level, schoolwide, or regional basis. These assessments enable teachers to administer test prototypes, which predict students' performance on similar state assessment tasks. The prototypes also prepare students for the state test. Students become familiar with the type of question, the time allowed, the scoring rubric, and the procedural information and strategies. Practice reduces fear and makes testing part of common conversation and performance.

Teachers should analyze the content of their state tests. The Curriculum Matrix identifies the standards that are tested on many of the state assessments. This information helps teachers understand the topics, content, and skills to emphasize in locally developed assessments. In addition to knowing the content, teachers should also examine the types of questions used on state assessments. For example, if the state test uses short-answer questions in which students must construct a response, teachers should develop similar questions. One state has recently introduced questions to test listening skills. Test proctors read a passage, and students must respond to related questions. If students have not had experience with this type of test, they may perform poorly just because of lack of familiarity.

See Chapter V

5 **Using the Curriculum Matrix**

Curriculum Mapping

A student's entire learning experience in school is more productive and meaningful when it is coherent and connected.

What Is Curriculum Mapping?

A student's entire learning experience in school is more productive and meaningful when it is coherent and connected. Every school strives to achieve a meaningful program of learning for its students. To ensure that learning is interconnected, many schools have found curriculum mapping to be helpful. The curriculum mapping process involves charting the content, skills, and assessments delivered for all subjects at all learning levels. The resulting curriculum maps become a tool that teachers can use to identify gaps, overlaps, and duplication in curriculum.

A curriculum map is a communication tool. Mapping can be done across grades to allow teachers to view what students learn from grade to grade, subject to subject, and month to month. On a district level, teachers can see the complete learning picture for students — the education program from kindergarten through grade 12.
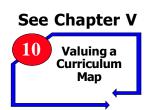
The next step is to use this process to prioritize the focus areas for learning. Teachers cannot possibly teach everything of value during the time that they facilitate learning for students. With curriculum maps, teachers know what is being taught across the school experience and can compare this with what should be taught in the limited instructional time available. In addition, mapping reveals content that is common across subject areas, giving rise to opportunities for more meaningful learning through interdisciplinary instruction.

The Curriculum Matrix is a valuable resource for the curriculum mapping process because it matches state standards and topics to state tests and community expectations. Teachers can then match these with their own content and instructional activities. Also, teachers can find the correlation between standard, content area, and community expectations — another valuable checkpoint. Thus, the Curriculum Matrix becomes a resource that provides standards, community expectations, and testing content areas to the curriculum mapping process.

Why Curriculum Mapping is Important

The most important outcome of curriculum mapping is the improved student achievement. By addressing gaps and overlaps in the schoolwide curriculum and focusing instruction on identified and prioritized curricular content areas, the "what" of the taught curriculum is identified, defined, reidentified, and redefined. Teachers connect assignments, projects, and instructional topics across classrooms and disciplines. The student receives a more coherent, integrated, and meaningful learning experience. Student achievement is bound to improve when instruction is targeted on the content that is essential for students to learn.

"Curriculum maps are the tools of the practitioner, the foundation upon which other work is based."
Heidi Hayes Jacobs

See Chapter V

10 Valuing a Curriculum Map

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Curriculum mapping is useful for long- and short-range planning. By examining curriculum maps, teachers can redesign and modify their instruction to:

See Chapter V

11 Developing a Curriculum Map

- match state and district standards
- locate and eliminate unnecessary repetition of content
- identify and fill gaps
- develop interdisciplinary instruction
- ensure that they teach what will be tested.

The Curriculum Mapping Process

The curriculum mapping process begins with teachers recording what occurs in their classrooms over a given period of time. While the design of the curriculum map varies based on the information collected, maps typically contain the following categories:

- standards, benchmarks/performance indicators from state frameworks or standards
- time frame — by calendar week, month, semester, year
- content/skills — what students are expected to know and be able to do
- procedures/topics — how content is taught
- evidence of learning — the degree of competency is suggested, introduced, reinforced, or mastered
- assessments — how competency is measured; what is the evidence of a student's ability to demonstrate competency
- instructional materials and resources.

See Chapter V

12 Analyzing Gaps Using Curriculum Maps

Table X illustrates a form used in gathering data for a curriculum map. Another type of curriculum map that focuses more on what the performance indicators, or topics, mean to the teacher is shown in Table XI. The emphasis here is on the standard, which becomes the starting point of the mapping. This map is an aligning tool. Note that there is no time reference given on this format.

Table X
Curriculum Map 1

Teacher _____ Course _____ Grade Level _____

Month	Topic	Content/Skills	Assessments	Standards

Table XI
Curriculum Map 2

Teacher _____ Course _____ Grade Level _____

English Language Arts Standard 1 - Language for Information and Understanding				
Performance Indicator	**Content** *What I Teach*	**Process** *How I Teach*	**Type of Measure** *How I Assess*	**Student Work** *Evidences of Student Learning*
1. Listening and Reading to: a. gather and interpret information from children's reference books, magazines, textbooks, electronic bulletin boards, audio and media presentations, oral interviews, and from such forms as charts, graphs, maps and diagrams				

Curriculum maps answer such questions for teachers as:
· What has the student been taught before coming to my class?
· What is the student expected to learn during my class?
· Do I need to teach this?
· How well does my curriculum match state and/or district standards?

When designing curriculum maps, it is important to have teachers participate in the actual creation of them. Teachers should identify and agree on categories, or mapping areas. Resources need to be available to teachers in the process, including district goals, local syllabi, state standards, and statewide assessment information along with the teachers' plans and instructional units.

See Chapter V

12 **Analyzing Gaps Using Curriculum Maps**

Curriculum mapping is not an easy task. Teachers must sometimes let go of content and instructional activities that are dear to them. These are successful lessons that are proven motivators for students and enjoyable to facilitate, but which now do not fit the content areas mapped. Furthermore, some teachers feel guilty when they acknowledge what is really happening, or not happening, in their classrooms.

Designing Curriculum Mapping

There are a number of ways to organize curriculum mapping. Schools may have a map of each elementary and intermediate grade level as well as subject areas at the high school level. Maps may be created by standards area. These would show the correlation between the standards in a particular academic area and what is taught.
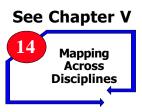
Analyzing curriculum maps is an excellent professional development opportunity for staff as they consider what is being taught, how it is assessed, and what can be done to improve both instruction and assessment?

Another form of mapping is interdisciplinary. This map might depict the standards in one academic area, and teachers in other academic disciplines do the mapping. For example, writing may be thought of as everyone's business to teach. Thus, all teachers would respond to the writing standards in relation to what they teach and what students learn. This process becomes particularly beneficial at the high school level where students often need to pass state tests in math and English language arts. By asking every discipline to cross-reference its academic area to English and math standards, at the minimum, all teachers become aware of the requirement in these two core academic areas.

An extremely revealing exercise is to have teachers in Career and Technical Education programs map their content, skills, and processes with the academic standards in core academic disciplines. Schools that have done this are amazed at the number of academic standards that are introduced, reinforced, or mastered in the Career and Technical Education programs. This builds support for these programs in a schedule that is already filled with many academic requirements.

See Chapter V

14 **Mapping Across Disciplines**

Resources

Internet Sources

AEL   http://www.ael.org/cmdt/

Cartographer   http://www.cmap.com

Curriculum Mapper   http://www.westjam.com

Jacobs, Heidi Hayes Site http://www.curriculumdesignes.com/

NCS Pearson   http://www.ncs.com

North Central Regional Lab   http://currmap.ncrel.org/default.htm

Northwest Regional Lab   http://www.nwrel.org

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Bernhardt, Victoria L. (1998) *Data Analysis*. Larchmont, NY: Eye on Education.

Cotton, K. (1999) *School Improvement Programs*, Volume 11. J.H Block, S.T. Everson, and T.R. Guskey (eds.). New York: Scholastic.

Gruenwald, P. J., Treno, A. J., Taff, G., and Klitzner, M., (1997) *Measuring Community Indicators*. Thousand Oaks, CA: SAFE Publications, Inc.

Herman, J. L., & Winters, L. (1992) *Tracking Your School's Success: A Guide to Sensible Evaluation.* Newbury Park, CA: Corwin Press.

Jacobs, Heidi Hayes. (1997) *Mapping the Big Picture: Integrating Curriculum and Assessment K-12*. Alexandria, VA: Association for Supervision and Curriculum Development.

Marzano, Robert, Pickering, Debra, and Pollack, Jane. (2001) *Classroom Instruction that Works: Research-based Strategies for Increasing Student Achievement.* Alexandria, VA: Association for Supervision and Curriculum Development.

Chapter V   Activities for Staff Development

Processes to Align Curriculum and Instruction

Aligning standards, tests, and essential skills to improve instruction is not a simple task. It requires significant and persistent effort to implement these curricular changes.

One of the challenges that school leaders face is stimulating staff to try something new without negating the work that has preceded it. Teachers look skeptically at disjointed curricular initiatives and hope, "This too shall pass."

The extensive efforts necessary to align curriculum and instruction can be broken into 11 **Processes** (see Figure 8 and Table XII). Figure 8 shows the **Data Inputs** to the processes as well as the **Outputs**. Table XII provides a **Characteristics** checklist to help school leaders assess where they are in aligning curriculum and instruction.

Schools that have a number of these characteristics are well on their way to having standards-based aligned curriculum and instruction. Schools that lack some of these items know there is work to be done. If an **Output** does not exist, the corresponding **Process** is what the school staff needs to work on. It is not necessary to redo outputs that already exist, simply review these with staff and connect them to a process**.**

The staff development activities in this chapter were created to introduce and reinforce these processes, as shown in Figure 9.

Please note: The activities in this chapter are designed to be conducted by the instructional leaders or staff development specialists in a school/district. The International Center can also provide Senior Consultants and Masters Teachers who are familiar with this material to assist in any way desired. Please contact us to discuss your staff development needs.

(518) 399-2776   info@daggett.com

Figure 8
Standards Alignment Processes

Data Inputs

- State Standards
- Essential Skills
- Test Specifications
- Local Standards
- Current Learning Outcomes
- State Test Results
- Student Data
- Curriculum Map
- Themes/Local Resources
- Achievement Tools/ Resources

Processes

- Developing an Understanding of Standards
- Analyzing Community Needs
- Analyzing State Tests
- Developing Local Standards
- Curriculum Mapping
- Connecting Academic and Career and Technical Education
- District/School Improvement Planning
- Instructional Planning
- Selecting/Developing Local Assessments
- Analyzing Student Achievement
- Instructional Improvement

Outputs

- Culture focuses on standards
- Local Priority Skills and Knowledge
- Local Curriculum Frameworks
- Curriculum Maps
- Crosswalks between CTE and Academics
- District/School Improvement Plans
- Teacher Instructional Plans
- Local Assessments
- Instructional Improvement Priorities
- Academic Intervention Services
- Revised Instruction

Table XII
Characteristics of Standards Alignment
Checklist

Output	Characteristics			Process
	Yes	No		
School culture that emphasizes standards	❏	❏	Standards are part of the conversation of student achievement.	Developing an Understanding of Standards
	❏	❏	Accountability systems are based on standards.	
	❏	❏	Data are collected to measure achievement of standards.	
	❏	❏	Recognition and celebrations are designed around standards.	
Local priority skills and knowledge	❏	❏	Teachers have a short list of priorities for instruction.	Analyzing Community Needs
	❏	❏	Priority needs of the community are known to all.	
	❏	❏	Key areas of state/standardized assessments are known to staff.	Analyzing State Tests
	❏	❏	Teachers have identified how their instructional areas relate to these priorities.	
Local curriculum frameworks	❏	❏	District has local curriculum standards and student competencies.	Developing Local Standards
	❏	❏	Local curriculum is linked to state standards.	
	❏	❏	Teachers have access to and use these curriculum resources.	
Curriculum maps	❏	❏	Curriculum topics are sequenced, assigned to a grade level and time of the year.	Curriculum Mapping
	❏	❏	Teachers have had input in the development of curriculum maps.	
	❏	❏	Teachers have access to and use curriculum maps.	
	❏	❏	Teachers have linked lesson plans to these curriculum maps.	
Crosswalks between Career and Technical Education (CTE) and academic areas	❏	❏	CTE courses have been analyzed to identify content that supports academic standards.	Connecting Academic and Career and Technical Education
	❏	❏	CTE teachers have a priority to reinforce academic standards.	
	❏	❏	There are frequent conversations between CTE and academic teachers to share instructional ideas.	
	❏	❏	Applied academic courses are developed and offered.	
	❏	❏	Professional development is provided on integrating academics and CTE.	
	❏	❏	Team teaching of CTE and academic teachers is practiced in school.	

Characteristics of Standards Alignment Checklist, continued

Output	Yes	No	Characteristics	Process
District/school improvement plans	❑	❑	Root causes of obstacles to student achievement have been identified.	District/School Improvement Planning
	❑	❑	A comprehensive plan sets the priority for use of funds, instructional improvement, teacher evaluation, and professional development.	
	❑	❑	Professional development and staff evaluation are aligned with priorities.	
Teacher instructional plans	❑	❑	A consistent process is used by teachers to develop instructional plans.	Instructional Planning
	❑	❑	The instructional planning process is supervised.	
	❑	❑	Instructional plans are shared among teachers.	
	❑	❑	Teachers have access to resources to help develop instructional plans.	
Local assessments	❑	❑	Local assessments are developed consistent with district and school priorities.	Selecting/ Developing Local Assessments
	❑	❑	Teachers have input to decisions regarding the selection and use of standardized tests.	
	❑	❑	Teachers have access to resources to develop local assessments.	
	❑	❑	Local assessments and scoring guides are shared among teachers.	
	❑	❑	Local assessments are developed to parallel those used in state assessments.	
	❑	❑	A balance is achieved between recall assessments and performance measures.	
Instructional improvement priorities	❑	❑	Each teacher has a personal plan for improvement priorities consistent with district goals and based on student achievement results.	Analyzing Student Achievement
Academic intervention services	❑	❑	There is a district plan for academic intervention services and processes for referring students and terminating services.	Analyzing Student Achievement
	❑	❑	Parents are fully informed of options for students and referrals.	
	❑	❑	Teachers understand the plan and refer students for services.	
Revised instruction	❑	❑	Teachers facilitate instruction that supports the standards.	Instructional Improvement
	❑	❑	Teachers offer a variety of instructional activities and methods.	
	❑	❑	Instruction is motivating to students and they are actively engaged.	
	❑	❑	Teachers exhibit interest in continual improvement.	

**Figure 9
Teacher Activities Related
to Alignment Processes**

Developing an Understanding of Standards
    1.   Identifying Factors that Influence Change
    2.   Matching Standards to Curriculum
    3.   Understanding Standards
Analyzing Community Needs
    4.   Analyzing the Curriculum Survey of Essential Skills
Analyzing State Tests
    5.   Using the Curriculum Matrix
    6.   Reading Test Specifications/Blueprints
    7.   Analyzing Test Questions
    8.   Analyzing the Test
Developing Local Standards
    9.   Differentiating Standards and Instruction
Curriculum Mapping and Gap Analysis
    10.   Valuing a Curriculum Map
    11.   Developing a Curriculum Map
    12.   Analyzing Gaps Using Curriculum Maps
    13.   Scaffolding Skills
Connecting Academic and Career and Technical Education
    14.   Mapping Across Disciplines
District/School Improvement Planning
    15.   Identifying Root Causes
Instructional Planning
    16.   Planning for Rigorous and Relevant Learning
    17.   Which Instructional Strategies Work Best?
    18.   Linking Standards and Student Work
Selecting/Developing Local Assessments
    19.   Designing Parallel Tasks
Analyzing Student Achievement
    20.   Analyzing Students' Performance on the Test
    21.   Identifying Academic Intervention Strategies
Instructional Improvement
    22.   Peer Review of Lessons
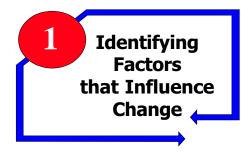
1 Identifying Factors that Influence Change

Purpose

Focusing instruction on standards can be a significant change for teachers. One way to engage staff initially is to spend time reflecting on the forces influencing any curricular change.

When groups assemble, they typically focus on problems and overcoming obstacles. This activity helps to clarify both the negative and the positive to create a more balanced view of the work that needs to be done to achieve a goal.
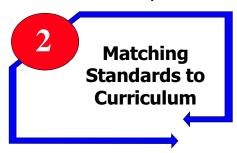
Forces moving toward a change in an organization are called *driving forces.* These are opposed by forces against the change, called *hindering forces*. Once these forces are clearly identified and analyzed, the change can be achieved by: (1) reducing or eliminating a hindering force, (2) strengthening a driving force, or (3) changing the direction of any force.

Preparation

- Have newsprint to record responses
- Designate and orient facilitators to lead each group

Procedure

1. Identify primary goal of the proposed change.

2. Organize participants in groups of 8-10 people.

3. Have each group list hindering forces — obstacles to making the change or achieving the goal. (It is often easier to start with hindering forces.)

4. Have the groups list the driving forces that would support making the change or achieving the goal.

Time
1-2 hours

5. Once the lists are complete, have each group prioritize the items and select 3-5 of the most significant driving and hindering forces.

6. Working with each of the forces in turn, brainstorm specific action steps that will strengthen driving forces, reduce hindering forces, or change the direction of forces. These lists will provide good ideas for further development of work plans.

7. Record the prioritized lists and action steps from each small group on newsprint to share with the entire group. Consider forming a new prioritized list and set of action steps that represent the thinking of the entire group.

2

Matching Standards to Curriculum

Purpose

The purpose of this activity is to help teachers understand state standards and their correlation to instruction. This activity will stimulate teacher conversation about what standards mean, what is included in them, and how well curriculum matches the standards. The activity is a variation of an affinity diagram, where a group sorts information.

Preparation

- Put one state standard topic/performance indicator each on 5x7 index cards. These can be cut from a large document and pasted on the cards. Keep the standards numbered or labeled by subject/grade level so they can be reassembled in order.
- Put each topic/idea from local curriculum on a card of a **different color** from the standards (or somehow easily identifiable as local curriculum). At the secondary level, use course titles.

Procedure

1. Form groups of no more than 20 people from single grade level or subject area across several grades.

2. Divide the cards evenly among the participants, giving them both local curriculum and state standards.

3. Have participants sort their cards, grouping similar skills and knowledge.

Time
at least 2 hours

4. Participants then post their cards on the wall, grouping similar cards together.

5. Once all the cards are on the wall, have participants scan through them. Depending on the number, this could take some time.

6. Invite everyone to begin to move similar cards into clusters, grouping state and local topics together.

7. After most of the cards are grouped, assign groups to take a grouping and sort it by color.

8. Have each group make two parallel lists: a list of state standards and a list of local standards. This becomes the beginning of the match between state and local curriculum.

9. Follow-up activities include fine-tuning the lists by having others react to them. Have some people look for orphans – state standards that do not have a link in local standards and vice versa. This provides extensive information for curriculum mapping and/or developing local standards.

3

Understanding Standards

Purpose

This activity forces teachers to think about and describe what the standards really mean to them. Often teachers are able to recall what a standard says but when pressed to interpret what it means or what it would look like in instruction or in student work, teachers are not so sure. This activity helps teachers begin to translate standards into meaningful instruction.

Preparation

- Have on hand copies of state standards/topics/benchmarks
- Make copies of **Standards Interpretation Chart** worksheet

Procedure

1. Working individually, have each teacher select five standards/topics/performance indicators/benchmarks from an academic discipline, read them, and translate them into his/her own words using the Standards Interpretation Chart.

2. The teacher then provides further explanation by giving an example of what the standard looks like in instruction and in the results of instruction, student work.

3. Have teachers exchange their Standards Interpretation Chart with two other teachers working on standards from the same discipline. Allow time for the teachers to read each other's charts and make additions and modifications.

4. In small groups of 5-8, have teachers discuss what they learned from the activity.

Time
30 minutes
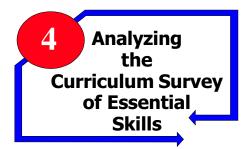
Worksheet **Standards Interpretation Chart**

1	Standard/Topic/Performance Indicator
What This Means to Me	
How I Teach This	
How This Is Reflected in Student Work	

2	Standard/Topic/Performance Indicator
What This Means to Me	
How I Teach This	
How This Is Reflected in Student Work	

3	Standard/Topic/Performance Indicator
What This Means to Me	
How I Teach This	
How This Is Reflected in Student Work	

4	Standard/Topic/Performance Indicator
What This Means to Me	
How I Teach This	
How This Is Reflected in Student Work	

5	Standard/Topic/Performance Indicator
What This Means to Me	
How I Teach This	
How This Is Reflected in Student Work	

4 **Analyzing the Curriculum Survey of Essential Skills**

Purpose

This activity engages school districts in a serious discussion about the over-crowded curriculum.

The International Center for Leadership in Education designed a Curriculum Survey of Essential Skills to help districts identify the most essential curricular content in terms of the rigor and relevance needed to prepare students for post-school, real-world experiences. The Survey results can be used to guide discussion about the curriculum changes necessary to enable all students to achieve higher standards. The Survey helps schools differentiate between topics that are essential and those that are merely nice to know.

This activity must be planned 6-8 weeks ahead of time so that you will have the Curriculum Survey results for your district.

Administering the Curriculum Survey
- The International Center provides the district with copies of the Survey, which lists topics typically taught in mathematics, science, and English language arts.
- The district recruits a broad cross-section of the community to complete the Survey (educators and non-educators) and collects the Survey answer sheets.
- The International Center compiles and summarizes the results in a report that contains the district ranking and the national ranking of all topics in each content area as well as the rankings by various subgroups of the community.

For information about procedures and cost of administering the Curriculum Survey, please contact the International Center (518) 399-2776 or info@daggett.com.

Preparation

- Make copies of the district's Curriculum Survey report prior to the meeting.

Procedure

1. Distribute copies of the Curriculum Survey report and have participants analyze the rankings in small heterogeneous groups. Discuss:

   How do our district rankings compare to the national rankings?
   - Identify similarities, differences, and determine rationale (if any) for variations.

Time
half day or
full day

continued

Analyzing the Curriculum Survey of Essential Skills, continued

Are there differences in the rankings of the various subgroups?
- Identify similarities, differences, and determine rationale (if any) for variations.
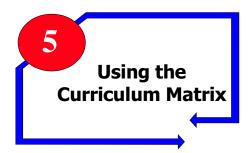
2. Regroup into homogeneous groups by grade level or subject to analyze the topics in each subject.

   Identify the most important curriculum topics in three areas:
   - On Target — topics that are important in the Survey and that all students in the district currently develop.
   - Missing in Action — topics that are important but not emphasized in the curriculum.
   - Orphans — topics that are currently taught but not listed as a high priority.

   Examine On Target topics to map them across the K-12 curriculum to see where they are introduced or reinforced. Do the same for Missing in Action topics.

3. Have participants examine Orphan topics and identify whether they should be dropped completely, modified, or retained in spite of the Survey results. Can they be used to teach other skills?

4. Have participants assign Missing in Action topics to a curriculum area/ grade level.

5. Have participants begin to think more broadly about interdisciplinary performance assessments, project, integrated units, or other experiences which would develop one or more of the topics in the On Target and Missing in Action lists. This is frequently a better strategy than adding a new course or topic.

6. Develop action plans: Using all the information analyzed and developed, have participants prepare a curriculum action plan for a school, grade level, or subject area. The action plan will describe initiatives, implementation activities, time line, responsibilities, and evaluation.

5

Using the Curriculum Matrix

Purpose

This activity gives teachers practice using the Curriculum Matrix. By analyzing the Curriculum Matrix, teachers will understand its organization, categories, and priority ratings. Once they are familiar with the Curriculum Matrix, teachers will readily see its value in setting instructional priorities.

Preparation

- Make copies of relevant subjects/grade levels from your Curriculum Matrix (found in Chapter VI)
- Make copies of the **Curriculum Matrix Discussion Questions** worksheet

Procedure

1. Review the origin and meaning of the information displayed on the Curriculum Matrix (see Chapter III and the State Information and State Standards Summary sheets in Chapter VI).

2. Group teachers by academic discipline/grade level.
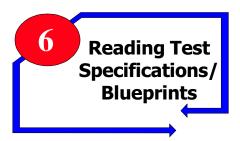
3. Have teachers work in pairs or small groups to analyze the information on the Curriculum Matrix for their grade level/academic area. Have them respond to each of the questions on the handout:

   - Which topics/performance indicators are most valued by the community?
   - Which topics/performance indicators are emphasized on state assessments?
   - Which topics/performance indicators are not emphasized on state tests?
   - How could you use this information?

4. Lead a full-group discussion on what was learned and what needs to be modified in instruction to coincide with high priority ratings based on the Curriculum Matrix information.

Time
1 hour

Worksheet

Curriculum Matrix
Discussion Questions

Which topics/performance indicators are most valued by the community?

Which topics/performance indicators are emphasized on state assessments?

Which topics/performance indicators are not emphasized on state tests?

How could you use this information?

6 **Reading Test Specifications/ Blueprints**

Purpose

To prepare students for state tests, teachers need to know what the test emphasizes. This activity provides teachers with an opportunity to become more familiar with test specifications and to analyze them in terms of their influence on instruction and assessment.

Preparation

- Make copies of the testing specifications for the test (available from the state education department)
- Make copies of the **Test Specifications Discussion Questions** worksheet

Procedure

1. Have teachers work individually to study the test specifications.

2. After analyzing the test specifications, have teachers answer the questions on the handout:

   - What do the testing specifications tell you?
   - How does this impact your instruction?
   - How does this influence your classroom assessment?
   - Which testing specification is most helpful? Why?
   - Should students and parents have access to this information? Why? Why not?

3. Have teachers form small groups and share their responses.

Time
45 minutes

Worksheet

Test Specifications
Discussion Questions

What do the testing specifications tell you?

How does this impact your instruction?

How does this influence your classroom assessment?

Which testing specification is most helpful? Why?

Should students and parents have access to this information?
Why? Why not?

7 **Analyzing Sample Test Questions**

This activity helps teachers to see the connection between what a student is being asked in a test question and the related state standards/performance indicators/topics as learning areas.

Purpose

- Have copies of the state standards on hand (may be taken from the Curriculum Matrix in Chapter VI)
- Provide sample test questions or questions from previous years
- Make copies of **Sample Linking Standards to Test Questions** handout and the **Linking Standards to Test Questions** worksheet

Preparation

1. Working in small groups of 3-4, have teachers study sample test questions and identify the state standards addressed in the questions.

2. Using the Linking Standards to Test Questions handout, have them fill in the chart for each test question. Questions may test more than one standard or benchmark.

3. Discuss findings with the entire group.

Procedure

Time
1 hour

Optional

- Have teachers search for more sample questions for their state tests. These are generally available from the state education department and on the Website.

- Compile a resource guide of sample test items for students and other teachers.

Handout

Sample
Linking Standards
to Test Questions

Test: *High School Exit Exam*   **Subject:** *English Language Arts*

Test Question	Standard/Topic/Benchmark	Evidence in Question
#1 – In which situation would the writer's purpose be primarily to instruct?	Critical Thinking – Recognizes different purposes and methods of writing; identifies a writer's tone and point of view.	The student is asked to distinguish among situations and indicate which one matches the given purpose of instructing.

Sample Item
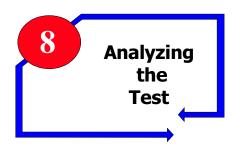
1.   In which situation would the writer's purpose be primarily to instruct?

   A.   writing jokes for a speech to be given before a civic group
   B.   writing about the opening of a new play for the local newspaper
☞   C.   writing the owner's manual that accompanies a new videocassette recorder
   D.   writing a letter to the editor of the newspaper opposing the building of a hazardous waste dump.

Worksheet

Linking Standards
to Test Questions

Test: **Subject:**

Test Question	Standard/Topic/Benchmark	Evidence in Question

8 **Analyzing the Test**

Purpose

To help students be successful on a state test, teachers need to know what is on the test. This activity asks teachers to study a test and become familiar with the questions, time constraints, organization, etc.

An effective follow-up activity is to have the teachers take the test. Sometimes a true understanding of the questions can be realized only by actually trying to answer them.

Preparation

- Make copies of a current sample test, released test items, or a recent old test (often available from the state education department and/or its Web-site)
- Make copies of **Analyzing the Test** worksheet
- Obtain copies of the scoring guide from test administration materials

Procedure

1. Form small groups of 6-8 teachers from the same discipline or grade. If a test is comprehensive of several grades, it is helpful if teachers from those grades are present. For example, if an English Language Arts test is given at grade 4, have teachers in grades 1 through 3 review the test together as well as grouping the grade 4 teachers.

2. Following the worksheet Analyzing the Test, have teachers work individually or in pairs to identify and describe the types of tasks, time constraints, scoring guide(s), number of questions, and standards/topics emphasized on the test.

Time
depends on
length/complexity
of test

3. Discuss findings in the group. Then have teachers outline the steps they would need to take to prepare their students for this test. Record the steps on flipchart paper and post them in the room.

4. Have individuals do a walk-around to see the steps that each group identified.

5. Conclude by discussing the steps and identifying areas where teachers believe they need support or professional development to complete these steps.

Worksheet
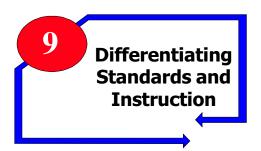
Analyzing
the Test

Test _____ **Subject** _____ **Grade** _____

	Multiple Choice	**Short Answer**	**Extended Response**	**Essay**
Number of Questions				
Total Points				

Time Constraints

Special Directions, Prompts, Allowable Reference Materials and Tools (e.g., calculator)

Analyzing the Test, continued

Scoring Guide(s), Type(s), Characteristics of Student Work Needed to Score Successfully

Other Things to Note

Steps to Prepare Students for this Test

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

9 Differentiating Standards and Instruction

Purpose

The purpose of this activity is to help teachers distinguish terms that are used to describe student achievement from those used to describe instruction. Many teachers are used to describing their teaching in terms of content. The movement to standards requires teachers to think more about student learning as defined in state standards as topics, performance indicators, and competencies.

Preparation

- Make copies of **Differentiating Standards and Instruction** worksheet and answer key
- Do not hand out answer key until end

Procedure

1. Review for teachers the terms used in your state standards and what constitutes student work.

2. Have teachers complete the handout individually and then compare the answers with a partner. Hand out the answer key and discuss any questions that teachers have.

Time
45-60 minutes

<Worksheet>

Differentiating Standards and Instruction

The purpose of this worksheet is to differentiate clearly among **standards** (skills and knowledge students will learn), **curriculum content** (the labels that describe portions of the curriculum), and **student work** (what students will do to demonstrate competence as part of instruction).

Review each of the following items and label it S for Standards, C for Content, or W for student work.

S	**C**	**W**
Standards – describe what students will know and be able to do	**Content** – labels topics to be covered in teaching	**Student Work** – describes tasks students do to engage in learning

_____ Speak to share data, facts, and ideas
_____ Speaking and listening
_____ Statistics and probability
_____ Test consumer products and illustrate data graphically
_____ Tour the school building and identify parallel lines, planes, and triangles
_____ Understand and apply ratios, proportions, and percents through a wide variety of hands-on explorations
_____ Understand the purpose for writing; for example, explain, describe, narrate, persuade, and express feelings
_____ Literature
_____ Listen in order to follow directions involving a few steps
_____ Know all perimeter and area formulas
_____ Journal of observations from a scientific inquiry
_____ Informational reading
_____ Give and seek constructive feedback in order to improve writing
_____ Geometric shapes
_____ Demonstrate understanding of probability by solving word problems

_____ Creative writing
_____ Algebra
_____ Add, subtract, multiply, and divide fractions, decimals, and integers
_____ Make a scale drawing of the classroom
_____ Measurement
_____ Use estimation to solve problems for which exact answers are inappropriate
_____ Use pattern blocks to discover relationship of fractions
_____ Solve problems that illustrate the use of fractions and decimals
_____ Research paper on a current scientific issue
_____ Reasoning and problem solving
_____ Reading for critical evaluation
_____ Read from informational texts such as textbooks, reference materials, graphs, charts and diagrams
_____ Read two books a month
_____ Presentation using computer visuals

Answer Key

Handout

Differentiating Standards and Instruction

S	**C**	**W**
Standards – describe what students will know and be able to do	**Content** – labels topics to be covered in teaching	**Student Work** – describes tasks students do to engage in learning

__S__ Speak to share data, facts, and ideas

__C__ Speaking and listening

__C__ Statistics and probability

__W__ Test consumer products and illustrate data graphically

__W__ Tour the school building and identify parallel lines, planes, and triangles

__S__ Understand and apply ratios, proportions, and percents through a wide variety of hands-on explorations

__S__ Understand the purpose for writing; for example, explain, describe, narrate, persuade, and express feelings

__C__ Literature

__S__ Listen in order to follow directions involving a few steps

__S__ Know all perimeter and area formulas

__W__ Journal of observations from a scientific inquiry

__C__ Informational reading

__S__ Give and seek constructive feedback in order to improve writing

__C__ Geometric shapes

__S__ Demonstrate understanding of probability by solving word problems

__C__ Creative writing

__C__ Algebra

__S__ Add, subtract, multiply, and divide fractions, decimals, and integers

__W__ Make a scale drawing of the classroom

__C__ Measurement

__S__ Use estimation to solve problems for which exact answers are inappropriate

__W__ Use pattern blocks to discover relationship of fractions

__W__ Solve problems that illustrate the use of fractions and decimals

__W__ Research paper on a current scientific issue

__C__ Reasoning and problem solving

__C__ Reading for critical evaluation

__S__ Read from informational texts such as textbooks, reference materials, graphs, charts and diagrams

__W__ Read two books a month

__W__ Presentation using computer visuals

10 **Valuing a Curriculum Map**

Purpose

This activity helps teachers understand the purposes and essential components of a curriculum map. Curriculum mapping is an alignment process that draws a comparison between what teachers are teaching over a period of time and the standards. Schools use curriculum maps to ensure that priority instructional areas get taught. Maps are also excellent short- and long-term planning aids.

This activity should precede actual mapping in Activities 11-14. The mapping categories agreed upon here can become the template for the school's curriculum maps.

Preparation

• Make copies of handout **Sample Curriculum Maps** displaying different categories of information (e.g., calendar based, standards based)
• Post discussion questions (see below)
• Obtain flip charts and markers for each group

Procedure

1. Review the purposes of curriculum mapping.

2. Have each teacher read the sample curriculum maps and note the information that they provide.

Time
40 minutes

3. Divide large group into small groups of 4-5. Each group should identify a facilitator to keep the group focused and ensure that everyone has a chance to participate and a recorder.

4. Have the groups address the following discussion questions based on what they know about curriculum mapping and the maps studied:

   • What should be included on your curriculum map? Why?
   • What would you be able to do differently if you had this information?
   • How would student learning be different if you had this information?

5. Following discussion, have the groups select the essential headings for their curriculum map and record them on the chart paper. Post the chart paper.

continued

Valuing a Curriculum Map, continued

6.　　Have participants do a "walk-around" to look for the similarities and differences among the groups' choices for essential areas to map.

7.　　With the whole group, discuss the similarities and differences. Have the teachers agree upon headings for curriculum mapping. Ask participants to record one reason why each heading is essential to have.

Potential sources of curriculum maps:

Internet
http://www.cels.kent.edu/materials/sampcm.htm

http://www.troyschoolspa.org/cmgentile.pdf

http://www.bcsd.stier.org/maps/ela7.pdg

http://www.wnylrc.org/Training/Curricul/paper.pdf

Publication
Curriculum Mapping: Charting the Course for Content, ASCD, 1999

Handout

Sample Curriculum Maps
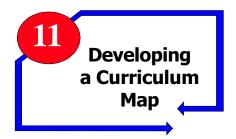
Sample Curriculum Map 1

Teacher _____   **Course/Grade** _____

Month	Topic	Content/Skills	Assessments	Standards

Sample Curriculum Map 2

Teacher _____   **Course/Grade** _____

English Language Arts Standard 1 - Language for Information and Understanding				
Performance Indicator	**Content** *What I Teach*	**Process** *How I Teach*	**Type of Measure** *How I Assess*	**Student Work** *Evidences of Student Learning*
1. Listening and Reading to: a. gather and interpret information from children's reference books, magazines, textbooks, electronic bulletin boards, audio and media presentations, oral interviews, and from such forms as charts, graphs, maps and diagrams				

11 **Developing a Curriculum Map**

This activity engages teachers in planning and keeping a curriculum map. Curriculum maps show what, when, and how topics are taught in a grade or course. Elementary and middle-level maps are developed at a grade level, with separate sections for the different disciplines. At the secondary level, maps are usually developed for specific courses. Curriculum maps also describe how the content is assessed and tied to state and local standards.

Purpose

- Have copies of state standards, curriculum resource guides, and local/district standards
- Have teachers bring instructional materials, plans, resources
- Make copies of a template for mapping curriculum (see previous activity)

Preparation

1. Review the meaning of the headings on the curriculum map template. Provide an example under each heading.

Procedure

2. Working in groups by grade level or academic discipline/course, have teachers construct a curriculum map covering six months.

3. Bring teachers back together at the end of the day and have each group report on their progress. Answer any additional questions and address any concerns.

Time
Full day to plan a curriculum map

Follow-up

4. Have teachers follow the map and meet by subject or grade at the end of each month to review their place on the map and to reflect upon what worked and what they would change.

Follow-up reflective discussions held monthly throughout the year

5. At the end of six months, bring the entire group back and reflect upon:

- Was the curriculum map an accurate reflection of what was taught?
- How did they use the information mapped?
- What were the limitations, if any, of the map?
- What modifications need to be made, if any, in the map headings.

6. Modify the curriculum map headings, if necessary, and have teachers plan a map for the entire school year.

7. At the end of the school year, bring the entire group back to reflect again on the mapping process.

12 **Analyzing Gaps Using Curriculum Maps**

Purpose

A gap analysis of curriculum maps shows the distance between what is actually taught and the "ideal" or desired curriculum, instruction, and assessment. In curriculum mapping, teachers indicate what they believe their instruction is or what they hope it will be. In gap analysis, teachers show how they are teaching and assessing state and/or district standards. They indicate what they do rather than what they should do.

In this activity, participants undertake a gap analysis exercise. Completing a gap analysis helps teachers understand what they need to do to fulfill the standards.

Preparation
- Have copies of state/local/district standards, curriculum resource guides, and local/district curriculum map
- Make copies of worksheet **Gap Analysis Reflective Questions**
- Have teachers bring their instructional plans, materials

Procedure

1. Explain the purpose of a gap analysis of a curriculum map.

2. Provide teachers with the local curriculum map. If one has not been developed, use the format for Sample Curriculum Map 2 in Activity 10 and have teachers map a small portion of the standards.

Time
varies with number of standards analyzed
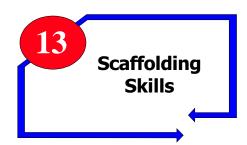
3. Working independently, instruct teachers to read a specified number of standards. Have them place a checkmark next to things they do in their teaching and circle things they do not do. For the circled items, have them note whether they do something else in place of the listed item.

4. Next have teachers list instructional activities they do which are not listed on the map and look for connections to the standards/topics/performance indicators.

5. Have teachers complete the reflective questions individually and then share their observations with one another.

Worksheet

Gap Analysis
Reflective Questions

1. Which standards/topics/performance indicators do you have the most difficulty transferring into instruction?

2. Which standards/topics/indicators do you emphasize?

3. Which standards/topics/indicators do you underemphasize?

4. What areas do you assess? Which ones do you not?

5. What should you drop or add to improve your instructional focus on the standards?

13

Scaffolding Skills

Purpose

Curriculum mapping provides an opportunity for teachers to learn what other teachers at the same grade and at other grade levels are teaching. Teachers can use the curriculum maps to identify gaps, repetitions, matches with standards, potential opportunities for integration, and the time of year when various topics are taught. Of particular benefit is understanding what students have been taught before. Knowing the expectations a student has already met enables a teacher to build on concepts and applications rather than reintroduce or repeat content.

This activity engages teachers in learning about the standards and topics/performance indicators covered at various levels of learning and in various subjects. This information helps in designing meaningful instruction that builds on previous learning.

Preparation

- Have available copies of the state standards, curriculum resource guides, and local/district standards
- Make copies of **Scaffolding Skills** worksheet

Procedure

1. Form small groups of teachers from different levels (elementary, intermediate, and high school) by discipline (English language arts, math, science).

2. Have each group select a standard and a topic/performance indicator from the standards.

Time
45 minutes

3. Have teachers identify the similarities and differences in the topic/performance indicator for this standard at each learning level.

4. Have teachers describe learning activities that would correlate with each performance indicator at each level.

5. Have groups report out on the standard and topic/performance indicator selected, the similarities and differences found, and the learning activities for each level.

6. Following discussion, have teachers reflect individually on how this activity influences their instruction.

⬡ **Worksheet**

Scaffolding Skills

Standard: _____

Topic/ Performance Indicator	Corresponding Learning Activity
Elementary	
Intermediate	
High School	

Scaffolding Skills Worksheet, continued

1. What **similarities** exist among the different levels?

2. What **differences** exist among the different levels?

3. How does this affect my instruction?

14 **Mapping Across Disciplines**

Purpose

This activity shows the value of interdisciplinary mapping. Interdisciplinary mapping crosswalks the standards in one academic area to the content in another academic area. Teachers in the second discipline do the mapping in relation to these standards. Thus, teachers become aware of the standards in other academic areas and can share in the instructional responsibility for teaching them. Topics that may be duplicated are identified as well.

In this activity, teachers in Career and Technical Education programs map their content, skills, and processes with the academic standards in core academic disciplines and identify the degree of instruction in their programs. This activity also builds support for Career and Technical Education (CTE) programs by showing how students can meet academic requirements through them.

Preparation

- Have available copies of state/local/district standards and curriculum resource guides
- Have teachers bring instructional plans, materials, resources
- Make copies of the **Linking Academics Example** handout
- Make copies of the **Linking Academics** worksheet

Procedure

1. Explain the purpose of interdisciplinary mapping.

2. Have each teacher read over the Linking Academics Example, which maps Agriculture Mechanics – Small Engines with Mathematics.

3. Discuss the meaning of each link: Required, Taught, Applied, Supported, and Tested.

4. Have teachers complete the Linking Academics worksheet for a Career and Technical Education program/course.

5. At a later date, provide an opportunity for the Career and Technical Education teachers to meet with the academic teachers and share how their programs/courses support instruction in the academic areas.

Time
half day or full day, depending on number of academic standards linked to CTE

Handout

Linking Academics
Example

Course or Program: Agricultural Mechanics – Small Engines

Academic Area: Mathematics

Academic Indicators	Academic Link				
	Required	Taught	Applied	Supported	Tested
Problem Solving, Reasoning					
• Determine, collect and organize the relevant data needed to solve real-world problems.	X		X		
• Determine the reasonableness of solutions to real-world problems.		X			X
• Use technology whenever appropriate to solve problems related to basic living skills including, but not limited to, personal finance, wages, banking and credit, home improvement, taxes, business situations, purchasing, and transportation.		X			
• Apply problem-solving strategies to solve problems in the natural and social sciences and in pure mathematics.	X		X		X
Communication and Connections					
• Formulate questions, conjectures, definitions, and generalizations about, data, information, and problem situations.			X		
• Use a variety of technologies to represent and communicate mathematical ideas and determine the appropriateness of their use.			X		
Numbers and Numeration					
• Read and write rational numbers.	X		X		
• Use physical models to represent rational numbers.	X		X		
• Recognize and demonstrate the difference in magnitude of rational numbers.	X				
• Compare magnitudes of integers, rational, and irrational numbers.	X				
• Develop and use order relations for integers, rational and irrational numbers.	X				

continued

Linking Academics Example, continued

Academic Indicators	Academic Link				
	Required	Taught	Applied	Supported	Tested
Measurement					
• Use graphics technology to analyze real world data. Make predictions based on interpolation and extrapolation from data.			X		
• Make decisions based on interpretation of data.			X		X
Functions, Relations and Algebra					
• Analyze functions and relations to describe how a change in one quantity results in a change in another.					
• Use charts and tables to organize and represent data.		X	X		
Discrete Mathematics					
• Represent data and solve problem situations using graphs, trees, and matrices.		X			
• Use algebraic and geometric iteration to explore patterns and solve problems.		X		X	
• Use combinations and permutations to solve a variety of problems.			X		
• Solve optimization problems.			X		
• Analyze different algorithms for efficiency.			X		

Worksheet
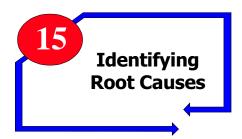
Linking Academics

Course or Program:

Academic Area:

Academic Indicators	Academic Link				
	Required	Taught	Applied	Supported	Tested

15

Identifying Root Causes

Purpose

This activity focuses on improving student achievement by identifying the major factors and root causes that contribute to a result, known as the "current effect." Using a cause and effect diagram, participants show the factors that contribute to a problem (or a positive outcome).

Preparation

- Make copies of **Root Causes Diagram** worksheet and **Instructions for Identifying Root Causes** handout

Procedure

1. Clearly describe the problem (current effect) to be diagrammed (e.g., absenteeism, low student achievement, lack of teacher involvement).

2. Have participants work in groups of 6-8 to fill in the worksheet, following the instructions on the handout:

   Place the current effect in the box with the long arrow (effect arrow) heading to it.

   Identify the major categories of factors that contribute to the problem. This will help the team organize the causes. Some common categories in school settings are **people, policies, procedures, public,** and **physical plant.** Use any category that helps participants think creatively. Place each category in a box with an arrow pointing at the effect arrow.

   Brainstorm the factors that contribute to the problem, or effect. Ask: "What causes this factor?" The answers are written on the diagram with arrows connecting them to the appropriate main category.

   Continue to ask "why" in order to identify root causes.
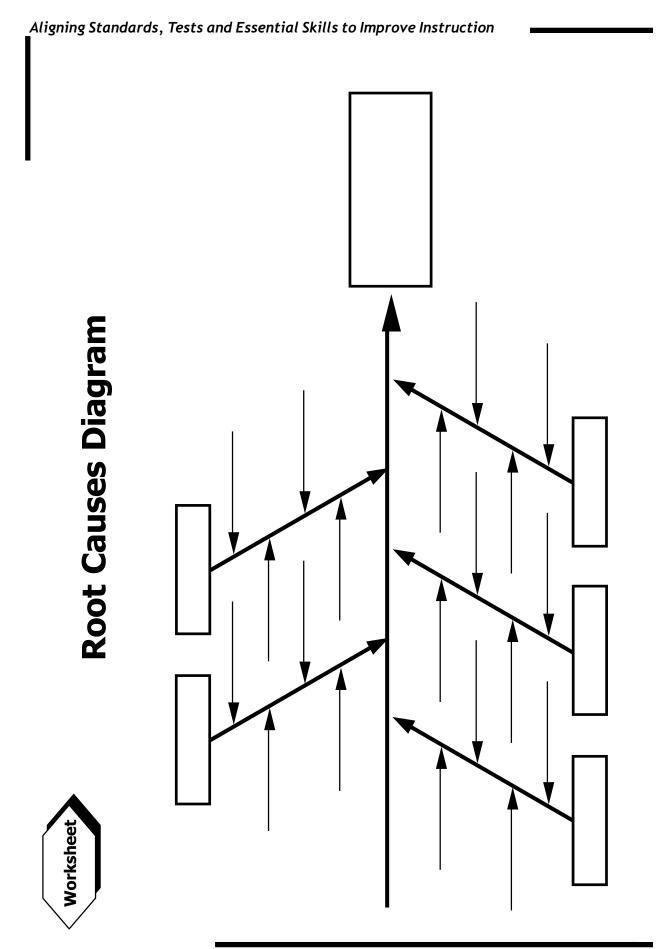
   Use the following criteria to evaluate your diagram:
   - Is the effect clearly stated?
   - Are all potential factors listed?
   - Are all factors categorized or did some fall outside the major categories?
   - Do all factors relate to the effect?
   - Is the diagram complete and understandable?

3. Prioritize the list to indicate which factors to focus on first.

Time
30-40 minutes

Handout

Instructions for
Identifying Root Causes

1. Place the current effect in the box with the long arrow (effect arrow) heading to it.

2. Identify the major categories of factors that contribute to the problem. This will help the team organize the causes. Some common categories in school settings are **people, policies, procedures, public,** and **physical plant.** Use any category that helps participants think creatively. Place each category in a box with an arrow pointing at the effect arrow.

3. Brainstorm the factors that contribute to the problem, or effect. Ask: "What causes this factor?" The answers are written on the diagram with arrows connecting them to the appropriate main category.

4. Continue to ask "why" in order to identify root causes.

5. Use the following criteria to evaluate your diagram:

   - Is the effect clearly stated?
   - Are all potential factors listed?
   - Are all factors categorized or did some fall outside the major categories?
   - Do all factors relate to the effect?

6. Is the diagram complete and understandable?

Root Causes Diagram

16 **Planning
for
Rigorous and
Relevant
Learning**

Purpose   In this activity, participants work through a lesson using the Performance Planning steps and the Rigor/Relevance Framework.

Preparation
- Make copies of **Performance Planning** worksheet
- Make copies of **Performance Planning Example** handout and the **Traditional Lesson Plan** handout on which it is based
- Make copies of the **Rigor/Relevance Framework** handout
- Have available the Curriculum Matrix

Procedure   1. Have teachers work individually or with a partner from the same grade or same subject.

2. Distribute the Performance Planning Example handout and the Traditional Lesson Plan for teachers to review.

Time
2 hours

3. Have teachers use the Performance Planning worksheet to develop an instructional plan for a familiar topic. The unit should focus on a single narrow topic for which it is natural to develop 4-6 expected competency statements.

4. Remind participants to rate both the Application and Knowledge levels for the expected skills and knowledge on the Rigor/Relevance Framework.

5. After participants have developed some materials through the first six steps, have them share their work with other participants and provide each other with feedback. Look for consistency between degree of application and instructional activities (i.e., if the expected Application Model level is real world (Level 4 or 5), then the Student Work should reflect real world).

⬡ **Worksheet**

Performance Planning

1. **Definition -** What is the focus of the instructional unit (discipline(s), topic, area, theme, setting, or time)?

2. **What are the related standards and Curriculum Matrix priorities?**

3. **Competencies** - What are students expected to know and be able to do and at what levels on the Rigor/Relevance Framework?

Competency	Knowledge Level	Application Level	R/R Quadrant

Performance Planning Worksheet, continued
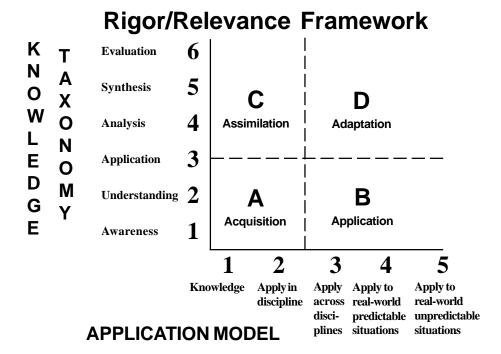
4. **Student Work** - What student work will you expect of students and use to measure achievement?
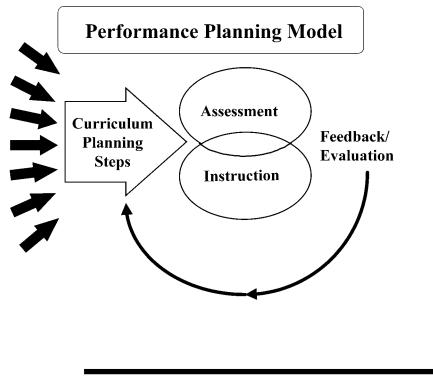
5. **Content** - What content will students need?

6. **Big Ideas** - What key questions will trigger student interest and/or what concepts are important to develop?

7. **Assessment and Instruction** - What assessment and instructional activities, methods, and strategies will be effective in helping students meet the competencies?

Rigor/Relevance Framework

KNOWLEDGE **TAXONOMY**

Evaluation	6
Synthesis	5
Analysis	4
Application	3
Understanding	2
Awareness	1

C Assimilation

D Adaptation

A Acquisition

B Application

1   2   3   4   5

Knowledge | Apply in discipline | Apply across disciplines | Apply to real-world predictable situations | Apply to real-world unpredictable situations

APPLICATION MODEL

Performance Planning Model

Curriculum Planning Steps

Assessment

Instruction

Feedback/ Evaluation

Performance Planning Example

1.   Definition - What is the focus of the instructional unit (discipline(s), topic, area, theme, setting, or time)?

Mathematics – Grade 8
Applied activity to reinforce proportions
Incorporate Language Arts skills

2.   What are the related standards and Curriculum Matrix priorities?

Mathematics Standards –Standard 3 - Mathematics (Intermediate)
Number and Numeration
• use numbers in a variety of equivalent forms (integer, fraction, decimal, percent, exponential, expanded and scientific notation).
• understand and apply ratios, proportions, and percents through a wide variety of hands-on explorations.

Operations
• add, subtract, multiply, and divide fractions, decimals, and integers.
• apply concepts of ratios and proportions to solve problems.

Modeling
• visualize, represent, and transform two- and three-dimensional shapes.
• use maps and scale drawings to represent real objects or places.

Measurement
• estimate, make, and use measurements in real-world situations.
• select appropriate standard and nonstandard measurement units and tools to measure to a desired degree of accuracy.

English Language Arts Standards - Standard 1 - Listening and Reading for Information (Intermediate)
• integrate and analyze information from charts, diagrams, etc.
• relate new information to prior knowledge and experience.

Curriculum Matrix Priority

Measurement – Medium Priority (Low on Test but High on Public Survey)
Ratios and Proportion – High Priority (Medium on Test and High on Public Survey)

Performance Planning Example, continued

3. **Competencies** - What are students expected to know and be able to do and at what levels on the Rigor/Relevance Framework?

Competency	Knowledge Level	Application Level	R/R Quadrant
Make accurate measurements	3	4	B
Estimate scale model size and proportion	3	4	B
Construct scale model	3	2	A
Write up experiences of constructing model	4	2	C
Understand appropriate scale	4	2	C

4. **Student Work** - What student work will you expect of students and use to measure achievement?

Students submit scale models made from various materials, a sheet of measurements and mathematical computations, and a written Project Report form with photograph attached

5. **Content** - What content will students need?

numbers in a variety of forms (integer, fraction, decimal, percent)
ratios, proportions
visualize, represent, and transform two- and three-dimensional shapes
scale drawings to represent real objects
measurements
apply formulas in direct measurement activities

6. **Big Ideas** - What key questions will trigger student interest and/or what concepts are important to develop?

How would you construct a very large scale model? (key question)
How would you construct a small scale model? (key question)
Selecting proper scale for model/job (big idea)

7. **Assessment and Instruction** - What assessment and instructional activities, methods, and strategies will be effective in helping students meet the competencies?

Review concepts of proportion
Demonstrate constructing a scale model box
Assign student projects to create a scale model, including write-up and reflection
Use scoring guide to assess projects and write-ups

Traditional Lesson Plan
Proportions, Models, and Similar Figures

Handout

Learning Context

Students use their knowledge of algebra, measurement, and geometry to analyze a problem. They design and construct a model and then communicate in writing what they have accomplished.

This project is designed to emphasize the importance of proportions. Student models created for the project will be used to introduce similar figures in geometry. The mathematical concept of proportions is one of the most important for students to master. Proportions are widely used in mathematics relating to topics ranging from geometry to algebra to trigonometry and to probability and statistics. Proportions are also important in earth science, biology, chemistry, and physics.

This learning experience is based on the following learning standards and specific performance indicators.

Mathematics Standards
Standard 3 - Mathematics (Intermediate)
Number and Numeration
• use numbers in a variety of equivalent forms (integer, fraction, decimal, percent, exponential, expanded and scientific notation.)
• understand and apply ratios, proportions, and percents through a wide variety of hands-on explorations.
Operations
• add, subtract, multiply, and divide fractions, decimals, and integers.
• apply concepts of ratios and proportions to solve problems.
Modeling
• visualize, represent, and transform two- and three-dimensional shapes.
• use maps and scale drawings to represent real objects or places.
Measurement
• estimate, make, and use measurements in real-world situations.
• select appropriate standard and nonstandard measurement units and tools to measure to a desired degree of accuracy.

• develop measurement skills and informally derive and apply formulas in direct measurement activities.
Uncertainty
• use estimation to check the reasonableness of results obtained by computation, algorithms, or the use of technology.

English Language Arts Standards
Standard 1 - Listening and Reading for Information (Intermediate)
• integrate and analyze information from charts, diagrams, etc.
• relate new information to prior knowledge and experience.

Procedure

Students are asked to choose an object, whether it be a crayon, a table, or a TV. They are instructed to measure all of the dimensions of their object. Then they set up a proportion in order to reduce or increase the measurements of their object. All measurements, proportions and calculations should be neatly labeled and written on loose-leaf paper to be turned in with their project. Next, students build a scale model of their object using the new dimensions.

When students bring their completed projects to school, they are asked to fill out a Project Report form summarizing what they have accomplished and learned. Models are photographed and attached to each Project Report.

Instructional and Environmental Modifications
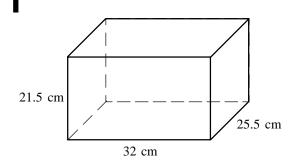
This project works well in classes with a wide range of student abilities. An in-depth explanation of the project is helpful. On the day the project is assigned, do a demonstration lesson and build a scale model of a box according to the same procedures students will follow for their assignment. The project is assigned and then discussed.

The following sample was modeled so that all students would know what had to be done.

continued

Traditional Lesson Plan, continued

Proportions Project

Dimension	Old Measurement	Proportion	New Measurement
Height	21.5 cm	$\dfrac{new}{old} = \dfrac{12}{21.5}$	12 cm
Length	32 cm	$\dfrac{12}{21.5} = \dfrac{n}{32}$	17.9 cm
Width	25.5 cm	$\dfrac{12}{21.5} = \dfrac{n}{25.5}$	14.2 cm

21.5 cm
25.5 cm
32 cm

Time Required
Planning of the project was approximately 2 hours. Students were given 4 weeks to work on their project at home. Assessment and photographs of 15 projects took approximately 15 hours.

Resources
For the project demonstration you need a box, ruler, construction paper, scissors, and tape. Students use a variety of materials. Models are made of cardboard, construction paper, contact paper, wood, paper mache, or felt and other materials. Students use rulers and string for measurements and calculators for computations. Markers, crayons, glue, tape, and scissors are also useful materials.

Assessment Plan
Projects are graded using the following rating scale.

RATING FOR PROPORTION PROJECT
Total Score (100 points)
1. **Mathematics** (40 points)
Correct use of a scale factor (5 points)
Clear presentation of material (5 points)
Correct proportions (10 points)
Correct calculations (15 points)
(percentage of correct calculations)
Correct rounding of decimals (5 points)
2. **Degree of Difficulty** (10 points)
Simple rectangular prism (1-3 points)

Simple cylinder (3-5 points)
Combination rectangular prism & cylinder (5-7 points)
Complex combinations of figures (8-10 points)
3. **Model Design** (30 points)
Built to scale (10 points)
Neat (10 points)
Creative (10 points)
4. **Project Report Form** (20 points)
Question #1 Explain what you did for this project. (5 points)
Question #2 Did you have a plan for the project. (2 points)
Question #3 What materials did you use? (3 points)
Question #4 What did you like best about the project? (3 points)
Question #5 What did you like least about this project? (3 points)
Question #6 What did you learn from this project? (4 points)

Student Work
Students submit scale models made from various materials and a sheet of measurements and mathematical computations. Students also complete a written Project Report form and a photograph is attached.

Source: Joanne Scollan, Farmingdale Central Schools, New York State Academy for Teaching and Learning

17 **Which Instructional Strategies Work Best?**

Purpose   This short activity helps teachers make the connections between the Rigor/ Relevance Framework and the instructional strategies they use.

Preparation   •   Make copies of the handout **Instructional Strategies** and the worksheet **What Works Best**?

Procedure

1. Discuss the definition of instructional strategies and ask participants to write down a few strategies they use in teaching.
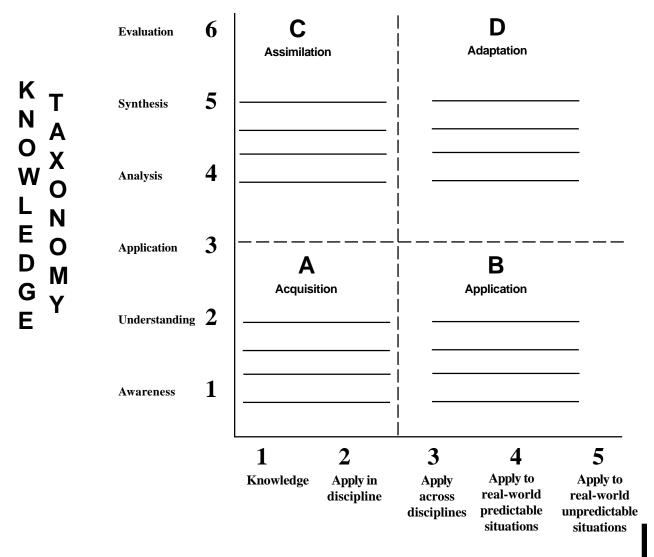
2. Have teachers share in pairs their lists of strategies.

Time
20 minutes

3. Have pairs report out. List the group's compilation of strategies.

4. If the group is not familiar with the Rigor/Relevance Framework, explain it.

5. Have each teacher complete the worksheet What Works Best?

6. Use a go-around to have teachers report out strategies listed in each quadrant.

⬡ **Worksheet**

What Works Best?

Certain instructional strategies work better than others depending on the quadrant of the Rigor/Relevance Framework in which the learning objective falls. List two or three instructional strategies that you think would be effective in each of the four quadrants.

Rigor/Relevance Framework

Evaluation **6**	**C** Assimilation	**D** Adaptation
Synthesis **5**		
Analysis **4**		
Application **3**	**A** Acquisition	**B** Application
Understanding **2**		
Awareness **1**		

K N O W L E D G E **T A X O N O M Y**

1	**2**	**3**	**4**	**5**
Knowledge	Apply in discipline	Apply across disciplines	Apply to real-world predictable situations	Apply to real-world unpredictable situations

APPLICATION MODEL

Instructional Strategies

Handout

Brainstorming stimulates thinking and allows students to generate vast amounts of information and then sort that information in an engaging learning process.

Community service involves learning opportunities in which students do unpaid work that adds value to the community.

Compare and contrast learning activities require analysis to identify similarities and differences.

Cooperative learning places students in structured groups to solve problems by working cooperatively.

Creative arts are artistic products or performances that can also be used to develop skills in other curriculum areas.

Demonstration involves direct observation of physical tasks, such as the manipulation of materials and objects.

Games are exciting, structured activities that engage students in individual or group competition to demonstrate knowledge or complete an academic task.

Group discussion is any type of verbal dialogue among students used to explore ideas related to an instructional topic.

Guided practice refers to homework, worksheets, and computer practice wherein students solve routine problems to reinforce concepts or skills.

Inquiry engages students in posing questions around an intriguing investigation, making observations, and discussing them.

Instructional technology means a multimedia computer application that provides a choice of learning paths and enables tailoring of programs to student questions or interests.

Internship is a formal placement in an employment situation for additional learning while the student is still in school.

Lecture is a verbal presentation of knowledge by the teacher to the students, often supplemented by visuals and handouts.

Literature is reading to discover use of language; acquire information about people, history, cultures, and society; and develop skills of analysis, inquiry, logic, and recall.

Memorization is rehearsal for the recall of facts using techniques for remembering information, including mnemonic devices.

Note-taking/graphic organizers involves organizing logical notes for reference and using graphics, diagrams, and symbols to represent information.

Presentations/exhibitions are oral presentations by students requiring them to organize ideas and express them in their own words.

Problem-based learning introduces concepts through use of problem-solving skills on a real problem or investigation.

Instructional Strategies Handout, continued

Project design requires students to integrate their skills and knowledge to create their own literary, technological, or artistic work, as individuals or in a group.

Recognition and rewards are motivational techniques used by teachers to provide positive feedback to students on their successful efforts and achievement.

Research means students locate and retrieve information from several sources, such as library references, textbooks, other individuals, and electronic databases via the Internet.

Review and **re-teaching** refers to teachers' planned efforts to review previously learned content and assist students who may not have fully acquired the knowledge.

Setting objectives and **advance organizers** are initiating techniques teachers use to engage students in learning, including emphasizing what will be learned and presenting engaging questions or activities.

Simulation/role playing replicates the way skills or knowledge are used outside school, ranging from role playing to computer-generated virtual reality.

Socratic seminar combines the elements of teacher questions, inquiry, and discussion around key topics, with the teacher asking probing questions as needed.

Teacher questions stimulate significant student thinking in response to thoughtful queries about connections with new information.

Total physical response requires students to engage in a physical activity as well as mental processes.

Video provides new information to students through visual presentation ranging from full-length commercial movies to short information or news segments.

Work-based learning presents opportunities for students to learn through on-the-job experiences ranging from job shadowing to full employment.

Writing makes students organize their knowledge and reinforces concepts in any form from a one-paragraph test-question response to a multi-page research report.

18 **Linking Standards and Student Work**

Purpose   The purpose of this activity is to help teachers think of instruction in terms of student work. Teachers first reflect on examples of student work and then relate student competencies to specific types of student work that might be used to achieve those competencies.

Preparation
- Make copies of worksheets **Linking Your Standards and Student Work** and **Practice Linking Standards and Student Work**
- Make copies of handout **Examples of Student Work**

Procedure

1. Review terms related to the standards (performance indicators, competencies, etc.) and student work.

2. Have teachers brainstorm typical student work that they facilitate in their classrooms.

Time
30-45 minutes

3. Review the Student Work handout and have teachers fill out the Practice Linking Standards worksheet.

4. Working individually or in pairs, have teachers list competencies/topics from the standards in the left column of the Linking Your Standards and Student Work worksheet and types of student work that could be facilitated to develop that competency in the right column. Refer them to the Examples of Student Work handout to stimulate their thinking further.

Worksheet

Practice Linking Standards
and Student Work

Directions: For each of the standards, list student work that would enable students to learn that standard. Start with a generic type of student work and complete the item with a specific task related to that area of learning.

Example:

Standard/Topic	**Student Work**
use maps and scale drawings to represent real objects or places	construct a scale model of a house

Standard/Topic	**Student Work**
Apply in writing the rules of grammar, punctuation and spelling	
Gather information from a variety of sources and summarize and analyze	
Follow oral directions	
Know how to decipher unfamiliar words	
Perform operations with numbers including decimals, ratios, percents, and fractions	
Understand characteristics of parallel lines	
Understand best procedures for statistical data collection, organization, and display	
Understand how and why rotation and revolution of Earth affect day, seasons, and weather	
Understand systems of human body	
Make observation of the local environment using senses and instruments	

Worksheet

Linking Your Standards
and Student Work

Directions: In the left column, place topics from the standards assigned to your grade level or from your course of study. Opposite each entry, list student work that would enable students to learn that topic. Start with a generic type of student work and complete the description with a specific task related to that topic.

Standard/Topic	Student Work
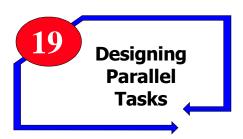
Examples of Student Work

- Advertisement
- Audiotape
- Autobiography
- Banner
- Biography
- Brochure
- Business
- Cartoon
- Chart
- Children's book
- Coat of arms
- Collection
- Community service
- Composition
- Constitution
- Construction
- Contract
- Correspondence
- Crossword puzzle
- Debate
- Defense
- Demonstration
- Design
- Diagram
- Diorama
- Discussion
- Display
- Dramatization
- Drawing
- Editorial
- Essay
- Eulogy
- Evaluation

- Exhibit
- Experiment
- Fable
- Family tree
- Field guide
- Flag
- Game
- Graph
- Icon
- Interview
- Invention
- Joke
- Journal
- Letter
- Log
- Machine
- Magazine
- Manufacturing process
- Map
- Memo
- Memoir
- Mnemonic
- Model
- Mosaic
- Mural
- News report
- Newspaper
- Oral history
- Oral report
- Painting
- Petition
- Photo album
- Play
- Poem

- Poster
- Production process
- Proposal
- Puppets
- Questionnaire
- Questions
- Rap
- Relief map
- Research report
- Resume
- Rules
- Scale model
- Scrapbook
- Script
- Sculpture
- Shadow box
- Sketch
- Skit
- Slide show
- Software application
- Solution
- Song
- Speech
- Story
- Survey
- Taxonomy
- Teach a lesson
- Test
- Theory
- Time capsule
- Totem pole
- Videotape
- Website

19 **Designing Parallel Tasks**

Purpose

In this activity, teachers design a test question that parallels a question on the exam. In the process, teachers become more familiar with the state standards and assessments.

Parallel task design has three purposes.
- It gives the teacher a framework for better understanding state assessment tasks.
- It enables the teacher to administer test prototypes that can predict students' performance on similar state assessment tasks.
- It prepares students for the test.

The last purpose is the most important. Students become familiar with the type of question, the time allowed, the scoring rubric, and the procedural information and strategies contained in the task.

Preparation

Have copies of the following:

- State standards, curriculum resource guides, and local/district standards
- Instructional materials and resources
- Sample test questions/tasks (often found on state education department's Website; old tests may be used provided specifications haven't changed)
- Related scoring guide (from test administration materials)

Procedure

1. Review the purposes of parallel question design.

2. Provide teachers with a sample test question.

Time
2 hours
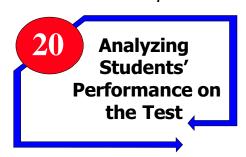
3. Have teachers individually analyze the question and determine:

- What knowledge and skills do students need?
- What do teachers need to know to help students perform well on the question?
- What are the related standards and performance indicators contained in the question?
- How is the question scored?
- What time limitation, if any, is part of the question administration?

Designing Parallel Tasks, continued

4.   Have teachers work in small groups to develop a parallel question. The groups need to:

- Identify a context for a new question.
- Identify what the students need to know and be able to do.
- Correlate the knowledge and skills with the Rigor/Relevance Framework.
- Design the question components.
- Create an exemplary response.

5.   Have teachers administer the question to students and assess the effectiveness of the design.

- Is the question clear?
- Will students who have the required skills and knowledge answer it well consistently?
- Does the question measure the intended standards and indicators?
- Is the scoring procedure clear?

20 Analyzing Students' Performance on the Test

Purpose

Students' completed test papers can reveal a great deal more than the overall score does. This activity engages teachers in analyzing test papers closely to determine the academic intervention services students need and to modify instruction to ensure students' success.

Preparation

- Make copies of **Analyzing Test Performance** worksheet
- Have available students' completed test papers

Procedure

1. Working in groups by grade level or course, have teachers group test papers by lowest and highest scores (e.g., the 10 highest and 10 lowest papers or a percentage of papers determined by the group based on the total number).

Time
2 hours

2. In a collaborative dialogue, the group discusses each question or task, the students' work, and the results in order to identify trends and patterns in students' performance.

3. Have groups complete the Analyzing Test Performance worksheet.

4. Have the groups describe the instructional implications of their analysis and identify the types of academic intervention services needed. These services may include: additional instruction (e.g., extra time for focused instruction or additional staff to increase student-teacher contact time); and/or support services (e.g., guidance, counseling, study skills development, attendance improvement activities).

5. Based on the information identified, have each group design a process for action research. Action research engages teachers in "trying out" experimental designs in their classrooms. The design might be a new instructional strategy or approach or a new way of grouping students. Teachers collect evidences of the differences that result, particularly noting the progression of student achievement under these new approaches.

6. Have each group report out the most significant finding/suggestion for instructional improvement to the group at large.

59

Worksheet

Analyzing Test Performance

Lowest Scoring Papers

A.   Knowledge and Skills Students Can Demonstrate

B.   Deficit Knowledge and Skills

C.   Instructional Implications

D.   Academic Intervention Services

E.   Plan for Action Research

continued

Analyzing Test Performance, continued

Highest Scoring Papers

A. Knowledge and Skills Students Can Demonstrate

B. Deficit Knowledge and Skills

C. Instructional Implications

D. Plan for Action Research

21 **Identifying Academic Intervention Strategies**

Purpose

One of the challenges of requiring all students to pass state tests is that some students will have difficulty achieving high levels of performance. Rather than failing these students and having them repeat a course or grade, schools are taking a fresh look at practices that can assist students in meeting higher standards. Part of the new approach is to initiate interventions as soon as poor student achievement is noted, either by teacher observation or on a standardized test.

Academic intervention services fall into two categories: **instructional services** and **support services**. Instructional services provide intensive academic tutoring/coaching to students. Support services include all the non-academic services that can address obstacles to learning.

This activity will stretch participants' thinking about procedures to identify students who require academic assistance and the range of services and types of interventions that have the potential to meet the needs of these students.

Preparation

- Make copies of the worksheet **Academic Intervention Services** and the handout **Examples of Academic Intervention Services**

Procedure

1. Introduce concept of academic intervention services.

2. Divide teachers into groups of 6-8 people who work at the same grade level or with a "house" of students. Have them discuss the standards and review student results on the state test.

3. Working individually, have teachers complete Section A. Difficult Skills and Knowledge and Section B. Characteristics of Low Performing Students on the Academic Intervention Services worksheet.

4. Working in pairs, have teachers share their thoughts. Then have them take turns making additions to their lists and drafting Section C. Academic Intervention Services.

5. Hand out Examples of Academic Intervention Services. Have pairs read this list and add any additional idea(s) to their individual lists of academic intervention services.

6. Now ask the small group to share the academic intervention services and develop a priority listing of those services most needed in each group.

Time
60 minutes

Worksheet

Academic Intervention Services

Academic intervention services are changes or additions to regular instruction that offer the potential to assist students in achieving higher standards. Academic Intervention Services include direct instruction as well as school support services.

| Section A | **What categories of skills and knowledge in the standards and assessments create the most difficulty for your students?** |

| Section B | **Thinking about your students who have the greatest difficulty meeting the standards in Section A, list several of the characteristics of these students.** |

| Section C | **List several instructional services that will help students meet high standards. What support services are needed to make the additional help most effective?** |

Examples of
Academic Intervention Services

Instructional Services

- Alternative location of teaching
- Computer-based individual instruction
- Distance Learning supplemental classes
- Extended day (before or after school)
- Extended length or frequency of classes
- Homework club
- Longer class period
- Modification of teaching methods
- More frequent class sessions
- More individualized regular instruction
- Peer tutor
- Reduced class size
- Reduced frequency of other classes
- Repeat courses
- Stretch courses (3 semesters to cover 2 semester course)
- Study skill instruction
- Summer school
- Teacher assistant
- Team teaching
- Progress monitoring

Support Services

- Attendance improvement
- Counseling
- Discipline procedures
- Family intervention
- Heath and nutrition counseling
- Safe house
- Study room
- Study skills

22 Peer Review of Lessons

Purpose

The objective of peer review of lessons is to help teachers improve instruction. This activity offers a clearly defined process that outlines the roles and responsibilities of the reviewers and the teacher whose practice/work is being reviewed. Criteria for the review are included as well.

Preparation

Ahead of Time
- Give teachers several weeks advance notice of the opportunity to participate in the review. Provide them with a copy of the worksheet **Lesson Submission Form** to fill out as well as the **Criteria for Lesson Review** worksheet for their information.
- Identify 6-8 reviewers who teach the same grade or subject as the presenting teacher.

For the Review
- Make copies of the **Criteria for Lesson Review** worksheet for the reviewers and the completed **Lesson Submission Form** from the teacher

Procedure

Review of Lesson Presentation

1. **Introduction** — The facilitator gives an overview of the format, asks for a recorder, and distributes to each reviewer the **Reviewer's Worksheet**. (5 minutes)

Time
60+ minutes

2. **Teacher Presentation** — The teacher outlines the learning experience, providing information on the context in which the work was done, the targeted learning standard(s), and the performance indicators. The teacher may suggest a focus question for the review. (10 minutes)

3. **Quiet Time** —All reviewers read the **Lesson Submission Form**, examine all corresponding materials, and take notes on the Reviewer's Worksheet. (10 minutes)

Peer Review of Lessons, continued

4. **Reviewers' Feedback** —Reviewers provide warm feedback (supportive and empathetic responses that emphasize the promise of the learning experience) and cool feedback (critical and comparative responses that emphasize the ways in which the learning experience could be enriched). The teacher listens and takes notes. (10 minutes)

5. **Teacher Response** — The teacher responds to the peer reviewers' comments. Reviewers become the active listeners. (10 minutes)

6. **Full Group Conversation** — Both teacher and reviewers engage in open conversation about the learning experience. (10 minutes)

7. **Summary** — The recorder summarizes the session, reviews references made to the criteria, and offers a general overall impression. (5 minutes)

8. **Consultation** — The facilitator, recorder, and teacher confer and complete a written report so that the teacher has immediate feedback on the learning experiences.

Worksheet

Peer Review
Lesson Submission Form

Please write up the lesson to be reviewed, addressing each of the categories.

Lesson Title_____Your Name _____

Learning Context
What is the purpose, objective, or focus of the learning experience, including the learning standard(s) and the specific performance indicators being assessed? Where does this experience fit in the school or course curriculum? What do students need to know and/or be able to do to succeed with this learning experience?

Outline and Timetable
Outline the major aspects of the lesson, state the amount of time for preparation and implementation (length of class period and number of days to implement the lesson).

Procedure
Describe, in narrative form, your actions and the actions of students including how the learning experience supports student progress toward attainment of the learning standards, reflects current scholarship in your field and "best" classroom practice, and incorporates technology (when used).

Lesson Submission Form, continued

Reflection
Why was this lesson developed? What did you learn from implementing it? How effective was it?

Resources
List unique resources (human or material) needed to complete this experience successfully, both for the student and for you.

Instructional/Environmental Modification
Describe the procedures used to accommodate the range of abilities in the classroom, including students with disabilities, students with limited English proficiency, or bilingual students.

Student Work
What products will students produce? Attach examples or photographs of student work reflecting different levels of student performance.

Assessment Plan
Describe the manner in which students are evaluated and reflect on their work. Submit any assessment tools used to document student progress (e.g., scoring guides, rating scales, checklists).

Worksheet

Criteria for Lesson Review

I. RELATION TO LEARNING STANDARDS

This learning experience clearly links to performance indicators/topics/benchmarks for the specified learning standard(s). It requires students to understand and use ideas, perspectives, tools and/or methods that are central to the learning standards.

❏ Excellent	❏ Good	❏ Fair	❏ Poor
Comments:			

II. RIGOROUS

The learning experience is appropriately challenging in academic rigor, allowing students to think independently and extend their knowledge.

❏ Excellent	❏ Good	❏ Fair	❏ Poor
Comments:			

III. REAL-WORLD RELEVANCY

The learning experience relates to a problem or situation connected to the world beyond school and allows students to focus on a real audience for a real purpose.

❏ Excellent	❏ Good	❏ Fair	❏ Poor
Comments:			

IV. ENGAGEMENT

The learning experience allows students to become actively engaged in tasks that lead directly toward the learning objectives.

❏ Excellent	❏ Good	❏ Fair	❏ Poor
Comments:			

Criteria for Lesson Review, continued

V. ASSESSMENT PLAN

The learning experience incorporates elements of good assessment: clear criteria to guide work, feedback on work in progress, and reflection on work completed.

❑ Excellent	❑ Good	❑ Fair	❑ Poor
Comments:			

VI. ADAPTABILITY

The learning experience is adaptable to other classrooms and other students. It does not require a narrow student population, undue expenses, or extraordinary circumstances.

❑ Excellent	❑ Good	❑ Fair	❑ Poor
Comments:			

VII. TECHNOLOGY INTEGRATION

The technology, if used, assists students in achieving the learning standard addressed in the assessment plan.

❑ Excellent	❑ Good	❑ Fair	❑ Poor
Comments:			

VIII. PRESENTATION

The learning experience is clearly written and fully developed so other teachers have a real understanding of what is happening in the classroom and can relate to it.

❑ Excellent	❑ Good	❑ Fair	❑ Poor
Comments:			