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ABSTRACT

Information, a process model, and resources are presented in this guidebook to help staff and administrators design, initiate, and implement a local indicator system that will provide them with hard data to aid decision making. The introduction defines quality indicators and the indicator system and explains the system's local policymaking uses. Section 2 discusses the characteristics of some indicator systems and provides examples of current models. Definitions of content, student performance standards, and system delivery standards are also offered, and a general process that transforms indicator systems into statistics and information for decision making is described. The third section proposes a local decision-making process model that involves the following stages: developing policy questions; collecting data; and utilizing data. Criteria for choosing indicators, and future trends are also discussed. The following resources are in section 4: a glossary of examples of state/district report cards; examples of indicators for school systems; key dimensions of the 50 state performance accountability systems; examples of content and student performance standards; Exchange of Permanent Records Electronically for Students and Schools (EXPRESS); California Student Information System (CSIS)/data categories; resource organizations and contact information; criteria for evaluation of student assessment systems; CRESST: Assessments in Practice Data Base Protocol; and the national education goals. Five figures are included. (Contains 53 references.) (LMI)

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Section I. Introduction

Goals and Overview of Sourcebook

School and district administrators are called upon to make a multitude of decisions ranging from the mundane to the academic. Examples of some of the decisions that come up include:

- Should we adopt this new program?
- Are these test items measuring the curriculum?
- Which textbooks should we choose?
- How can we tell if our students are learning the material?
- How many more bilingual teachers will we need next year?
- How many computers can we buy?
- Have changes in grouping practices affected the performance of higher achieving students?

To help administrators make such decisions, they are often bombarded with data: inundated with reports, quality indicators, data, and statistics that describe the nature of their school or district. These include test scores, attendance rates, discipline records, and numerous others. And although massive changes in the availability of data and technology have been seen, there has been little change in the uses of data. Often decisions are made without the support of data that are hard and timely, and data that are available are often old and are seldom well-suited to the decision at hand. Administrators are sometimes at a loss as to how to make a coherent whole out of the different sources of data and how to integrate them with their knowledge about their school or district. While they may have a tendency to make decisions based on their professional knowledge, they also have a nagging feeling that somehow these statistical data are important and must be attended to, especially if they can be used to support decisions. Some may be uncomfortable working with data, and may rely on other professionals to

interpret them. Many principals report they need help in interpreting test results (Herman, Winters, & Golan, 1990).

Needs of administrators and policymakers at local schools and districts have not received much attention in the development of systems of education indicators. This sourcebook is targeted at school and district staff, including principals, teachers, superintendents, and other management staff. Our aims are simple: to demonstrate that indicator data can be used as tools to improve school professionals' ability to make decisions and monitor progress over time, and to help them design processes for doing so.

The major goals of the sourcebook are the following:

- To describe ways in which districts and schools can develop and use indicator data;
- To show ways in which indicators and indicator systems are useful as tools;
- To propose a process to move from policy questions to indicators, to collecting data, to use of information for decisionmaking;
- To provide a set of resources and examples for school and district staff; and
- To explore how districts and schools can make use of and benefit from information derived from national and state indicator systems.

With the information, process model, and resources presented in this sourcebook, school and district-based staff and administrators should be able to design, initiate, and implement a local indicator system, including establishing standards and monitoring changes over time. Using such a system will provide local systems with hard data to help in decisionmaking.

Through its work, the Metropolitan Educational Trends and Research Outcomes (METRO) Center at Southwest Regional Laboratory (SWRL) seeks to improve the quality of information that is available at school and district sites for teachers, parents and administrators, and to promote the systematic use of data by principals and other administrators. Many metropolitan schools in this region are adopting formal programs for site-based management. However, little attention is being given to the kinds of

information and information services that site-level managers will need to do the job expected of them. Our objectives are to increase the capacity of site-based managers to make data-based decisions that lead to improvements in the quality of instruction.

What Is a Quality Indicator?

Statistics that measure important aspects of a system or provide information about the condition or health of a system are called *indicators*. One superintendents' group views indicators as "vital signs" regarding the health of the educational program and that point the way toward its improvement (Massachusetts Association of Superintendents, 1991). Indicators are generally useful in a policy context to assess how a system is working and whether progress is being made. *Indicator systems* refer to models of the central components of the entire educational system along with indicators for measuring each component (Shavelson et al., 1987). They provide a means for determining the types of changes that might be made to improve schools or districts. Indicators are becoming increasingly common in local school districts, where they are beginning to be used as management tools. However, with the exception of scores on standardized achievement tests and national dropout rates, education does not have a commonly accepted set of indicators to gauge its quality.

We can borrow from the field of economics, which is developed in this area. Everyone knows about several "leading economic indicators": the Dow Jones average, the unemployment rate, and the Gross Domestic Product (GDP). These measure the general economic health of our nation. Although economists in Washington, D.C., argue endlessly about the reliability of unemployment figures (because of differing definitions and methods of data collection), the rate is generally accepted as a good barometer of our economy's health and also is estimated at the state and local level. One problem in the education field, which is somewhat related to the unemployment figure arguments, is that states and districts use different ways to count schools and enrollments and use different

definitions for commonly used terms like dropout. Until 1987, states used over 10 methods to count schools and to report enrollments (CCSSO, 1986).

More potential indicators can be used in any given school or district, or even by state and federal policymakers. Consequently, there must be criteria for selecting them. One set of criteria maintains that indicators should:

- Measure the central features of schooling;
- Measure what is actually being taught or considered important to know;
- Provide information that is policy-relevant;
- Focus on the school site;
- Allow for fair comparisons across schools; and
- Maximize the usefulness of the data collected and minimize the burden of collecting it. (OERI, 1988, p. 5)

Although indicators can be useful in making decisions that will improve schools, there are some things that indicators *cannot do*:

- Set goals and priorities. Educational goals and priorities are established by the public through its elected representatives. The information generated by an indicator system can inform those objectives, but it is just one factor among many in shaping decisions about policy preferences and priorities.
- Evaluate programs. Social indicators cannot substitute for a well-designed, in-depth social program evaluation. They do not provide the level of rigor or detail necessary.
- Develop a balance sheet. Social indicators lack the common referent available to economic indicators...education cannot put each of its constructs on a common dollar metric (Shavelson et al., 1987, p. 8).

Why Do We Need Indicator Systems?

Although economic indicators have been in use for quite some time, education indicators are a relatively new phenomenon. How did they originate?

The publication of *A Nation at Risk* (National Commission on Excellence in Education, 1983) led to much policy activity, particularly at the state level, designed to improve schools. It has been difficult, however, for the public, policymakers, and

educational professionals to judge the effectiveness of reforms. Early attempts at tracking such effects using indicators, such as the Secretary of Education's Wall Chart, received much criticism based on two arguments. First, the use of the Scholastic Aptitude Test (SAT) and the American College Testing Program Test (ACT) was criticized because of extreme variations in the makeup of the population of students who took these tests in different states. Second, the Wall Chart data provided insufficient information about policies and practices that were amenable to change and would facilitate increased student achievement.

Since *A Nation at Risk* was published, there has been some extensive work, much of it funded by the National Science Foundation, to create new and better models and indicators of the quality of American education primarily to measure the progress of educational reform. Most of the work on education indicators has dealt directly with problems of monitoring changes in teaching science and mathematics, especially in junior and senior high schools. However, the questions that these indicators seem best suited to answer are fairly free of science or mathematics subject matter. Therefore, most of the work on indicator systems appears to be quite generalizable to many areas of the school curriculum.

In addition to much federal activity in the area of indicators, by 1991, over 35 states had developed indicator-based accountability systems, and many more are in the process of doing so (CCSSO, 1991). Current systems often focus on student achievement, and education accountability is generally defined in terms of accountability for outcomes (Malen & Fuhrman, 1991). Several states (including Arizona, California, and Nevada) have passed laws mandating school or district-level report cards. Although accountability per se is not a new phenomenon, the focus has changed in the past few years from a top-down state-level external control model to a focus on local cooperation with the state department of education and a local emphasis on self-improvement over

time. However, there is a lot of variation among states in the degree to which the state government has strict control over districts.

The public demand for accountability has forced school systems to produce information on student outcomes, thus the major focus of most accountability systems and report cards is on achievement outcomes. Recently, the focus has shifted from almost exclusive use of traditional multiple choice standardized tests to greater use of performance-based tasks tied to levels or standards of performance.

Why do we need indicator data? The generally accepted purposes of indicators are:

- to measure the health of the system;
- to monitor the progress of the schools over time;
- to provide descriptive data about the system, including strengths and weaknesses;
- to provide clues about how components of a system are related;
- to provide accountability systems with hard data and diagnostic tools; and
- to aid in federal, state, and local decisionmaking.

Shavelson et al. (1987) identify five functions that an indicator system might serve in the *policy context* of a national system of indicators. Four of them are equally relevant to management and policymaking at school sites:

- describing status, such as level of participation in science or mathematics by ethnicity, gender, and social class;
- providing an early warning by identifying emerging trends and problems such as sharp declines in achievement by certain subpopulations;
- identifying policies that appear to be succeeding or unintended consequences of policies that have been put into effect;
- supporting leadership in school reform, such as information that shows to what extent students are engaged in "hands-on" science.

In practical terms, what exactly can indicators and indicator systems do for school and district staff? According to one large district in Maryland that has developed such a system, indicator systems are invaluable tools for teachers and administrators

(Montgomery County Public Schools, 1991). After instituting a School-based Instructional Monitoring System (SIMS) in 23 pilot schools in 1991, and training principals and teachers in its use, Montgomery County ninth graders hit an all-time high in the percentage passing the Maryland Functional Reading and Math tests. Minority students made large gains as well. Three high school principals with high pass rates credited the SIMS system for helping them boost student scores, mainly by making it easy to quickly pinpoint students who needed help. According to an assistant superintendent in charge of the program, SIMS "gives principals and school leadership teams the mechanisms to monitor and evaluate their own effectiveness, as opposed to waiting to read a newspaper article to tell them how they're doing with kids." (Nurmi, Feb. 19, 1992, p. 1). How was this system useful? It helped teachers and principals to quickly pinpoint students who need help; plan instruction effectively; monitor school and student progress over time; monitor progress of special needs students; gain access to school and student information; and gain local control over student data (MCPS, 1991).

Indicators within such a system are not exactly the same as information in a traditional student information system. Instead of being external to the building, dated, and aggregated as in traditional systems, indicator systems can be internally built and controlled, easily kept up-to-date, and individualized. School staff can get involved and become knowledgeable about their school. With an internal system, staff will have more than data or statistics; they will have information they can use to make decisions, such as placement in special language programs or tutoring, amount of homework needed, or degree of availability of academic or honors classes.

Because indicator systems are based on models of schooling that propose relationships among inputs, processes, and outcomes of schooling, they can be used to decide whether changes in policies and programs are warranted. For example, disaggregating information about student enrollment in particular courses provides information that can help explain differential achievement. Girls, for example, are less

likely to enroll in higher level mathematics courses than boys, and their lower achievement scores seem related to this fact. In a high school, staff can look at local data that show differential course taking and achievement and decide what steps to take to increase female enrollment in math courses.

In 1989, a group of school superintendents, citizens, and staff from the Massachusetts Department of Education began a project to develop and test the usefulness of an array of background, process, and outcome indicators for public schools. In 1990, the project became a formal program of the Massachusetts Association of School Superintendents. The group is working to create a grass-roots approach to accountability that focuses on voluntary self-improvement. The association is working to get teachers involved in creating indicator systems by providing resources and stipends (Appendix C gives examples of indicators for school systems developed by the Massachusetts Association of Superintendents, along with a sample of data sheets used to collect indicator information on a spreadsheet).

A recent report of this group details the project and presents a case for the development of school indicators at the local level. It asserts that benefits to superintendents include the following:

- Improve the effectiveness of the school system and provide diagnostic tools for discovering improvement opportunities and allocating resources;
- Increase job satisfaction for school system employees by providing "how-are-we-doing" feedback; and
- Generate community understanding and support for the school system. Progress reports can help the community develop pride in the school system's accomplishments (Massachusetts Association of School Superintendents, 1991).

The Massachusetts group and others maintain that data or indicators have generally had little direct influence on planning or policymaking (David, 1988). There are several reasons for this. Indicators are only one of many sources of information. Many school decisions that can influence policy are made informally, and even formal decisions can be

made with little reference to a data system or indicator system. Because of this, data are not often collected, analyzed, or presented around particular issues. However, an indicator system built on a model of schooling provides a framework for developing indicators local staff will use. According to the Massachusetts group, an indicator system can be used for decisionmaking through strategic planning using site-based management (Massachusetts Association of School Administrators, 1991). There is some evidence that if school and district staff are involved in the creation of a districtwide indicator system, they are more likely to provide accurate information to make policy changes based on the data (McLaughlin & Pfeifer, 1986).

Using the example of access to high quality curricula, local staff could decide to improve the quality of the curriculum in certain classes, such as eighth-grade algebra. This would involve allocating resources, in terms of staff time and funds for staff development, differently from current practice. In addition, staff could decide to provide additional counseling to students to increase the numbers of certain subgroups that select challenging courses.

School sites have a stake in knowing more about dependable associations that exist between conditions of schooling and desired outcomes. Local managers are involved in making decisions having impacts that are intended to be long term. In one way or another, these decisions are attempts to deal with resources and how they are to be used; delivery of services to diverse subpopulations of students; standards for what will be taught, who will teach, and what students will be eligible to participate; goals in achievement that will be pursued; and outcomes that will be accepted.

As mandatory report cards or periodic quality reviews of districts and high schools become increasingly common, it is likely that indicator systems will be used more in districts, as they can provide evidence of school improvement. For example, in California, every district and school is bound by the state Department of Education's Program Quality Review that mandates reviews every several years. It builds on a school

improvement model involving content standards. Quality criteria include specific aspects of the curriculum in the content areas and schoolwide policies and processes that shape and support instruction. In addition, school performance reports which report on how a program compares with quality criteria are released every year. Indicator systems will facilitate the implementation of such reviews and improvement efforts, whether or not they are mandated.

Despite accountability pressures and their obvious benefits, school use of indicators is not widespread for several reasons. Few school or district staff have participated in the creation of indicator systems, thus may not feel ownership. Some local schools and districts will participate in collecting data for national or state indicator systems, but the data they generate is not likely to be information they can use. Another reason may be that most indicators have focused on student achievement as measured by traditional standardized tests, which some believe lack validity. Many principals believe that test scores receive too much attention because of emphasis placed on them by state and district officials. Another reason may be that state reports are often too complex and contain too many indicators to be useful to local school staff.

There are other local concerns about the use of indicators. Cost is part of the problem. In particular, indicators that require fairly precise accountings of teacher and student engagement or specific activities in the classroom (process indicators) over an extended period may be put aside. However, some data available on the school level (for example, course offerings or teachers assigned out of field) may be easily obtainable for little or no cost in schools. Additional concerns about the use of indicators include unfair comparisons with others, teaching to the tests, and the belief that some indicators are impossible to measure precisely.

Many of these concerns can be mitigated if local schools design their own indicator systems. Some superintendents believe that national and state indicators are not sensitive to the central issues of schooling, thus the local schools should design their own

indicators (Massachusetts Association of School Superintendents, 1991). Local districts and schools do have needs for information that will support local policymaking, and they have a growing capacity to satisfy more of their own needs. Many districts have very good technology and easy-to-use software for data management. The investment needed to provide training and staff development that will greatly enhance the capacity of sites to generate and maintain databases of their own is modest. And the payoffs in terms of community support, school and district staff involvement and job satisfaction, and the availability of diagnostic tools for judging progress over time should make indicator use desirable to local staff.

The purpose of this sourcebook is to help local staff develop and use indicators so the decisions they make are more likely to lead to the outcomes they desire. It is organized in the following way.

Section II discusses characteristics of some indicator systems, the major indicator realms, and examples of existing indicator system models. Definitions of content, student performance standards, and school and system delivery standards are provided. A general process to transform indicator systems into specific indicators and then into statistics and information for decisionmaking also is presented.

Section III is practical and hands-on. A process model for local decisionmaking is proposed that moves from policy questions to indicators to collecting data to use of information for decisionmaking. Criteria by which to choose indicators are presented. Ways in which staff can use indicators for decisionmaking are described. Examples of models and indicators used commonly are presented. Probable future trends also are discussed, including federal, state, and local student information systems developments.

Section IV is a resource section that presents information and material that may be useful for school and district staff in developing indicators, report cards, or assessment systems of their own. Resources that were selected were those that may provide useful

information, guidance, and assistance to local administrators. The appendices include the following:

- •A glossary of indicator and assessment terminology;
- •Examples of state/district report cards;
- •Examples of indicators for school systems;
- •Key dimensions of state performance accountability systems;
- •Examples of content and student performance standards;
- •EXPRESS system description;
- •California Student Information System (CSIS) data categories;
- •Resource organizations and contact information;
- •Criteria for evaluation of student assessment systems;
- •CRESST: Assessments in Practice Data Base Protocol; and
- •The National Education Goals.

Section II. Indicator Systems

Indicator Systems: Existing Models

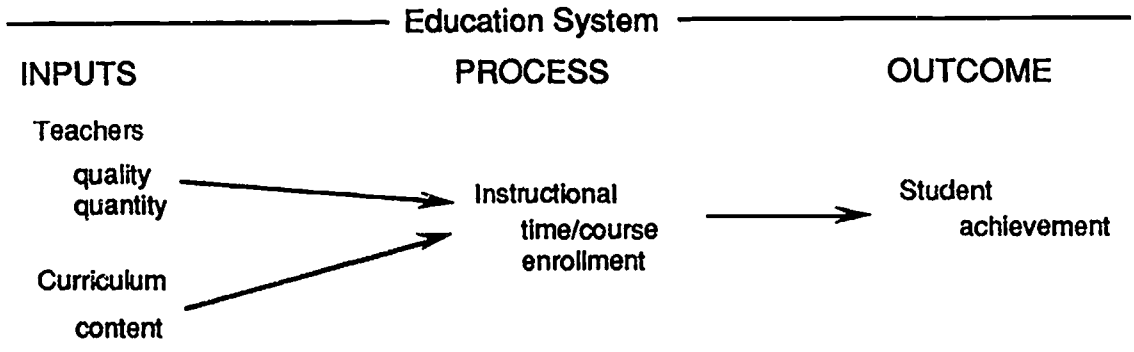
Since 1983, there has been a great deal of work in designing systems of education indicators. Most major projects or working groups have dealt in one way or another with creating some kind of national model that captures the most salient features of schooling and associated outcomes. As previously noted, *indicator systems* refer to models of the central components (such as staff, curriculum, and fiscal resources) of the entire educational system, along with indicators for measuring each component (Shavelson et al., 1987). No general comprehensive indicator system is available for education.

Indicator systems need to be useful for policymaking. They need to reflect theory and research about the relationships among the variables indicators represent. Then, when a policymaker looks at outcomes of interest, he or she has prior information about what inputs and process may need to be changed to improve outcomes.

Most of the recommendations for indicator systems feature some version of an input-->process-->output model that flows from characteristics of the community and the population served, through characteristics of the school itself, to characteristics of learner outcomes. Student achievement is the primary outcome in all of the indicator models, although other variables, such as enrollment in advanced courses and occupational or career choices made after graduation are considered.

Several examples of indicator systems may be useful to local policymakers who want to develop their own systems. A very simple model of schooling (Figure 1) was used by Raizen and Jones (1985, p. 12) to select the National Research Council's (NRC) set of education indicators. It includes four realms (teachers, curriculum, instruction, and achievement), three input variables (teacher quality, teacher quantity, and curriculum content), two process indicators (time spent in courses and enrollments) and one output variable (student achievement). Two additional variables, expenditures and public attitudes were considered by the NRC committee. These variables were not included in the selection of indicators, mainly because the committee could find no strong research-based relationships between these variables and schooling outcomes.

Figure 1
National Research Council model.



Later models were more extensive and included considerably more detail. For example, RAND's basic model of schooling (Shavelson et al., 1987, p. vi) adds details in

all three components of the input-->process-->output model, as shown in Figure 2. Outputs from this model include more than student achievement (although it would very likely be the primary output), and inputs include fiscal resources and student background along with teacher quality. In addition, school and curriculum quality, and teaching quality and instructional quality are added to the processes realm.

Figure 2
Schooling components included in the RAND model.

Inputs	Processes	Outputs
•Fiscal and other resources	•School quality	•Achievement
•Teacher quality	•Curriculum quality	•Participation
•Student background	•Teaching quality	•Attitudes and aspirations
	•Instructional quality	

A more complicated model of an educational system that also shows links among elements also was presented by Shavelson et al. (1987) (see Figure 3). It includes the same basic domains as does the model in Figure 2, but differs in that it uses links. The links propose that data in different realms can be linked analytically, although not always in a causal way. For example, most research demonstrates that teacher quality is related to school quality, and that instructional quality is related to student achievement and participation.

A more recent model (National Forum on Education Statistics, 1990) reflecting a consensus from a broad cross section of education policymakers in state and federal agencies describes an education statistics system that covers four domains.

The four indicator domains are:

I. Student and community background statistics

II. Education resource statistics

Fiscal resources

Human and nonhuman resources

III. School process statistics

Implemented curriculum

Teaching quality

School environment

IV. Student outcome statistics

Student achievement

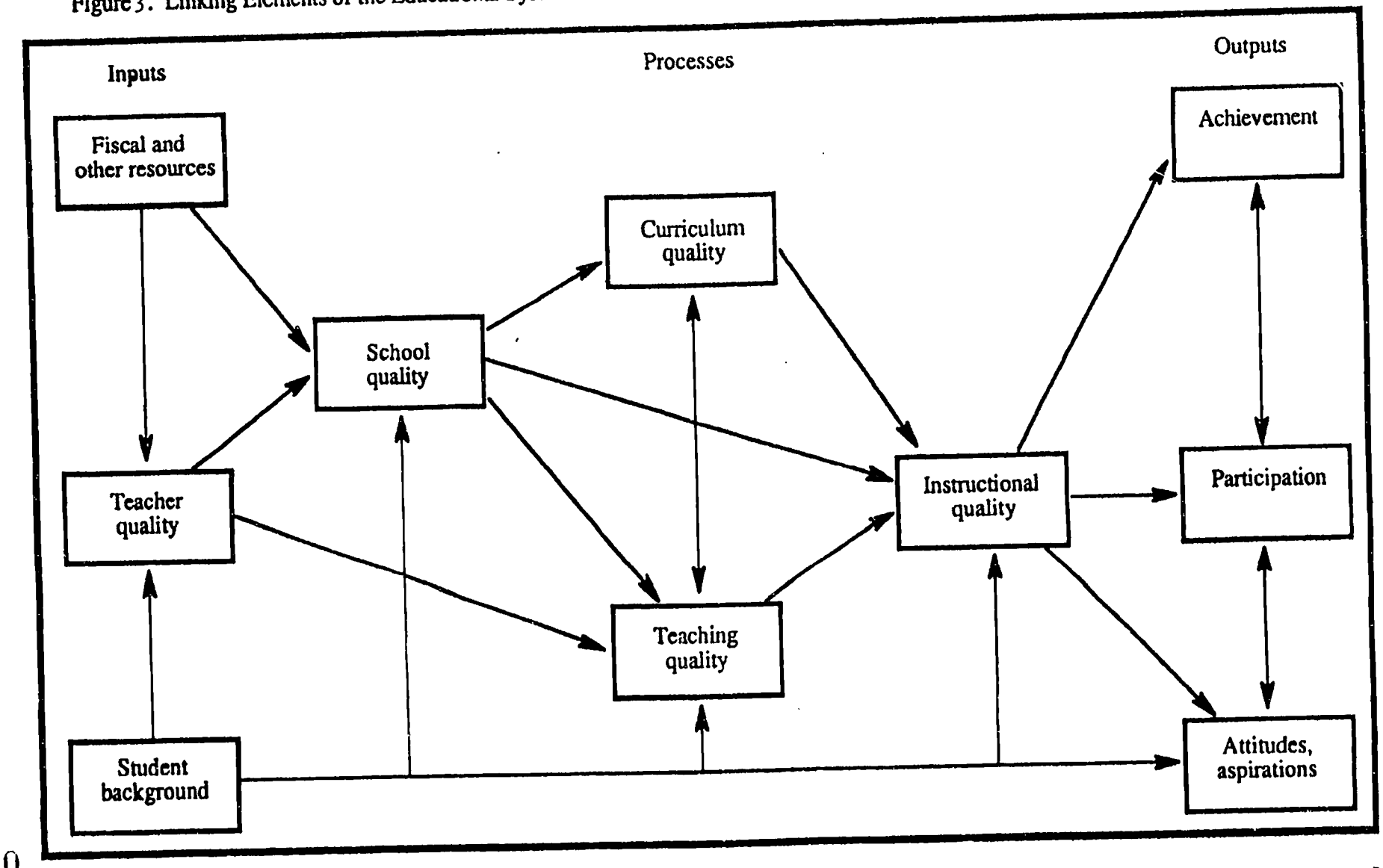
Student participation and progression

Student status after high school

Student attitude and aspirations

This model's domains are similar to those in the RAND model.

Figure 3. Linking Elements of the Educational System



Source: Richard Shavelson et al. *Indicator Systems for Monitoring Mathematics and Science Education.* the RAND Corporation, August 1987

Another indicator system that may be useful is the one developed by the State Education Assessment Center. In developing the Council of Chief State School Officers (CCSSO) model for states, the Center first identified a set of "ideal" indicators (Blank, 1986), based on a synthesis of results from various models. From that set, a list of "priority" indicators were selected based on three criteria: (a) importance and utility of an indicator; (b) technical quality of data that can be obtained; and (c) feasibility of obtaining required data (p. 7). The CCSSO project (Blank & Dalkilic, 1990) identified 11 specific indicators along with anticipated data sources as seen in Figure 4.

Figure 4
CCSSO Priority Indicators

Student Outcomes
Student achievement (NAEP)
Student attitudes/intentions (NAEP)

Instructional time/participation
Grades 7-12 course enrollment (state data collected by CCSSO)
Elementary minutes per week (NCES Schools & Staffing Survey: SASS)

Curriculum Content
Students' opportunity to learn (data not available)

School Conditions
Class size (SASS or CCSSO state data)
Number of course preparations per teacher (SASS or CCSSO state data)
Course offerings per school (SASS or CCSSO state data)

Teacher Quality
Courses/credits in science/math
Teaching assignments by certification field/subject (CCSSO state data)

Equity
Gender and race/ethnicity by student or teacher indicator (CCSSO state data)

To develop a local indicator system, it is possible to start with the basic input-->process-->output design and indicator realms from any model, and to include or exclude indicators of special concern. Some models use an input-->process-->output design, but include special details that reflect particular concerns of their designers. For example,

Hall et al. (1985) suggested adding *educative difficulties* (pupil's capabilities, motivations, handicaps, English language facility, out-of-school supports, etc.) as one of three background variables because "...pupils who enroll in some schools enter with cognitive accomplishments and capabilities, motivations, and out-of-school environments and resources, which make educative efforts easier and less complex than those in other schools." (p. 9). Romberg (1987), on the other hand, specifically omitted *instructional time* because it seemed like an overly simplistic way of measuring curriculum quality, and had no observable link to quality.

The School Reform Assessment (SRA) project (McDonnell, et al., 1990) designed a model for identifying coursework indicators that would fit within a larger input-->process-->outcome model of the schooling process. One objective was to probe what it means to measure or describe course content going beyond a title or a syllabus. Another objective was to ascertain the feasibility of actually obtaining in-depth information about coursework, using relatively low-cost methods, such as teacher surveys. The model for student coursework included four basic elements (p. vi):

- Topic coverage;
- Instructional strategies;
- Curricular objectives (e.g., emphasis on concepts and processes in comparison to basic skills); and
- Teacher qualifications.

A larger model of the schooling process was not specified as such, but indicators identified by the project could easily fit within several of the models that have already been reviewed (e.g., Raizen & Jones, 1986; Shavelson et al., 1987). These elements fall within several domains, including teacher quality, curriculum quality, and instructional quality.

A similar project involves work by a congressionally mandated Special Study Panel on Educational Indicators (Burstein, 1991). In contrast to other models that use the input->process-->outputs structure, the panel developed sets of indicator realms tied to six

"enduring" issues :

- Knowledge, skills, attitudes and dispositions for well-educated citizens in a democratic society;
- Quality of schools;
- Readiness for school;
- Societal support for education;
- Educational contributions to economic productivity; and
- Equity in opportunities, experiences, and results for children at risk of school and societal failure.

These six realms result in some of the same indicators as in the other models of schooling, but some are supplemental. For example, equity is not an indicator realm in most other models.

The models presented here share many characteristics. Most importantly, they reflect research findings about relationships among significant components of schooling. The models may be useful to school and district staff who want to know how variables are related to other variables. The model selected points to the indicators used. Consequently, the model selected by district staff should be one that includes domains of particular interest or concern at the local site. For example, if there is local concern about the quality of teachers, the model chosen should include sufficient indicators in that domain to allow defensible judgments about teacher quality and decisions about how to improve it. For example, indicators could include teacher major, number of classes taken in field, number of years of experience, and recent in-service in the teaching field.

Schools and districts need to review various models of schooling and examples of indicator systems, and choose indicator realms for their model that are useful for decisions to be made at their level. A school or district team can identify a basic model such as the NRC or RAND model and decide on which indicator realms to include. In particular, which variables in which realms can they influence and are related to important outcomes? For example, if a new high school mathematics curriculum

focusing on problem solving is instituted, what is the impact over time on student interest in math, student achievement, and course taking? Or, what is the impact of increasing teacher planning time (teacher quality) on amount of homework assigned and degree to which homework is checked (teaching quality)? Local staff members can develop their own models or use pieces of others' models. Feasibility, cost and burden all play a role in choosing indicators. It is generally recommended that fewer rather than a greater number of indicators be used for decisionmaking. This is generally in the ball park of 20 or fewer.

Although all of the indicator system models presented have some advantages, we recommend the simple RAND model (Figure 2), as it includes most of the important domains that many local schools and districts use or report. These include fiscal indicators, teacher quality indicators, student background indicators, school quality indicators, and achievement indicators.

The Role of Standards and Assessments

Since many accountability systems today are outcome-driven, two major issues in developing local systems are the role of standards and assessments. The National Council on Education Standards and Testing (NCEST) sees *education standard* as a generic term, generally referring to the knowledge and skills students should possess. Webster's Dictionary contains two general meanings for "standard." The first is "something established by general consent as a model or example to be followed." The second is "a definite level or degree of quality that is proper and adequate for a specific purpose." The National Council of Teachers of Mathematics (NCTM) defines standard as a statement that can be used to judge the quality of a mathematics curriculum.

District and school administrators have always tried to answer a general question about student performance: How are our students doing in comparison to some standard?

Generally school personnel have used grade level or average achievement as a reference point.

The major questions about standards have been:

- Are students performing at or above grade level?
- Are students performing "adequately" when compared to similar schools or districts?
- Are students maintaining or improving their performance over time? (Herman, Winters, & Golan, 1989)

Few administrators generally ask, "What do these scores mean in terms of actual student performance?" (Herman, Winters & Golan, 1989, p. 9)

We are seeing the beginning of a shift in regard to the type of standards we use to judge performance. Using a norm-referenced framework, in which each student's (or school's) performance is only judged in relation to others' performances provides information with limited utility. Asking questions such as: "What percentage of students are at grade level?" "How many students scored above the 50th percentile?" "How did we do on the state test compared to similar schools?" does not provide information that can lead to changes in curriculum and instruction that, in turn, can have an effect on student achievement.

Criterion-referenced approaches differ from a norm-referenced framework in that student performance is assessed against a set standard or cut point (e.g., 75% correct). In the emerging framework, a similar criterion-referenced approach is used in which each student's (or school's) performance is assessed against clear external standards of performance. Schools can use such information to identify performance gaps in a particular domain, such as teaching quality. The indicators collected in other domains identified by the schooling model can then be used to determine potential improvements in curriculum, teacher quality, etc., that can address the gaps.

The American public has recently become aware that traditional norm-referenced scores and methods of comparison cannot tell us what students can actually do. In

response to public concern about the absence of national standards keyed to world-class levels of performance, the National Education Goals Panel (NEGP) is monitoring goals and objectives for the year 2000 that were agreed upon by President Bush and the National Governors' Association (Education Week, March 7, 1990). Mechanisms for tracking the progress of the nation and the 50 states in meeting these goals are being developed by a National Education Goals Panel that includes representatives from the National Governors' Association, the Bush Administration, and majority and minority leaders of the House and Senate. The Goals Panel's annual report on the attainment of the National Education Goals may provide school and district-based professionals with ideas about indicators and systems they may wish to adopt for their own purposes. The Goals Panel plans to publish a handbook for local administrators who want to use the indicators chosen by the National Education Goals Panel to produce its own report.

In the first Goals report (NEGP, 1991), objectives (standards) and indicators for all six national goals were displayed at the national and state level (see Appendix K for a list of the six national education goals and objectives along with indicators for Goal 3: Student Achievement and Citizenship and Goal 6: Safe, Disciplined and Drug-free Schools. In addition, an example of state-level indicators on the goals and objectives is presented). An example of a goal and allied objective is the following: Goal 4: "By the year 2000, U.S. students will be first in the world in science and mathematics achievement." An allied objective (standard or target) is: "The number of teachers with a substantive background in math and science will increase by 50 percent."

In response to national concerns about our inability to measure our nation's progress toward the national education goals, the National Council on Education Standards and Testing (NCEST) was convened by the National Education Goals Panel. In early 1992, the Council issued a report that tries to move the nation toward adopting high national education standards for all students and recommends that new forms of student assessment be developed to determine progress toward national standards for and

methods of assessing student and school progress (National Council on Education Standards and Testing, 1992). Standards and assessments are the two cornerstones of this group's platform.

Student performance standards are the most well-known, but they are only one type of standard. The Council's Task Force on Standards recommends content and performance standards for students, as well as school and system delivery standards. Standards are more specific than goals, and specific levels are set in objectives associated with standards. The Task Force recommends that overall standards be set in subject matter areas, including English, math, science, history, and geography. In each content area, an overarching statement "should describe in brief and general terms a vision of the nature of the education standards for the content areas" (NCEST, 1992, p. E-5). One example of such a statement is the one used in the new California Mathematics Framework. "Mathematical power" is described as: "Mathematically powerful students think and communicate, drawing on mathematical ideas and using mathematics tools and techniques" (California Department of Education, 1991).

Content standards define specific subject matter a student should know or be able to use. The Council's Task Force defines *content standards* as standards that describe the knowledge, skills, and other necessary understandings that schools should teach for all students to attain high levels of competency in the subject area. These content standards become targets for creating assessments. They also become targets for teachers who are constructing curricula (Tucker, 1992). Curriculum frameworks used by some states (as in the California Mathematics Framework),are assumed to be equivalent to content standards. The NCTM *Curriculum and Evaluation Standards for School Mathematics* also are considered content standards (see Appendix E for examples of NCTM content standards). An example of a standard and two objectives from the NCTM Standards for the elementary grades is:

Standard 12: Fractions and Decimals

In grades K - 4, the mathematics curriculum should include fractions and decimals so the students can—

- Use models to relate fractions to decimals and find equivalent fractions; and
- Apply fractions and decimals to problem situations (Working Groups of NCTM, 1989).

To translate the general content standards into the specific language of the classroom teacher who is charged with implementing them, a group of teachers at Seeds University Elementary School at UCLA prepared mathematics objectives derived from the California state framework and classroom practice (see Appendix E). These are concrete objectives for the classroom broken down into early childhood, lower, middle, and upper grades. Examples of several objectives relating to decimals and fractions are the following:

- Identify, read, and compare fractional portions of an object;
- Add and subtract like fractions using manipulatives;
- Find equivalent expressions for decimals and fractions; and
- Apply numerical operations in a problem-solving situation.

Some work in developing content standards has been done in the areas of science, U.S. history and geography. In science, Project 2061 established by the American Association for the Advancement of Science has developed conceptual reports in the areas of physical and information sciences and engineering, biological and health sciences, mathematics, social and behavioral science, and technology. The development of the standards is still in progress, but a draft is expected in late 1992, which will include standards and benchmarks. The state of California has developed a science framework (CDE, 1990) that is organized around the themes of science, including energy, evaluation, patterns of change, scale, and structure, stability and systems and interactions. In addition, the National Assessment of Educational Progress (NAEP) developed science

objectives in 1990 that included topics within three topic areas: life science, physical sciences, and earth and space sciences. It also includes three aspects of the nature of science: the nature of scientific procesess, the nature of values and principles, and the nature of scientific knowledge (ETS, 1989).

In the area of history, the Advanced Placement Program sponsored by the College Board provides a detailed "course description" that covers the equivalent for a full-year college course. These course descriptions are designed primarily for teachers and department heads, and have sometimes been called a syllabus. According to College Board, they set the "content standards" for the course.

The state of California has developed a History-Social Science Framework for California public schools, as well as an English-Language Arts Framework and a Foreign Language Framework. Currently national groups are working on the development of an arts framework and a geography framework.

According to the Goals Task Force, *student performance standards* establish the degree or quality of student performance in the subject matter set out in the content standards (see Appendix E for examples of student performance standards). Outcome standards also can be broad statements of what a student should be able to do. For example, many districts and schools choose "to communicate effectively" and "to work collaboratively with others" as outcome standards. Examples of a range of professionally judged student performances can serve as benchmarks for assessing the level of quality of a student's performance (NCEST, 1992, p. E-4).

The College Board Advanced Placement (AP) exams are one example of setting levels of performance, in which a student receives a score of 1 to 5. The performance levels are externally developed by subject matter and testing experts. A score of 3 means that a student has done well enough to pass a college-level exam on the subject. A score of 5 or "superior" is comparable to receiving an A in the subject at college. The NCEST Task Force recommends using at least three levels of performance standards, which

might be called "competent performance, "excellent performance," and "world-class performance."

In the state of California, the California Assessment Program (CAP) uses a 6-point rating scale to judge answers to the writing and mathematics prompts. This ranges from a 1: "purposes of the task were not accomplished," to a 4: "substantially completed purposes of the task," to a 6: "fully achieved the purposes of the task, while insightfully interpreting or extending beyond the task" (See Appendix E: CAP Performance Standards for Student Work for examples).

In addition to content and performance standards, *school delivery standards* set out criteria to enable local or state educators, parents, and the public to assess the quality of a school's capacity to educate their students in the subject matter set out in the content standards. They refer to students' opportunity to learn, broadly conceived, and do not refer solely to fiscal indicators, such as per pupil expenditure. For example, are teachers in a school well-trained in the content area of the standards? Does the curriculum of the school cover the content material in depth so that all students can master it? Do all students have access to equal fiscal resources and high quality teachers? Does student performance on desired outcomes indicate that the school provides equal "opportunities to learn" to all students? (NCEST, 1991). This may entail examining educational services, (e.g., class size, methods of enrollment, testing practices, and staff assignment), as well as programs (e.g. course offerings, enriched curriculum) to identify any racial/ethnic or language group patterns in the provision of programs and services. Whatever type and quality of educational services the school offers to some students should be equitably provided to and used by all students. An example of unequal delivery would be if college preparatory courses were offered and theoretically were available to all students, but the students using these courses were found to be predominantly white.

School delivery standards also refer to policy measures designed to give all students opportunity to learn. These policy-related measures are more subtle, and are harder to observe and measure. An example of how a tracking policy may result in unequal opportunity to learn is the following. In college-prep math courses, the focus is academic and generally includes more opportunities for students to interact with teachers and other students, and to engage in problem solving and writing. On the other hand, in remedial math courses, instruction tends to focus on basic skills development, social conformity, and individual rote work, and shows little student communication. Remediation of such disparate treatment can be carried out by changing district policies on tracking, changing course offerings (eliminating remedial classes), or changing procedures for placing students in courses. Variation in resources should not be used to justify and excuse variation in the quality of content presented or levels of student achievement. School standards can provide targets for determining whether a school is delivering the material to students (NCEST, 1992).

System delivery standards are similar to school delivery standards in that they set out criteria for establishing the quality of a state or school district's capacity and performance in educating students in the subject matter. School finance lawsuits at the state or district level have been the most common manifestation of attempts to reduce disparities (usually funding) among districts. Many today demand that states provide schools with the resources needed to meet education standards. In recent years, advocates for poor districts have begun to look beyond money issues to issues of curriculum quality and achievement measures.

National delivery standards have already been set out in the National Education Goals Panel in goals 3 and 4, which also establish objectives or targets for student achievement for the year 2000. The Task Force on Standards recommends that all states and districts establish their own achievement targets (see District Performance Report Summary in Appendix B for examples). For using indicators at the local level, the

Massachusetts Association of School Superintendents maintain that benchmarks or standards are necessary for comparison purposes (MASS, 1991). Section III describes in detail how a school or district can go about setting standards and targets.

The California "School and District Performance Report Summary" (see Appendix B) is an example of how school and district performance standards and targets can be reported. Since 1983-84, California has reported annually to high schools to measure each school's progress toward meeting accountability goals. California currently uses 15 quality indicators and one overall performance value for each school and district. Indicator realms include achievement, curriculum, dropout rate, and college-bound indicators (California High School Performance Report Summary, 1990). In each indicator realm, for each indicator, an absolute criteria level or standard is set, and the percentage of students achieving that standard is reported. The school and district distribution on each indicator is measured by counting the number of students at or above a certain level and converting to a percent. For example, in the curriculum area, percentage completing four or more years of English is an indicator. In the achievement realm, percent reading at the "commendable" level and above is an indicator, and scoring 3 or higher on the AP exam is another. One-year statewide growth targets for improvement for each indicator are set for schools and districts. Growth is the change in the percentage of students meeting set performance levels. Each positive percentage point indicates that 1% more students met performance levels than in the past. On the performance reports, the actual percentages on all indicators for 1990 are shown, as well as growth from base year (1987-88), one-year growth, and whether or not the school met its growth targets.

California's program has two goals: to support local action toward meeting goals, and to provide information necessary for schools and districts to set their own goals. This information allows decisionmakers to judge school performance on four levels: (a) how a school compares with itself over time, (b) how a school compares with all schools

statewide, (c) how a school compares with district performance, and (d) how a school compares with schools with similar student populations. To deal with vast differences in makeup of the student population, California compares schools and districts with like schools and districts within a "comparison band." The comparison band refers to schools and districts that have similar populations. A composite score is calculated for each school and district, based on student population in terms of ethnicity, mobility, poverty and limited-English-proficient students. Schools are compared with similar schools—from those 10% lower than it on the composite up to those 10% higher on the composite. Although this method allows for controlling for differences in population makeup, it does not measure or report access to high-quality resources including academic classes, such as advanced placement (AP) physics, and calculus and well-prepared teachers. Thus, although the performance reports give good information on performance standards and outcomes, they fail to give information on school or system delivery standards.

The sample district profile for the state of Arizona included in Appendix B (a dummy district) includes data and indicators on outcomes (e.g., standardized test results, percentage of students scoring below the 40th percentile, dropout rate), inputs (e.g., expenditures, teacher salaries, tax capacity, percentage LEP), as well as processes (student-teacher ratio, graduation requirements, programs and services). The Arizona report contains a few indicators or criteria that could be used to judge the quality of the district performance, These include comparing district-level variables, such as student-teacher ratio, number and percentage of students in bilingual programs, and number of bilingual staff with the state or county average or to a set standard. In addition, student test performance and dropout rates can be compared to ascertain if the district is providing equal opportunity to learn to all students.

Table 1 displays the crosswalk between different types of standards and indicator realms commonly used in schooling models. An "x" is marked when an indicator from a particular realm is used as the basis for judging whether or not a standard is met. For

example, the fiscal and other resources realm contains indicators that allow us to make judgments on whether school and system delivery standards are met, but does not contain indicators that allow us to decide if student performance standards are met. Student performance standards are measured through indicators of achievement or participation. Content standards are judged using subject matter, curriculum, and instructional realms. School and system delivery standards, however, relate to all of the indicator realms but student achievement and attitudes, in that the capacity and performance of the school or system in educating students incorporate many of the indicator realms.

Table 1
Crosswalk between Standards and Indicator Realms

INDICATOR REALMS	STANDARDS			
	STUDENT-PERFORMANCE STANDARDS	CONTENT STANDARDS	SCHOOL-DELIVERY STANDARDS	SYSTEM-DELIVERY STANDARDS
Fiscal/other resources			X	X
Teacher quality			X	X
Student background chars.			X	X
School quality			X	X
Curriculum quality		X	X	X
Teaching quality			X	X
Instructional quality		X	X	X
Student achievement	X			
Participation in courses	X		X	X
Attitudes and aspirations	X			

In judging the quality of a school or system in meeting these standards, educators, policymakers, parents, and the public should all feel ownership for the standards that are set. Ownership of standards is essential if there is to be commitment to reaching them. Without such ownership, analyses that reveal how well or poorly standards are met will be useless. Several possible approaches to standard setting at the national level are suggested in the NCEST report. The first approach begins at the national level and relies heavily on professional input from throughout the nation. This is similar to the model traditionally used by the National Assessment of Educational Progress (NAEP). The second model begins at the local and state level and generates documents that are later synthesized at the national level. This is a more "grass-roots" approach. The third model starts with professional judgment and examples from the national level and looks to the state and local levels for continual feedback. This would be an interactive process and would involve all groups. The Task Force recommends the third model because it offers the best chance to involve a broad spectrum of the public.

At the district or school level, there can be parallel processes in standard setting. The interactive model at the district level involves the development of standards by a group made up of curriculum experts from schools, as well as academic consultants. Professionals in the district, as well as parents and members of the community at large, would provide feedback leading to modifications. It is possible for schools and districts to set standards independent of the national standards or goals. However, attention to examples at the national and state levels may be warranted, as a significant portion of citizens is likely to be interested in how well local systems are meeting national goals.

The second important issue in developing indicator systems is the role of assessments. According to Roy Romer, the governor of Colorado, "Just creating standards is not enough. We also need a syllabus, instructional materials, appropriate teacher training and the right kind of assessment" (College Board, 1992). The National Council on Education Standards and Testing (NCEST, 1992) report recommends

development of regional and national assessment to determine progress toward national standards. Assessment snide to be created that embody the new standards created at the local, state, or national levels. The Council recommends that a new assessment system should consist of multiple methods of measuring progress, should be voluntary, and should be dynamic, not static.

The Council's Task Force on Assessment (1992) reports that there are five purposes of assessment:

- monitoring progress toward the national education goals;
- holding schools or students accountable for performance;
- certifying individual achievement and accomplishments;
- improving instruction; and
- evaluating the effectiveness of schooling or reforms.

States are considered to have the responsibility for creating assessments related to the national standards. They may use the assessments for different purposes, but they should enable their students to reach the content standards.

To bring challenging standards, higher expectations, and improved performance to students, curriculum resources and instructional strategies should be integrated with assessment and standard setting. The current separation of curriculum and instruction from assessment is ill-advised, and should be changed. In order that curriculum and instruction strategies make sense to teachers, they must be involved in developing curriculum frameworks and identify the characteristics that distinguish resources and strategies likely to help student achievement on the national standards. Curriculum materials must be linked to the standards and assessments used (NCEST, 1992).

In a recent development, the College Board has announced the establishment of an integrated program of standards, teaching, and assessments called Pacesetter. This is designed for educational reform at the secondary level, and consists of course content outlines similar to those used in AP courses, related assessments, and teacher

development opportunities. Offerings in mathematics, English, Spanish, science, and world history are planned. Each Pacesetter course will include an outline of course content and learning outcomes, strong teacher training and support activities keyed to the content outline for each case, classroom assessments that allow teachers to monitor and shape instruction , end-of-course assessments (including multiple choice and free-response questions), and a valid system for scoring end-of-course achievement tests on local, regional, or state levels (College Board, 1992).

Indicators related to student outcomes need to include measures that involve open-ended work or actual performance by students, in addition to students' responses to multiple-choice test items. Alternative forms of assessment should be a supplement to and, in some cases, a replacement for current ways of testing that focus on discrete skills and limit student responses to multiple choice. The technology for this kind of assessment is limited except, perhaps, in the areas of writing and mathematics. There has been much work done both at the state and local levels on the development of authentic writing assessments, and some work on the development of mathematics items and math portfolios and journals. Some sample items are available for use by district or schools; for example, the California Department of Education's Mathematics Sampler (CDE, 1991b). In addition, UCLA's CRESST Center has an alternative assessment data base, which contains examples of alternative assessments (see Appendix J).

Until current efforts to develop a consensus at the national level about what students need to know in science, social studies and other content areas bear fruit, schools and districts need to develop their own agreements on what performances they wish to measure and how they will do so. Although the process may be difficult at the start, the development of alternative assessments may be worthwhile over the long run, as they provide meaningful information about student outcomes.

Transforming Models into Indicators

Several basic models of indicator systems have been presented and discussed. Yet, models of schooling and standards are only the platforms for generating indicators that will provide policymakers with a picture of what is happening and whether things are getting better or worse. Some reports on the design of indicators have stated explicit criteria for going from model to indicator (Shavelson, et al., 1987; Blank & Dalkilic, 1990; McDonnell, et al., 1990). Other reports allude to general principles that were followed in identifying indicators (Raizen & Jones, 1985; Blank, 1986), but do not identify criteria as a distinct step in the process that was followed in indicator design and development.

Because there are numerous potential indicators, criteria are needed by which indicators should be selected. One set of such criteria has been developed (Shavelson et al., 1987). Indicators should:

- Provide information that describes central features of the educational system, such as teachers' work load or curriculum offerings;
- Provide information about current or potential problems, such as changing demographics;
- Describe educational conditions of particular concern to policymakers and amenable to change by policy decisions;
- Measure behaviors rather than perceptions;
- Provide analytical links among important components;
- Generate data from measures generally accepted as valid and reliable;
- Provide information that can be understood by a broad audience; and
- Be feasible in terms of timeliness, cost, and expertise. Indicator data need to be produced within a time frame that is compatible with policymakers' decision cycles and within given cost constraints; they should also be collectable, analyzable, and reportable within current levels of expertise.

Actual lists of indicators derived from models vary in detail and length from seven "key" indicators and six "supplementary" indicators in the NRC system (Murnane &

Raizen, 1987, pp. 2-4), shown in Table 2, to almost 40 indicators in RAND's model (Shavelson et al., 1987, p.37) of a "piggyback"[0] indicator system, as shown in Table 3.

Table 2
Indicators in NRC System

Primary Indicators	Supplementary Indicators
Extent of student learning in mathematics and science	Amount of time spent on science and mathematics homework
Extent of scientific and mathematical literacy of adults	Teacher preparation-college courses in mathematics and science, majors and minors, advanced degrees
Enrollment data for mathematics and science courses taken by students in high school and the amount of time spent on the study of science and mathematics in elementary and middle/junior high school	Teacher's use of time outside the classroom spent on professional activities related to their teaching of mathematics and science
Nature of student activities during science and mathematics instruction	Materials, facilities, and supplies available and used by teachers in mathematics and science instruction
Extent of teacher's knowledge in the subject matter that they are expected to teach	Level of federal financial support for science and mathematics education
Salaries paid to college graduates with particular subject-matter specialties who choose to enter various occupations	Commitment of resources by scientific bodies for the improvement of mathematics and science education in the schools
Quality of the curriculum content in state guidelines, textbooks and associated materials, tests, and actual classroom instruction in science and mathematics through matching to exemplary curriculum frameworks along four dimensions: breadth and depth of treatment and scientific and pedagogic soundness	

Source: Murnane and Raizen, 1987, pp. 2-4.

[0]The "piggyback" system is one that expands current data collection efforts, most of them by the National Assessment of Educational Progress. Other options considered in the RAND project would involve the National Science Foundation in collection of data independent of what is being done now by other agencies.

Table 3
Indicators in RAND "Piggyback" Indicator System

Resources	School characteristics	Classroom characteristics	Student achievement
Per-pupil expenditures	Course offerings		Mathematics
Percent of personal income expended on education	Course-taking requirements	*Curriculum*	Science
Beginning teacher salary	Teacher planning time	Textbook and materials use	of all students
Average teacher salary	Dropout rates	Coverage of core topics	college-bound seniors
Class size/teaching load	Student enrollments		prospective science/math majors
Computer use and laboratory facilities		Instruction	
Resource adequacy		Homework	
Computers available at the school		Student use of labs and computers	
Experienced teachers' salaries		Teaching methods	
		Access to labs and computers	
		Assessment	
Teacher characteristics			**Student participation**
Descriptors			Extracurricular activities
Experience			Current math/science course-taking
Comfort with subject matter			
Regency of education enrichment			
Student characteristics			**Student attitudes**
Race/ethnicity			Interest, liking, etc.
Gender			Social usefulness
Courses taken			Career relevance
Grades			Intended college major
Socioeconomic status			Conceptions of math/science

Source: Shavelson et al., 1987, p. 37.

Transforming Indicators into Data

A great deal of mediating activity takes place before one of the indicators identified as an element of an indicator system becomes a data element or statistic, or, as is often the case, becomes an integrated set of several statistics. In a way, the indicators are really constructs that tend to evoke a "common" sense that something is being measured, and that more or less of it will tell us there has been a change in the quality of education. Just as a high unemployment rate is felt by the American public as a decline in the economy, a higher per-pupil expenditure is sensed as an increase in public support for schools, if not a direct increase in school quality. Higher dropout rates are sensed as a decrease in school quality or effectiveness. Although some indicators measure actual behaviors (e.g.,

courses taken) and some are merely counted (e.g., per pupil expenditures, amount of teacher experience), others are not directly observable (e.g., access to computers, dropout rates). Some indicators can not be observed directly, but must be inferred or derived indirectly through administrative records or attitude surveys. Although indirect indicators are not as highly regarded as others, many believe they have sufficient validity to be useful.

To generate data, most all of the "indicators" must be transformed into specific questions or "pointers" that can be answered or quantified as part of an instrument or some other source for data collection. Sometimes, the source is a file from a district or county office where certain kinds of databases, such as certificates held by teachers or textbooks ordered for instruction are maintained from year to year. In generating data for an indicator, numbers can be taken from the file and recorded somewhere else according to a protocol that has been worked out ahead of time, usually with a fair amount of precision. For example, if certification in the subject being taught is an indicator of teacher quality, district personnel files can be used to determine and record the number of teachers teaching in their field.

More often, the data collection involves a standardized survey, a form, a log, or a test that is completed by students, teachers, administrators, or clerks within an individual school or by an external observer who goes to a school site. For example, if a school selects "amount of homework assigned" as an indicator of instructional quality, it will be necessary for the principal and all teachers, students, and parents to agree on exactly what this means. For instance, the metric could be number of minutes of reading and mathematics homework assigned per week. A standardized reporting form would need to be filled out by teachers, collected at the school level, and tabulated.

Few indicators are transformed into data in isolation from other indicators. More often, the questions that define a particular indicator are combined in a survey or test with questions that define other indicators. For example, reading and math scores are often

reported together. In addition, data for several different indicators are often gathered at the same time. For example, the same form used for reporting minutes of homework assigned could be used to report topic areas covered in class that week.

There are some indicators that are difficult to transform into data. Process indicators, such as topic coverage or teaching methods, are constrained by large holes in what we are able to observe easily and cheaply. If school personnel are to analyze and act on indicators of opportunity to learn, they need something to go beyond titles of high school courses or broad topic areas. One approach is to analyze coursework by time spent on different topics (McDonell, et al., 1990). However, the effort needed to include this kind of analysis as a meaningful part of an ongoing program of data collection is daunting.

Further, it is not sufficient to look at textbooks, under the assumption that teachers teach the content that textbooks present. That assumption is far less likely to be valid now than it was in the seventies and early eighties. Even if it were valid, indicators that tell us how well teachers follow textbooks are not consistent with current standards for how mathematics should be taught and learned, since many texts in use are not aligned with national or state curriculum frameworks. In addition, new curriculum frameworks generally recommend integration of different subject matters, which is not how most textbooks are organized. For example, mathematics standards maintain that different math topics, such as algebra and geometry, can be taught together using unifying ideas or themes. Unifying ideas are major mathematical themes relevant in different content areas. They reveal general principles at work in different areas and show how the topics are related. The concept of proportional relationships is an example of a unifying idea. Seeing the common principle operating in different subjects is an important part of mathematical understanding (CDE, 1991c).

Within schools and districts, teachers can develop their own indicators of opportunity to learn. Perhaps use of a common format for lesson plans could supply

needed data. Involving teachers in developing appropriate data sources has two added benefits: It directs attention to important issues and helps develop a commitment to providing this kind of information.

Transforming Data into Information for Decisionmaking

For data to have power, they must be packaged as information. As the National Forum Guide noted: "Good data help make good policies" (National Forum on Education Statistics, 1990). The transformation of data into information requires some thought about the audience. The same data can be packaged in different ways to satisfy the needs and interests of different audiences and the ways in which data are likely to be used. The importance of considering indicator development in the context of information and audiences was a primary concern expressed by Murnane & Raizen (1988) and Shavelson et al. (1987). In both cases, indicators that were selected were ones that fit some assumptions about policymakers as users of information. Special considerations were given, for example, to inclusion of indicators on race, sex, and ethnicity in national models, so that sampling designs for data collection could allow for disaggregation of outcomes, such as student achievement data by characteristics of students. These features in the model were thought to be particularly important to concerns about equity among policymakers at federal levels. These equity concerns are important at the state and local levels, too.

Usefulness of national indicators for policymakers at state and local levels will very likely be limited. Where states are most likely to see information about themselves is in published reports that show state-by-state comparisons. With the exception of the 1990 state-by-state NAEP in math and the CCSSO state indicator report, profiles of indicator data for individual states does not seem to be a service that federal projects will provide. However, states may be able to generate their own profiles from databases that are created and distributed by national indicator projects (e.g., state-by-state NAEP).

Some states do provide schools and districts with "report cards" that report in simple format how the unit is doing on state-level indicators. Some local administrators have complained, however, that state reports contain too many indicators to be useful ,and indicators chosen by the state do not always fit the needs of their district or school. District-designed indicator systems and indicators can be tailored to the special needs or conditions of the unit and could be timed to coordinate with decisionmaking cycles. It would be easier for local staff than for state staff to transform the district data available into information that could be used for decisionmaking.

A recent report on guidelines for score reporting (Aschbacher & Herman, 1991) examined current practice in state reporting of assessment results and provided guidelines for effective reporting of information. State testing directors were surveyed and various assessment reports were reviewed. In 1989, 47 states had statewide assessment programs and 30 of these used standardized norm-referenced tests. Some states also use criterion-referenced tests. Over three fourths of the states provide reports to districts and schools. Some states prepare class or individual student reports, or special reports for state legislatures. Three fourths of the states prepare at least five types of reports on test results. The report gives some guidelines for effective reporting of assessment results. They also can be useful for schools and districts in terms of deriving information and reporting indicator data other than test data. The guidelines are the following:

1. Know the audience and the purpose.
2. Keep it simple.
3. Be clear, accurate, comprehensive, and balanced
4. Use techniques to direct the reader's attention
5. Suit format to purpose

See Aschbacher and Herman (1991) for a detailed description of these guidelines, as well as for guidelines for creating effective graphs and tables. Herman et al. (1990) found that principals' favorite format of presentation is a graph. Schools principals

wanted to see analyses showing relationships between test results and instructional programs and more data about individual students to help with instructional diagnosis.

Section III. Developing Local Indicator-based Accountability Systems

Process Model for Decisionmaking Using Indicators

Indicator systems are not created overnight. According to David (1988), certain conditions need to be present in a school or district for the creation of an indicator system:

- A climate that supports planning and the use of data;
- A commitment to improvement by district leaders;
- Involvement of stakeholders in the design of the data system (e.g., teachers and principals);
- Technical expertise and data system support;
- Necessary resources; and
- An action plan.

Communities, districts, and schools vary widely in the degree to which they have developed accountability systems, data systems, or indicators. There is a great deal of variation in the degree to which districts and schools have efficient student information systems and a climate that supports the use of data-based decisionmaking. Some schools with little computer support have little or no capacity to generate their own indicator data. Although most districts of at least medium size have student information systems with some capacity, many do not use data derived in such systems for decisionmaking.

When certain conditions are present, the following steps may be useful in selecting, implementing and reporting indicator data (Blank, 1992). This model was developed for use by states, but can be used by schools and district staff.

Steps in Developing an Indicator System

A. Selecting Indicators

1. Develop a conceptual framework based on research and policy interests. The schooling model selected can serve as the framework.

2. Obtain commitment and cooperation of leaders.

3. Involve policymakers, educators, researchers, and data managers in selecting priority indicators.

4. Select a limited number of indicators and hold down complexity in reporting.

B. Organizing a Cooperative Data System

5. Decide method of collecting data.

6. Work with data users and providers to establish standards for producing comparable data.

C. Reporting Comparative Data on Indicators

7. Design data forms and crosswalk procedures.

8. Report indicators.

SWRL recommends a district-level strategy to implement the steps in developing an indicator system to aid in decisionmaking. The following are general steps for initiating and implementing a broad district- or schoolwide strategy. The steps in the process are best used together, but are presented step-by-step so that educators can choose those that are relevant to their own unit. Figure 5 displays the model and steps to follow in a districtwide strategy to develop an indicator system. The strategy has three phases: initiation, initial implementation, and completed implementation.

Phase I. Initiation of Districtwide Strategy

A. District-level initiation

1. District-level goals and objectives stated

2. District commitment and resources

3. Needs assessment

4. Accountability external to district

B. School-level initiation

1. School goals and objectives stated
2. School commitment and resources
3. Needs assessment

C. Official decision to start implementation

In some instances, schools may initiate or suggest a strategy to the district and ask for help. In other cases, a district may initiate a districtwide strategy and ask for school involvement. Although it is not necessary that both schools and the district work together, it is preferable. As seen in successful school desegregation and school improvement efforts, when central offices and school boards are both involved in an improvement effort, chances for successful implementation improve (Anderson, 1985, p. 16). Thus, to optimize chances of implementing the strategy, the participation of both the district and schools is desirable.

In the first phase, Initiation, district-level goals and objectives are stated by district staff (district superintendent, assistant superintendent, school principals, and board members), a commitment is made to the process by district leadership, and necessary resources provided. A needs assessment of some sort is necessary here. A needs assessment will reveal how well the district is performing in terms of good school practice. The initial self assessment is necessary to show the strengths and weaknesses of the district, as well as to identify data needs. One resource to assist districts in this assessment is the School Effectiveness package developed by Far West Laboratory (Mills, 1990). This package was designed for use by district administrators and principals to assess their student learning, instructional, administrative and external support/resource needs, and to set comprehensive goals for school improvement.

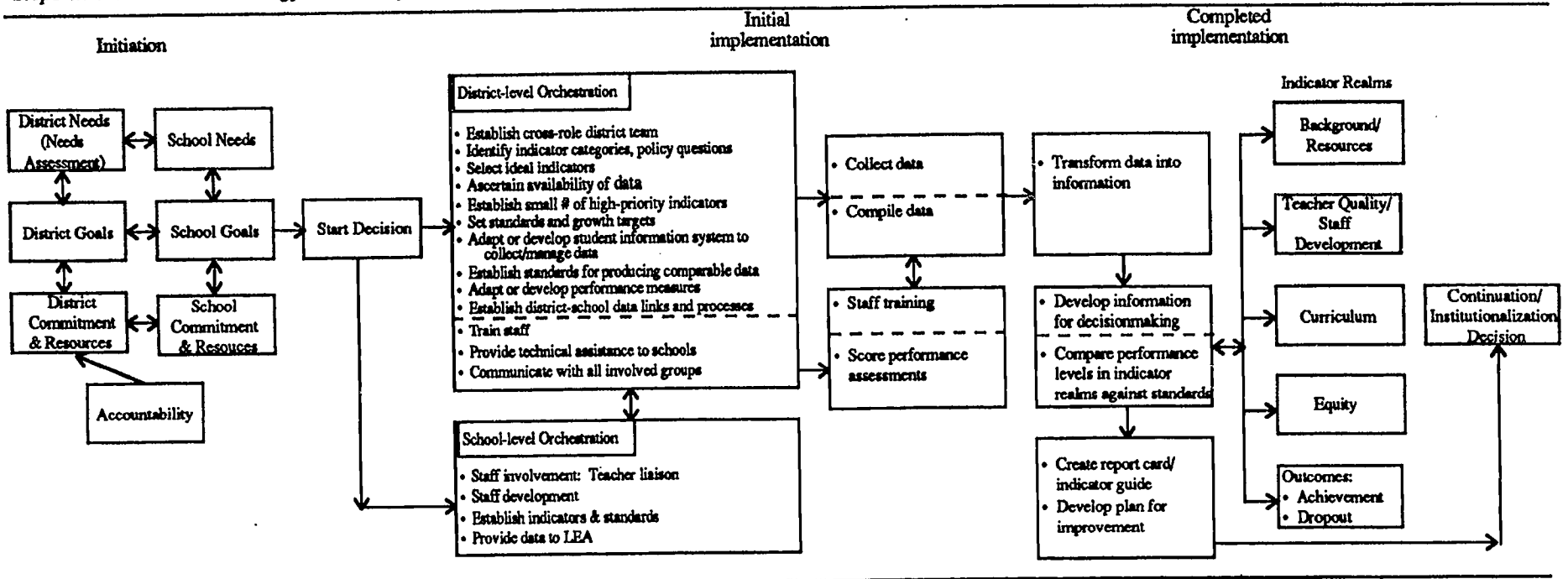
Another possible resource is the "Program Quality Review" model used in California. Both are built on schooling models similar to those presented earlier in section II.

As a result of the initial needs assessment, the district leadership should be able to set goals and identify high priority issues or policy questions for the cross-role team to address. For example, a district may show a weakness in the area of curriculum and instructional quality. In addition, achievement test scores are low. Since schooling models generally show that curriculum quality and instructional quality are related to student achievement and participation, the district may want to focus its indicator system primarily on the process domain (teaching quality, curriculum quality) and on associated achievement outcomes.

Along with a commitment, resources need to be provided by the district. These may include allocation of funds for teacher release time, training of staff in data systems or use of indicators, and provision of technical assistance to schools.

At the school level, goals and objectives are stated by the principal and teachers. This involves developing a consensus about the purpose of the school. A commitment to carrying out the process should be made by the principal and staff. Generally, some sort of group process in which individual teachers share their goals with their colleagues is used to develop consensus. A number of techniques for this exist. After goals are set, a needs assessment of some sort similar to the one conducted at the district level should be done by the principal and selected staff. Many of the "effective schools" programs provide a framework for the needs assessment, as previously noted.

Figure 5
Steps in district-wide strategy to develop indicator system.



Once the district- and school-level commitment to the strategy have been made and needs assessments conducted, a formal decision must be made to move from initiation to implementation. It will probably be made by the superintendent at the district level.

Phase II. Initial Implementation of Districtwide Strategy

A. District-level orchestration

1. Establish cross-role team
2. Identify indicator domains, policy questions
3. Select ideal indicators
4. Ascertain availability of data
5. Establish small number of high-priority indicators
6. Set standards and growth targets
   a. set district performance standards, growth targets
   b. set school-delivery standards,
   c. set district-delivery standards
7. Assess technical capacity: Adapt or develop student information system to collect/manage data
8. Establish standards for producing comparable data
   a. agree on standards and definitions
   b. design data forms
   c. crosswalk with state categories
9. Establish district-school data links and processes
10. Adapt or develop performance measures (if applicable)
11. Train staff in data elements, terminology and usage
12. Provide technical assistance to schools
13. Communicate with all involved groups

B. School-level orchestration

1. Staff involvement: teacher liaison
2. Staff development
3. Establish supplemental indicators and standards
4. Provide data to district

In the initial implementation phase, tangible district and school-level activities establish that the strategy is being put into place. Although the district office orchestrates most of the activities, cooperating with schools on activities is optimal. District-level orchestration includes a series of technical and administrative tasks. These include first establishing a cross-role district team. It is important to involve all stakeholders. Thus, the cross-role team should be made up of the superintendent or assistant superintendent, principals, teachers, and parents, as well as district data processing managers. Involvement of teachers and principals can help to increase the likelihood that indicators chosen will reflect practices that teachers or principals can control (David, 1988).

Next, based on results of the needs assessment, the team identifies indicator domains or categories and policy questions that need to be answered and selects ideal indicators. In selecting indicators, teams can make use of examples of indicator system and domains presented in this sourcebook. For example, a district could decide to use the RAND model (Figure 3) with its 10 domains. "Ideal" indicators are identified. These could include, for example, in the area of school quality class size, number of course preparations per teacher and number of course offerings. Next, a subgroup can ascertain availability of these data either at the district or school level. Are there data collected at the school level on the number of course offerings or can the data be gathered? Class size may need to be calculated using number of teachers and number of students per school. Some of this information may already be collected in the schools or at the district level. Based on this report, the team will decide on a small number of high priority indicators. To start with, fewer than 20 is desirable.

The group must then set (a) student performance standards and growth targets; (b) district delivery standards (and growth targets if desired); and (c) school delivery standards (if relevant) and growth targets (if desired).

There are many ways to establish benchmarks or performance standards. Several approaches are suggested by a group of Massachusetts superintendents:

- Compare with one's own history;
- Compare with comparable entities;
- Compare with national or statewide averages;
- Compare with "good practice" recommendations by associations;
- Derive analytically through use of models; or
- Make judgments using a group process or intuition (Massachusetts Association of School Superintendents, 1991).

Some of these benchmarks are more norm-referenced (e.g., compare with comparable entities, compare with national or state averages), while others are more criterion-referenced and are more in line with new conceptions of standards (e.g., compare with good practice used by associations such as NCTM Standards or derive analytically through use of models). In addition, most schools and districts have a desire to track their indicators over time.

District performance standards can be as simple as "percentage of high school students completing four or more years of English" and a one-year target could be set at 2%. In general, over 85 or 90 percent of students complete four years of English; thus, the target is set fairly low. In terms of achievement, a district could set a standard in terms of percentage of students scoring "commendable and above" and a one year target could be set at 4 % as is done in the California Assessment Program (see Appendix B for an example). Or it could set a standard or percentage of students scoring at or above the 50th percentile (if only norm-referenced tests are given). Growth targets should be set after examining past trends in district-level achievement. What is a reasonable target, based on the district's past history? School performance standards and targets can be set the same way as district standards, taking into consideration specific school characteristics.

Most educators today believe that there should only be one standard, instead of the current situation in which disadvantaged children are held to a lower "basic skills" standard, and in which more is expected of advantaged children. Although the same

standard in terms of achievement could be used for all schools in a district (e.g., percentage scoring at or above the 50th percentile), growth targets for various schools could be different. For example, if one particular school has a high percentage of limited-English-proficient (LEP) students and a high influx of immigrants, the growth target would be set lower than the target for a school that has very few LEP students and a low transiency rate.

In terms of setting school delivery standards, a team needs to set out indicators to enable local educators and parents to assess the quality of the school's performance in educating students in the subject matter and the progress the district is making in delivering quality programs and services to all students. Does the school (or district) "deliver" to all students an equal opportunity to learn? Here, input conditions such as fiscal resources and teacher quality are important, as well as process indicators such as curriculum quality. An example of setting criteria to assess a school's performance is the following.

A district may be concerned that its "high-quality" (qualified in the field) teachers are not equally distributed to various subgroups of student. Do LEP and disadvantaged students have equal access to qualified teachers? (e.g., those teachers who majored in the subject field, those who have taken recent in-service training in their field). A district could decide to set an overall criterion that at least 50% of its teachers majored in the field they are teaching in. In addition, this criterion could be examined by student subgroups (ethnicity, language background, SES) to see if there is equal access to quality teachers.

On the outcome side, a district may ask, "Does each school within the district provide equal opportunity to all students to take challenging courses such as AP physics, AP calculus, or AP English?" "Are there differences in the degree to which students have access to "gatekeeper" courses such as algebra or geometry, which have been shown to be highly related to test achievement?" Other delivery indicators could be level of

disciplinary actions, differential tracking policies, criteria for assignment of teachers to classes, and attendance statistics.

After setting standards and growth targets, districts need to assess their technical capacity to develop an indicator system, similar to how they conducted a needs assessment in the initiation phase. Some of the questions that may need to be answered at the district level include the following technical questions:

1. How much information needed is already being collected by data processing in the schools and district?
2. How will data from different sources be integrated?
3. To what degree is it anticipated that our district will need to establish new channels of information that flow into and from the central office?
4. How does enrollment and attendance information make its way from individual school sites to the district office (pencil and paper, electronic transmission)?
5. To what degree do principals need help in getting the data they need and in preparing reports?
6. To what degree do teachers need help in interpreting and using data on students?

In the next two steps, the data processing manager will most likely take the lead. First, it will be necessary to adapt the district's student information system to collect or manage the planned data collection. In the few instances in which districts do not have a student information system, a basic database program, such as EXCEL, can be used to develop data sheets to record indicator information, either on hard copy forms or onto a floppy disk program developed by the data processing staff (see Appendix J for an example of data sheets used in a Massachusetts district).

Members of the team, including representatives from various schools, must establish standards for producing comparable data. This involves agreeing on data standards and definitions; designing data forms to collect data; and conducting a crosswalk (or match) with state categories (if they exist) to ensure comparability. Data element standard definitions can be obtained from the Council of Chief State School

Officers in Washington, D.C., or from California's Student Information System (CSIS) in Sacramento. (see Appendices F and G.)

Data forms to record indicator information can be easily developed using software, such as DBASE or EXCEL, which use templates. Each indicator should have an entry number for use over time. A standardized format should be maintained by all reporting schools to facilitate compilation of data. A data manager should write a brief instructional handbook to accompany the data forms or floppy disk to ensure ease of use and standardization of data entries. The instructions should be revised following review and feedback from other team members.

The district team next needs to establish district and school processes to collect data. This may involve development of data collection hard copy forms or a floppy disk for data entry. The district will need to ascertain the types of training needed by the staff. Teachers or teacher aides may need to be trained in data element terminology and usage and data clerks may need to be trained in data entry. School staff may need assistance in working with computers or databases. Finally, the district is responsible for communicating with community members, staff and parents about the process, either through staff meetings, newsletters, or bulletins.

If performance assessment measures are desired, adaptation of current measure or development of new measures will be necessary. There are performance tasks available in various databases (see CRESST's Alternative Assessments database in Appendix J). As previously noted, the content and performance standards should be the target for creating the assessment. If new measures are desired, district resource teachers need to work with assessment experts and classroom teachers to design the assessment to be used to show progress in meeting content and performance standards. Use of items or tasks that have already been tried out somewhere is recommended, as development of performance assessments is a time-consuming and technical process.

School-level orchestration involves planning, organizing, and managing the school activities. First, as many school staff as possible should be involved in the process. In particular, one teacher liaison to the district team should be appointed at each school. This teacher should be given release time or a stipend, and should organize and coordinate the school's indicator system and plan for improvement with the district's indicator system. He or she would organize meetings to establish supplemental school indicators or standards, attend all district meetings, help design staff development for teachers and principals, and assist the principal in providing data to the district.

Each school may decide to use the indicators chosen by the cross-role district team, or may decide to supplement them with additional indicators. These indicators should be created by teachers and the principal. Each school needs to establish which indicators it wants to use and set standards and criteria for improvement. Last, the school needs to provide necessary data to the district.

Phase III. Completed Implementation of Strategy

A. Collect, compile, and score data

1. Collect data
2. Compile data
3. Staff training
4. Score performance assessments (if applicable)

B. Transform data into information, report indicator data

1. Transform data into information
2. Compare performance levels in indicator realms against standards (e.g., background/resources, teacher quality, equity, curriculum, school environment, outcomes)
3. Develop information for decisionmaking
4. Create report card or indicator guide
5. Develop plan for improvement

C. Continuation/Institutionalization Decision

In the next phase, data are collected by district staff, compiled and scored, and any assessment scored. Data obtained then need to be transformed into indicators and information for decisionmaking. When first beginning this process of developing a district indicator system, it is recommended that districts start with only a few critical indicators. Otherwise, coming to agreement on definitions, data elements, standard levels, etc., may be difficult within a district's limited time frame. In addition, data collection, compilation, and scoring are time consuming.

A major part of the overall process is transforming the data collected into information for decisionmaking. First, the district and school need to compare performance levels in various indicator realms against the standards set. The cross-role team needs to decide which data to present in the report card or indicator guide. In addition to test data, schools may want to report teacher/staff information (e.g., number of staff, pupil/staff ratio, teacher experience, teacher turnover, salaries), student information (e.g., enrollment, socioeconomic status (SES), class size, mobility, percentage LEP, percentage Chapter 1, percentage free lunch) and other areas of school effectiveness (e.g., dropout rates, graduation rates, opportunity to learn, percentage taking AP courses). Two examples of district report cards using various indicators and formats are given in Appendix B.

After putting together the report card, the district staff develops a plan for improvement. Based on its results and its targets, what level of improvement can it expect in the coming years? Finally, a continuation/institutionalization decision must be made (e.g., to continue the process over time). This may involve additional funding or personnel.

Looking to the Future

National efforts to develop and collect indicator data may not currently be able to provide much indicator information to local districts or schools, but there are ways in which the wealth that is accumulating from this work can be distributed to local districts.

The National Center for Education Statistics (NCES) operates an annual national survey, the Common Core of Data (CCD), which includes both fiscal and nonfiscal data. The survey collects data at the school, district, and state levels, but generally reports data only at the district and state levels. Since 1988, a report released annually describes the characteristics of the 100 largest public elementary and secondary school districts in the United States, including such data as enrollments, number of graduating students, number with Individualized Educational Plans (IEP), and pupil-teacher ratios. Recent improvements in the CCD database, including agreement among states on common definitions and methods, have enabled a more comprehensive look at the nation's and states' breadth and quality of schooling. In conjunction with the Chief State School Officers (CCSSO), NCES and its national Forum group have focused in recent years on developing a comprehensive, accurate, and timely reporting system for delivery to states.

In 1989, a task force established by the NCES began examining the feasibility of a nationwide electronic record transfer system. This was done in the hope that local school staff would benefit. It was hoped that the system would encourage state and local information system comparability. Participants in the task force include school district and state education agency staff from five states, NCES staff, and CCSSO staff.

After agreement on data standards and definitions, a pilot transmission of data in study of the EXPRESS system (Exchange of Permanent Records Electronically for Students and Schools: see Appendix E) was conducted in five states. The task force first developed a set of standard data elements and definitions in American National Standards Institute (ANSI) format for a pilot electronic transfer of students' records from districts to colleges. Data elements are in five areas:

- Demographic (name, address, race, home language);
- Academic history (prior school, course work, grades, attendance);
- Special programs and services (program type, placement dates, eligibility status);

- Health; and
- Test information.

Some of the anticipated benefits of the national record transfer system include promoting greater comparability and standardization of student information across local information systems; more timely request and receipt of student records; more timely availability of data for use in determining placement and support services for new students; greater efficiency for districts with automated student information systems,; reduced total cost to transfer records and availability of a multifunction network to local agencies, which can be used for many purposes. Although this is not strictly an indicator system, it includes five domains (demographic, academic history, special programs and services, health and test information) encompassing input--process--outcomes, and includes data elements or statistics agreed upon by all participants.

In a joint NCES-Census-CCSSO project, 1990 census mapping was carried out, converting census blocks to the nation's 17,000 school districts. School district boundaries were superimposed on a census map by block and the information digitized and converted to Census TIGER files. State coordinators assisted in the mapping. Over 200 tabulations covering demographic characteristics will be run and data will be distributed to states in late 1992, along with a CD-ROM disc, and user-friendly software. The CD-ROM file will include data from the 1990 Census, along with the NCES CCD ID number to allow merging of CCD data with Census data. Variables include a large range of demographic population data, fiscal characteristics, as well as education context variables, such as dropouts and percent age free lunch. It is likely that state level and district-level outcome data can also be added to the database to allow analysis of relationships.

One way that local districts can benefit from national developments is by using the knowledge gained at the federal level by solving methodology and data collection problems in developing such information at the local level. Many of the problems that

are being addressed nationally in the design of data collections are similar to problems that local sites face on a smaller scale. For example, much of the effort in national projects goes into the design of data collection so that information about student outcomes can be disaggregated by ethnicity and gender and by other variables that represent school background characteristics, school resources, and school processes. Local sites need to be able to see many of the same kinds of disaggregations if they are to be able to make good policy. In other words, they need to be able to take advantage of the growth in knowledge at the federal level in how to convert indicator constructs such as class size and teacher qualifications into surveys, forms, and assessments that, together with designs for data collection, can develop and maintain an indicator database over an extended period of time.

Involvement of local administrators and teachers in different aspects of design and interpretation of data has two potential benefits. First, there is a beginning of an investment in the most basic units of an infrastructure—local sites—for generating information about education. Sites that work collaboratively with national research projects on development of new indicators will become models for how local school sites can generate quality information about context and processes. Second, the methods and technology that grow out of these projects may be more feasible for local sites to carry out than for the staff of a nationwide project. Local sites do not assess costs in the same way as national projects. What is a true cost of data collection for a national project may be subsumed under "staff development" when the data collection is "owned" by site-level staff. Agencies who sponsor or conduct research on new such indicators should consider ways to disseminate findings to local sites, even before some of the findings can be incorporated into data collection efforts to support a national system.

Of particular relevance to local sites are problems such as the following:

- level of detail of questions needed to get at different aspects of an indicator variable;

- considerations about consistency in data collection from one year to the next that will improve the comparability of indicator statistics over time. In particular, what kinds of problems need to be anticipated in maintaining a sample across years?

- methods used to obtain different kinds of information that are critical knowledge for local sites if indicators generated are to be meaningfully compared to national standards;

- agreement on common definitions of important terms such as dropout; and

- integration of data from various sources.

As schools across the country continue a process of restructuring, the locus of responsibility for school management and policymaking shifts more to school sites. The fact that districts and school sites have not in the past engaged in serious efforts to generate data and to create and maintain indicator databases in support of decisionmaking should not be taken as evidence that they will not develop this kind of capacity in the future. The times are changing.

Resources

RESOURCES

The following resources are included for the benefit of school and district staff.

Appendix A is a glossary of indicator and assessment terminology and is provided for those not familiar with such terminology.

Appendix B provides various examples of state or district report cards, including two from California, one from Arizona and one from Massachusetts. These are provided to give readers an idea of the commonly-used indicators in (generally state-driven) indicator systems. However, it is important to notice that although the California school and district performance report summaries focus on outcomes, the Arizona district profile contains fiscal and other input indicators, as well as performance indicators. The Massachusetts "Fact Sheet" only reports results for achievement scores. School and district staff can use these examples as a springboard for selecting their own indicators.

Appendix C give examples of specific indicators for school systems developed by the Massachusetts Association of School Superintendents (MASS, 1991). It is provided because it is a good example of a local effort to choose indicators for a school system based on the input-process-outcome model. This system includes indicators for all the realms in the basic RAND model but one (teacher quality) and is well thought out. Also included is a form used in a database in the state of Massachusetts. This may be useful to district data processing personnel who want to create or adopt such a student information system.

Appendix D is a list of the key dimensions of the 50 state performance accountability systems, including whether the system is state, local or mixed, whether or not the state has a comprehensive indicator system, what types of test are used in the state, and whether the state publicly reports data on schools, districts and the state. It also lists whether the state reports comparisons, if data are reported in the context of demographic facts and whether performance triggers rewards or sanctions. This is provided as an informational resource for those who are interested in state level trends.

Appendix E gives examples of content and student performance standards. First, the NCTM Standards for the elementary grades are excerpted. Then, a set of Mathematics Objectives created by a group of teachers at UCLA's Corinne Seeds University Elementary School is presented. The teacher committee used the NCTM Standards and the California Mathematics Framework to create objectives to be used by teachers in classroom planning. This document effectively translates the NCTM content standards into teacher language, or concrete objectives to be taught in various content areas. The Seeds group is currently developing a companion assessment package to go with the objectives, which will have actual exercises and performance tasks to assess student performance levels. Hopefully, this document will be useful to teachers, principals and other local staff in implementing national or state frameworks.

Also included here are two examples of student performance standards drawn from *A sampler of mathematics assessment* (CDE, 1991). The first is a generic list of standards that can be used with many tasks. The second is a rubric specific to a task that asks students to write a paper on results of a smoking survey.

Appendix F includes an overview of a national system: Exchange of Permanent Records Electronically for Students and Schools (EXPRESS). It is included because there are several districts from five states currently participating in the pilot study, and local districts may be interested in participating in such a system.

Appendix G is a description of the California Student Information System (CSIS) and listing of categories of data. It is included for the benefit of readers in California that may be interested in the upcoming system. In addition, the categories of data are commonly-used ones and are the same as those used in the EXPRESS system. The state of California is cooperating with the federal group on common data standards.

Appendix H lists resource organizations and contact information for the readers who may need further help.

Appendix I presents Criteria for Evaluation of Student Assessment Systems created by the National Forum on Assessment. These have been endorsed by many federal, state and local

groups across the country and are provided as a service to districts or schools that are developing new assessments.

Appendix J is a document produced by the CRESST Center at UCLA: Alternative Assessments in Practice Data Base Protocol. The form can be used by any group that has created an assessment task and wishes to share it with others. Readers can contact CRESST for information on its assessment newsletter or on access to its data base materials.

Appendix K: The National Education Goals includes a list of all six national goals, with their associated objectives. In addition, for goal 3: Student Achievement and Citizenship, an excerpt from the Goals Panel's first report is included that displays what we now know and what we still need to know. Exhibitions of specific indicators of competency in mathematics and student drug use are included for informational purposes. An excerpt from one state's report (Colorado) is also included. This information is included for those readers who may want to develop goals or objectives similar to those adopted nationally.

Appendix A

Glossary of Indicator and Assessment Terminology

Glossary of Indicator and Assessment Terminology

Accountability Goal: Accountability for outcomes; subject to giving an account.

Advanced Placement (AP) examination. Exam given in various content areas by College Board to assess the level at which a student has passed.

Constructed-response Items: Open-ended written items that require students to produce a solution to a question.

Content Standards: Standards that set out the knowledge, skills, and other necessary understandings that schools should teach in order for student to attain competency in subject matter (ex. NCTM Standards, California Curriculum Frameworks).

"High Stakes" exam: An exam that is important in a student's life in terms of placement, grading or promotion.

Indicator System: Model of the central components of the entire educational system, with indicators to measure each component.

Indicator: Data or statistic that measures important aspects of a system or provide information about the condition of education.

Opportunity to Learn: Equal opportunity provided to students to learn the material. This includes topic coverage, instructional materials, well-trained teachers and curriculum resources.

Outcome: Output of the educational system (e.g. achievement, participation)

Performance Assessment; Testing methods that require students to create an answer or product to demonstrate their knowledge or skills.

Reliability: Consistency and generalizability of test data.

Report Card: checklist of key aspects of education that rates progress in meeting standards.

School Delivery Sandards: Criteria or metric set to enable local and state education staff, parents, and the public to assess the quality of a school's capacity and performance in educating student in subject matter described in content standards.

Standard Setting Process: A process by which standards are developed. The three major approaches are a) begin at the national level and rely on professional input; b) begin at local and state levels and synthesize at the national level; and c) start with professional judgment and examples from the national level and look to the state and local levels for guidance.

Student Performance Standard: Standard that establishes the degree or quality of student performance in the subject matter set out in the content standards (e.g. level 1 - 5 on AP exams)

System Delivery Standards: Delivery standards that set out criteria for establishing the quality of a school system's capacity and establish targets for student achievement.

Validity: Whether or not a test measures what it is supposed to measure.

World-class Standards: The highest level of student performance standards. To ascertain performance at this level, it is necessary to gather information about the quality of the best student work in other nations.

Appendix B

Examples of State/District Report Cards

California State Report Card 1991

Name: *California*
For: *California Treats Its Children*
OVERALL GRADE: D
Summary: *Unsatisfactory Performance for the Third Straight Year*

The Good News

- Overall school dropout rates are improving somewhat.
- Eighth grade reading and math achievement scores show slow but steady improvement.
- Infant death rates improved by nearly 10% over the past 4 years.

The Bad News: Serious Warning Signs

- 2.1 million children have no public or private health insurance–a 62% increase over the past 6 years. California now ranks 42nd among the 50 states.
- California's teen birth rate is rising steadily and is now well above the national rate.
- Rapidly increasing numbers of young people are in more serious trouble: over the most recent 4 years, youth homicide rates increased 25%, reports of child abuse and neglect 41%, the number of children placed in foster care 50%, and juvenile incarceration rates 23%.

THE CONSEQUENCES: A DAY IN THE LIFE OF CALIFORNIA'S CHILDREN

Many of California's children are healthy and doing well. But for hundreds of thousands, the picture is bleak and getting more urgent each day. Every day in California, 1,560 babies are born. And every day we do not take action to improve their situation:

- **3 young people will be murdered**
- **12 babies will die before their first birthday**
- **174 babies will be born to teen mothers**
- **179 teens will drop out of school**
- **306 babies will be born into poverty**

Source: *What's happening to our children? A county by county guide.* Sacramento, CA: Children Now, 1991.

CALIFORNIA STATE BENCHMARKS 1991
For Measuring the Well-Being of California's Children

Benchmark	Trend in California	Compared to National Avg.	Rank: Among 10 Best States?
EDUCATION = C			
1. Dropout Rates	Better	Worse	No (42nd)#
2. Preschool Education	Incomplete	NA	NA
3. Achievement Scores	Better	NA	NA
4. SAT Scores	Worse	Better	Yes (4th of 23)
5. Student/Teacher Ratio	Better	Worse	No (50th)
6. Per Pupil Expenditures	Better	Worse	No (31st)
HEALTH = D+			
7. Infant Mortality	Better	Better	No (13th)
8. Late or No Prenatal Care	Better	Worse	No (37th)
9. Inadequate Immunization	Worse	Worse#	NA
10. Uninsured Children	Worse	Worse	No (42nd)
11. Use of Nutrition Program	Better	Worse	No (44th)
12. Children's Mental Health	Incomplete	NA	NA
SAFETY = U			
13. Child Abuse/Neglect	Worse	Worse	No (48th)
14. Children in Foster Care	Worse	Worse	NA
15. Drug Exposed Babies	Incomplete	NA	NA
16. Youth Homicides	Worse	Worse	NA
TEEN YEARS AND BEYOND = D			
17. College Bound Students	Better#*	Worse#	NA
18. Unemployed Youth	Better	Worse	No (31st)
19. Teen Births	Worse	Worse	No (35th)#
20. Drug and Alcohol Use	Better#	NA	NA
21. Incarcerated Juveniles	Worse	Worse	No (50th)#
FAMILY LIFE = D			
22. Child Care	Incomplete	NA	NA
23. Homeless Children	Incomplete	NA	NA
24. Public Assistance Payments	Better	NA	Yes (2nd)
25. Hungry Children	Incomplete	NA	NA
26. Child Support	Worse	Worse	No (42nd of 47)
27. Children in Poverty	Worse	Worse#	No (35th)#
OVERALL GRADE = D			
	Worse: 48%	**Worse: 89%**	**Not in Top 10: 87%**

Trends are based on the most recent 4 years of information. When no clear trend emerges, data from additional years are analyzed. An (*) indicates that the trend is based on 5 years. A (#) indicates that no new data are available so data from earlier Report Cards are used. In most cases, ranks are out of a possible 51 (including 50 states and the District of Columbia) with 1 being best and 51 being worst.

NA: Information not available, Incomplete = Available data are incomplete, so no trend can be determined.

Explanation of Grades
A = Excellent, B = Good, C = Needs Improvement, D = Seriously Deficient, U = Unsatisfactory

Special Education Programs Available*	Students Served 1988-89
Multiple Handicapped/Severe Sensory Impairment	3
Deaf/Blind	0
Visually Handicapped	13
Physically Handicapped	14
Multiple Handicapped	22
Autistic	1
Severe/Profound	14
Hearing Handicapped	24
Trainable Mentally Handicapped	36
Seriously Emotionally Handicapped	7
Other Health Impaired	14
Educable Mentally Handicapped	67
Emotionally Handicapped	165
Learning Disabled	1,067
Speech	401
TOTAL Special Education Students	1,848

* Note: All Arizona school districts are required under federal and state laws and regulations to assure that all handicapped students have available to them a free appropriate public education including special education and related services designed to meet their unique needs. If some services are not provided, it is possible that there are no students requiring that service, or the students are being served by another agency (i.e., adjacent district, state school, county consortium or private provider).

Federal School Lunch Program 1988-89*

	Elem.	Junior High	High School	Adult
Reduced Prices				
Breakfast	$0.20	$0.00	$0.00	N/A
Lunch	0.40	0.40	0.00	N/A
Paid Prices				
Breakfast	0.40			
Lunch	0.70	0.70		$1.25
Special Milk Prices	0.00			
Food Service Workers				
Full Time	55			
Part Time	106			

Students Qualifying for Free/Reduced Price Lunch:	1,059
% of ADM Qualifying for Free/Reduced Price Lunch:	5.70%

Schools Not Participating:
Center School
Big School

* Participation in the Federal School Lunch Program is voluntary. Districts or individual schools in districts may opt out of the program.

Special Service Agencies for Special Education

Far West Developmental Learning Center
19956 West McDowell
Buckeye, AZ 85326 (257-2843)

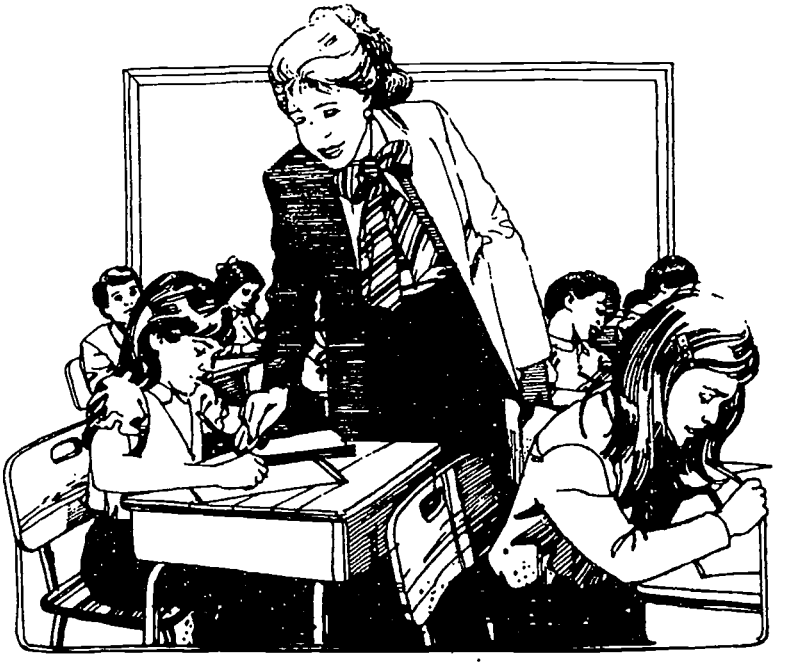
Maricopa County Special Education
Accommodation School District No. 512
11 Coolidge Street
Williams AFB, AZ 85225-7315 (892-1102)

Maricopa Special Services Consortium
210 South Sixth Street, P. O. Box 518
Buckeye, AZ 85326 (386-4471)

Preschool Program

- 4-day program
- Transportation and meals provided
- Program provided free of charge
- Program considered part of a community school

For more information regarding the preschool program, contact the district office.



Research and Development Division, Arizona Department of Education, 1535 West Jefferson, Phoenix, AZ 85007 • November 1991
C. Diane Bishop, Superintendent of Public Instruction

ABC UNIFIED SCHOOL DISTRICT

Arizona Education Profile

Arizona Department of Education • C. Diane Bishop, Superintendent of Public Instruction

The ABC Unified School District is located in Maricopa County, about 10 miles east of Somewhere, and serves kindergarten through 12th grade students from ABC and the surrounding environs with twenty elementary and middle/junior high schools and four high schools. More information regarding ABC is available in "Community Profiles" from the Arizona Department of Commerce.

Superintendent: Dr. Duane Smith
Assistant Superintendents: Dr. Glen Smith
Robert C. Smith
Dr. Betty Smith
John Smith

Address: 3800 North 20th Street, Phoenix, AZ 85000
Phone: 555-5555

School Board Members: Christy Jones
George Jones
Susan Jones
Don Jones
Diane Jones

ENROLLMENT AND STAFFING

Students	1983-84	1988-89	Staff	1983-84	1988-89
Enrollment	19,158	19,400	Administrators	51	62
ADM* K-8	10,983	11,732	Teacher Aides	99	77
ADM 9-12	7,958	6,845	Teachers	1,053	1,131
Total	18,941	18,577	Other Staff	637	645
			Total	1,840	1,915

*Average Daily Membership (Attending)

1988-89	ABC	Maricopa Co.	Arizona
Students per Teacher	16.4	18.6	18.4
Students per Teacher Aide	241.3	152.6	127.1
Students per Staff	9.7	10.2	9.7
Average Teacher Salary	$32,799	$30,605	$29,402

Racial/Ethnic Composition 1988-89

	ABC	Maricopa Co.	Arizona
White	80%	71%	64%
Black	1%	5%	4%
Hispanic	15%	20%	24%
American Indian	1%	2%	7%
Asian	2%	2%	1%

1988-89	ABC	Maricopa Co.	Arizona
Gifted Students	2,423	19,292	26,803
% of Total ADM	13.04%	5.92%	4.62%
LEP* Students	415	19,463	53,133
% of Total ADM	2.23%	5.98%	9.12%
Special Education Students	1,848	29,440	54,110
% of Total ADM	9.95%	9.04%	9.29%

*Limited English Proficient

FINANCIAL INFORMATION

Expenditures	1983-84	1988-89	% Increase
Maintenance & Operations			
Administration	$1,658,297	$2,142,878	29.22%
Instruction	28,137,259	43,516,383	54.66%
Instruction Support	6,486,052	10,085,093	55.49%
Operations	9,808,115	13,553,789	38.19%
TOTAL M&O Expenditures	46,089,723	69,298,143	50.35%
Teacher Retirement Adjustment*	2,140,453	—	—
Adjusted M&O Expenditures	49,362,714	69,298,143	40.39%

Non M&O Expenditures	1983-84	1988-89	% Increase
New Capital Items			
Capital Outlays	$4,317,559	$3,633,658	-15 84%
Debt Service	1,368,570	8,952,199	554.13%
Bond Building	0	27,444,840	—
Total New Capital Items	5,686,129	40,030,697	604.01%
Miscellaneous Non M&O Items			
School Plant	1,132,538	902,230	
Federal/State Projects	1,381,142	1,722,917	
Adjacent Ways	6,584	13,500	
Intergovernmental Agreements	0	0	
Indirect Costs	25,594	43,462	
Unemployment Insurance	32,267	14,246	
Other	1,881,821	3,340,848	
Total Misc. Non M&O Items	4,460,946	6,037,203	35.33%
TOTAL Non M&O Expenditures	10,147,075	46,067,900	354.00%
TOTAL EXPENDITURES	58,377,251	115,366,043	97.62%
Teacher Salaries (All Funds)	$27,275,989	$35,312,852	29.46%

* These contributions to the State Teacher Retirement Fund were not included in Maintenance and Operations expenditures for 1983-84, but are included in 1988-89.

Revenue Sources 1988-89

	Local	County	State	Federal
M&O	$48,453,590	$391,787	$17,409,290	$0
Capital Outlay	3,046,146	0	787,401	0
Adjacent Ways	63,808	0	3,897	0
Debt Service	8,315,963	0	18,084	0
TOTAL	59,879,507	391,787	18,218,672	0
% of District Revenues	76.29%	0.50%	23.21%	0.00%
% of State Revenues	44.66%	4.01%	48.67%	2.66%

Program Expenditures*

	1983-84	1988-89
Special Education		
Educable Mentally Handicapped	$302,901	493,443
Seriously Emotionally Handicapped	610,977	788,439
Hearing Handicapped	149,849	187,008
Other Health Impaired	110,064	93,864
Multiple Handicapped	147,194	213,708
Severe Sensory Impaired	—	20,649
Physically Handicapped	43,708	121,803
Learning Disabled	3,196,477	4,332,142
Speech Handicapped	577,066	996,704
Trainable Mentally Handicapped	326,159	347,761
Visually Handicapped	133,983	212,166
Total Special Education	5,598,378	7,807,687
Gifted	464,376	860,363
Bilingual Education	0	452,166
Remedial Education	0	0
Vocational Education	1,087,954	1,499,335
Career Education	0	0
TOTAL (incl. in M&O)	7,150,708	10,619,551
% of Total M&O Expenditures	15.51%	15.32%
State % of Total M&O Expenditures	12.64%	13.46%

* Program Expenditures only include state and local funds. Monies expended from any federal grants are not included.

Property Ownership 1988-89

Land and Improvements	$18,774,181
Building and Improvements	91,913,148
Furniture and Equipment	18,736,297
Construction in Progress	17,062,667
Bonds Outstanding (June 30, 1989)	$77,650,000

Property Tax Assessment August 1988

	Tax Base*	Tax Rate**
Primary Assessed Valuation	$1,329,653,362	$4.3393
Secondary Assessed Valuation	1,469,313,443	0.8458

* Excluding Salt River Project Assessed Valuation
** Per $100 Assessed Valuation

Primary Property Tax Capacity 1989*

	ABC	Maricopa Co.	Arizona
Capacity	$70,358,066	$651,704,800	$1,007,260,925
Equalization Base	62,089,984	1,076,065,265	1,959,064,330
Equalization Aid	2,594,845	557,387,078	1,119,161,196

*Definitions:

Property Tax Capacity is the dollar amount of revenue that a given district would raise if it applied the qualifying tax rate on property.

State Equalization Base is determined using the state funding formula.

State Equalization Aid is the actual amount of state aid that each district is given. This figure is determined by subtracting the Actual Tax Collections from the State Equalization Base. Maximum usage of the available tax base is required to receive State Equalization Aid.

STUDENT PERFORMANCE INDICATORS 1988-89

Standardized Test Results April 1989*

	ABC			Maricopa Co.			Arizona			U.S. Average		
Grade	R	L	M	R	L	M	R	L	M	R	L	M
1							43	58	49	54	59	52
2	73	79	75	53	61	60	49	57	56	53	55	52
3	65	68	59	49	54	47	46	51	43	52	53	50
4	65	63	58	49	50	47	47	47	43	52	52	51
5	65	66	60	51	54	49	49	50	45	52	50	51
6	65	63	62	51	53	52	48	49	47	50	50	51
7	66	69	63	53	56	51	51	52	47	50	50	50
8	65	73	62	52	58	49	49	55	46	48	48	48
9	70	66	64	58	54	51	54	52	45	48	49	48
10	66	57	61	55	47	50	51	45	46	48	48	49
11	63	62	63	53	54	49	50	51	44	49	43	49
12							48	44	40	50	47	50

R – Reading L – Language M – Math

*Percentile Scores

Graduation Requirements*

Minimum Credit Units as follows:

4.0	English
2.0	Laboratory Science
3.0	Social Studies
2.0	Mathematics
1.0	Physical Education
1.0	Cultural Enrichment
1.0	Practical Arts
8.0	Electives
22.0	TOTAL

*Graduation Requirements effective for class of 1989

Graduates and Dropouts 1988-89

	High School Graduates	Dropout Rate
ABC Unified	1,654	5.26%
Maricopa County	17,467	9.76%
Arizona	31,423	10.17%

Absentee Rate 1988-89

	ABC	Maricopa Co.	Arizona
Grades K-8	5.30%	5.65%	5.77%
Grades 9-12	4.30%	6.33%	6.62%

Percent Limited English Proficient (LEP) 1988-89

	ABC	Maricopa Co.	Arizona
Grades K-8	2.48%	6.45%	2.26%
Grades 9-12	1.19%	2.10%	2.72%

Students Scoring Below the 40th Percentile 1988-89*

	ABC	Maricopa Co.	Arizona
Grades K-8	17.65%	35.98%	40.55%
Grades 9-12	22.88%	37.30%	41.24%

* Standardized Achievement Test

PROGRAMS AND SERVICES

Bilingual Programs

	1984-85	1988-89
K-6 Transitional Bilingual	0	0
7-12 Secondary Bilingual	0	0
K-12 Bilingual Bicultural	0	0
English as a Second Language (ESL)	0	364
Individual Education	0	44
PHLOTE* Students	563	803
New and Continuing LEP Students	97	415

* Primary Home Language Other Than English

Bilingual Staff

	1984-85	1988-89
Certified Staff		
Bilingual Endorsements	0	1
Provisional Bilingual Endorsements	0	0
ESL Endorsements	0	9
Provisional ESL Endorsements	0	22
Without Endorsements	1	0
Non-Instructional Staff	0	0
Total Certified Staff	1	32
Paraprofessional Staff		
Associate Degree	1	0
High School Diploma/GED	0	12
Without High School Diploma/GED	0	0
Non-Instructional Staff	0	0
Total Paraprofessional Staff	1	12
TOTAL	2	44

Vocational Education Programs

	Students Served 1989-90
Accounting	311
Business/General Office	1,552
Marketing	89
Radio/TV Production	33
Cosmetology	20
Health Care	15
Life Management Education	1,084
Industrial Arts	836
Automotive	87
Drafting, Graphic Arts, Commercial Arts	37
Welding	1
Career Assessment and Services	1,066
Hospitality	8
Law Enforcement	6
Machine Shop	2
TOTAL	5,147

California Department of Education

District Performance Report Summary, 1989-90

District: EPIC UNIFIED
County: SAN DIABLO
CD code: 60-54321

This report is based on 1,507 seniors.

Quality Indicator Performance Levels	1989-90 Percent	Target Met[1]	1-Year Growth[2] from 1988-89	Growth[2] from Base[3] 1987-88	1989-90 Relative Rank[4]
CAP Achievement					
Reading - commendable & above	28	*	0	2	53
Reading - adequate & above	71		0	1	64
Mathematics - commendable & above	39	*	3	6	81
Mathematics - adequate & above	77	*	-1	4	75
Direct Writing - commendable & above	27	*	3	3	83
Direct Writing - adequate & above	60	*	3	3	87
Curriculum					
Geometry completion	64.3	*	0.7	5.6	69
Four or more years of English	75.5		0.6	-5.1	52
a-f course enrollments	47.0		8.1	-1.0	49
Dropout Complement (100 minus % dropping out)					
Three-year derived rate[5]	94.4	*	1.5	-1.2	77
College Bound					
a-f course completions	40.3	*	5.9	9.3	79
Four-year college attendance	21.4	*	0.5	2.8	79
SAT verbal - at least 450	16.9		-0.4	0.6	49
SAT mathematics - at least 500	21.7		0.5	0.9	66
Advanced placement - 3 or better	13.3	*	0.6	7.3	54
Average Performance Value	54.4	*	1.6	1.9	81

Summary	1990 Average Performance Value	Target Met[1]	Percent Change from 1988-89	Percent Change from Base	Relative Rank
District values	54.4	*	3.0	3.6	81
State values	48.9		1.9	3.4	N/A

Percent change is the increase in the pool of students who met performance levels.

Average performance value results for small districts (30 or fewer seniors) are not calculated because they tend to be unstable from year to year. Values based on fewer than 100 seniors should be interpreted with caution if being used for evaluation of district performance and program modification

[1] Stars (*) indicate performance or base-year growth targets were met for the quality indicators and the 1990 average performance value. Refer to the "How to Read" section in the Interpretive Guide for details.

[2] Growth is the change in the percent of students meeting performance levels. Each positive percentage point indicates that one percent more students met performance levels than in the past.

[3] The base year for all indicators is 1987-88 except CAP direct writing (1988-89), dropout complement, SAT, and AP (1986-87).

[4] The relative rank is the weighted average of schools' relative ranks; schools are weighted by size.

[5] The three-year derived dropout complement is weighted by four in calculating the Average Performance Value.

Missing values. Refer to "The Report" section of the Interpretive Guide for details on value substitution.
[a] All schools in the district had missing values in 1989-90. [b] 1988-89 missing [c] 1987-88 missing

Excerpt from: California High School Performance Report Summary, 1990. Sacramento, CA California Department of Education, Program Evaluation and Research Division.

California Department of Education

School Performance Report Summary, 1989-90

School: EPIC SENIOR HIGH
District: EPIC UNIFIED
County: SAN DIABLO
CDS code: 60-54321-7654321

This report is based on 235 seniors.

Quality Indicator Performance Levels	1989-90 Percent	Target Met[1]	1-Year Growth[2] from 1988-89	Growth[2] from Base[3] 1987-88	1989-90 Relative Rank[4]
CAP Achievement					
Reading - commendable & above	27	*	2	3	61
Reading - adequate & above	71		0	1	68
Mathematics - commendable & above	33		3	1	68
Mathematics - adequate & above	73		-3	-2	54
Direct Writing - commendable & above	22	*	2	2	65
Direct Writing - adequate & above	55	*	3	3	66
Curriculum					
Geometry completion	60.4	*	6.5	8.4	69
Four or more years of English	91.9	*	6.0	25.2	80
a-f course enrollments	43.9		11.4	-2.3	45
Dropout Complement (100 minus % dropping out)					
Three-year derived rate[5]	94.7	*	3.0	-2.8	75
College Bound					
a-f course completions	24.7	*	11.0	12.9	45
Four-year college attendance	14.6	*	-0.1	1.7	56
SAT verbal - at least 450	13.9	*	3.2	6.3	55
SAT mathematics - at least 500	15.2	*	1.6	2.2	57
Advanced placement - 3 or better	1.3		-2.4	0.9	26
Average Performance Value	51.4	*	3.1	2.9	77

Summary	1990 Average Performance Value	Target Met[1]	Percent Change from 1988-89	Percent Change from Base	Relative Rank
School values	51.4	*	6.4	6.0	77
District values	54.4	*	3.0	3.6	81
State values	48.9		1.9	3.4	N/A

Percent change is the increase in the pool of students who met performance levels.

Average performance value results for small schools (30 or fewer seniors) are not calculated because they tend to be unstable from year to year. Values based on fewer than 100 seniors should be interpreted with caution if being used for evaluation of school performance and program modification.

[1] Stars (*) indicate performance or base-year growth targets were met for the quality indicators and the 1990 average performance value. Refer to the "How to Read" section in the Interpretive Guide for details.

[2] Growth is the change in the percent of students meeting performance levels. Each positive percentage point indicates that one percent more students met performance levels than in the past.

[3] The base year for all indicators is 1987-88 except CAP direct writing (1988-89), dropout complement, SAT, and AP (1986-87).

[4] The relative rank is the percentile rank of a school's value when compared to base-year values of similar schools.

[5] The three-year derived dropout complement is weighted by four in calculating the Average Performance Value.

Missing values. Refer to "The Report" section of the Interpretive Guide for details on value substitution.
[a] 1989-90 missing — target met, growth, and relative rank not available (N/A) [b] 1988-89 missing [c] 1987-88 missing

Performance Report for California Schools

C 12 NORCAL
D 34567 MIDWAY UNIFIED
S 8901234 EPIC SENIOR HIGH
1986-87 Grade 12 Enrollment - 407

Standard Score Display

Course Enrollments 1986-87	1986-87 School Standard Score	Comparison Group Standard Score Range
Mathematics		
3 or more years	488	352-608
Advanced mathematics	499	359-576
English		
4 or more years	652	368-615
Science		
3 or more years	592	349-624
Chemistry	616	337-596
Physics	590	351-614
Advanced science	423	347-615
History/Social Science		
4 or more years	651	344-636
Foreign Language		
3 or more years	522	352-553
Fine Arts		
1 year art/music/drama/dance	473	345-617
Units required for graduation	627	369-627
University of California Requirements		
Enrollments in a-f courses	424	336-592
Graduates completing a-f courses	439	358-573

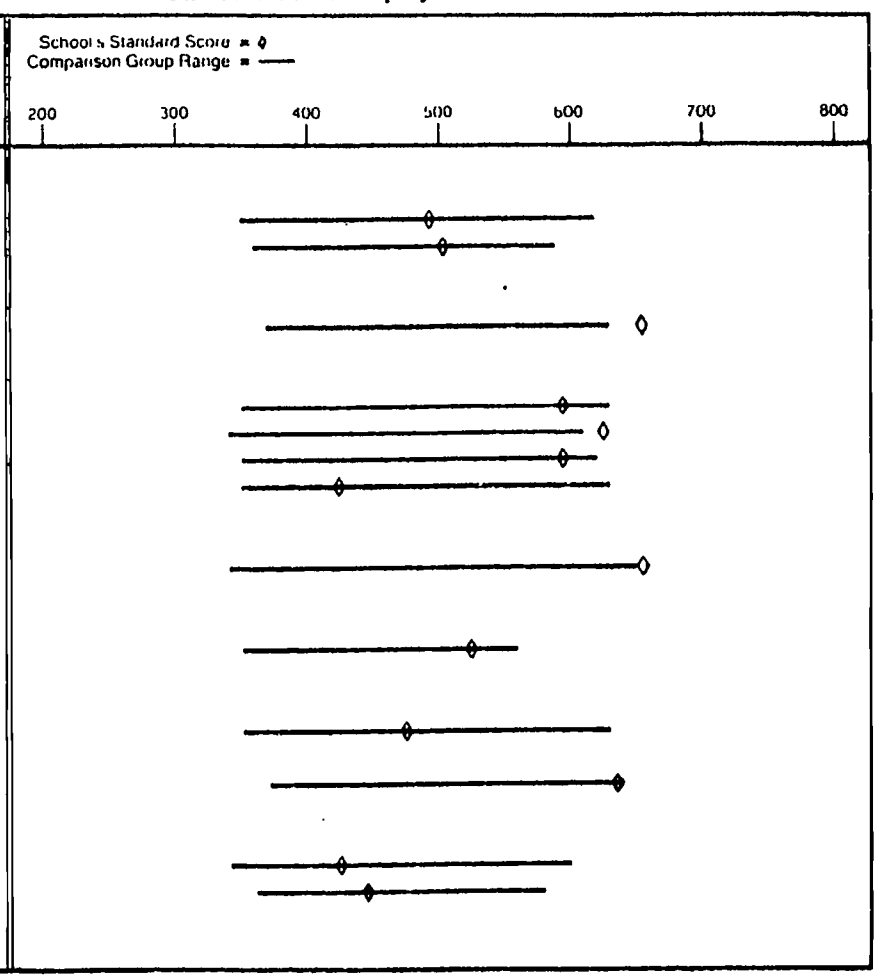


Figure 5.—An example of California's "floating" bands
SOURCE: California State Department of Education (1987)

SCHOOL INDICATOR FACT SHEET

ISSUE:

1990 Massachusetts Educational Assessment Program _____, Massachusetts.

FACTS:

This is the third report on the results of the Massachusetts Educational Assessment Program (MEAP) which includes student achievement in Reading, Mathematics, Science and Social Studies. Detailed analysis of MEAP scores can be obtained by reviewing the 1990 Educational Assessment Reports located in the superintendent's office. See attached Summary of District Performance.

DISCUSSION:

Assessment Highlights - District performance was significantly above the state average in reading, math, science and social studies in grades 4 and 12. In grade 8 scores in reading and mathematics were just above the state average, while scores for science and social studies were significantly above the state average.

RECOMMENDATION:

a. Analyze results

1. What are strengths/weaknesses of instructional program?
2. Study Grade 8 reading and mathematics curriculum.
3. Study Grade 4, 8 and 12 social studies curriculum.
4. What other factors might affect student performance?
5. Form committees, set milestones, give progress reports.

RECOMMENDED ACTION AGENCY:

Administrative Team, Dept. Heads, Team Leaders, Grade Leaders

Excerpt from: *The case for local indicators*. Boston, MA: Massachusetts Association of School Superintendent 1991.

Appendix C

Examples of Indicators for School Systems

A discussion draft developed by an informal task force of educators, MDE staff and interested citizens

	STATISTICS AVAILABLE FROM STATE MDE, MASC, MTA, AIM, Dept. of Rev., etc. schl/syst	STATISTICS AVAILABLE FROM SYSTEM schl/syst	QUALITATIVE INFORMATION FROM SYSTEM schl/syst
BACKGROUND INDICATORS (what the system works with)	Population education level Per-capita income Tax base/school-attending child Community classification-KOC Student socio/economic status Race/ethnicity/limited English Special needs %/type	School transiency index	
PROCESS INDICATORS (what the system and community do)			
A. Mostly Controlled by School System: (and parents)	Attendance rates Enrollment shares (public, voc, private, dropped) $/pupil by category Library vs. ALA standards Staffing ratios (instruction, counseling, administrative) Class size by category Instructional time by subject Promotion rates	% of budget for professional development % of budget for program development Use of volunteers Use of community resources $ from gifts/grants Teacher salaries Teacher attendance rates Race/ethnicity of staff % certified % long term substitute Promotion standards	RE CURRICULUM Curriculum breadth Individualization of instruction Guidance/counseling services Homework expectations Honors programs; advanced placement Use of info systems technology Teamwork emphasis RE ORGANIZATION AND MANAGEMENT Student-centered mission clear to all Leadership style and structure Professional development practices Parent/student choice of school Strategic long-range planning RE: PARENT School outreach to parents Expectations for parents Parent/student/teacher partnership
B. Mostly Controlled by Community:	Local $/pupil	Pre-school services % students working excess hours % students involved with courts	Community attitudes *re* education support Pre-natal and child health care Youth services; sports, clubs, counseling, big brother/sister, etc. Substance abuse prevention/treatment
C. Mostly Controlled by State Regulations:	State $/pupil Special ed staffing & placements Bilingual ed staffing Bilingual languages offered		
OUTCOME INDICATORS (what the results are for students; capabilities and achievements)	Completion rates, (including GED) Mass. Assessment results (reading, math, science, social studies) Mass. Basic Skills Test results Post high school plans	Completion standards AP scores and participation Awards & scholarships College Board Participation College Board results College placement % to 2, 4 year College placement selectivity Non-college placement information Results of academic competitions (math, science, clubs, etc.) Need indicators by categories - gifted, at-risk, bilingual, etc.	Judgments re persistence, curiosity, critical thinking, values, employability Student portfolio material Post-school evaluation by students, parents, next school, college, employer Post-school attainment (education, career, civic)

Excerpt from: *The case for local school indicators.* Boston, MA: Massachusetts Association of School Superintendents, 1991.

EDUCATIONAL INDICATORS FOR SCHOOL SYSTEMS

I

(Statistics available from State, MDE, MASC, MTA, Dept. of Rev., etc.)

SCHOOL YEAR 1990-1991

BACKGROUND INDICATORS (WHAT THE SYSTEM WORKS WITH)

100	Population education level	
101	Per-capita income	
102	Tax base/school-attending child	
103	Community classification-KOC	
104	Student socio/economic status	
105	Race/ethnicity/limited english	

106/107	Special needs %/type	502.1		502.4	
108/109		502.2		502.5	
110/111		502.3		502.6	

PROCESS INDICATORS (WHAT THE SYSTEM AND COMMUNITY DO)

Mostly Controlled by School System and Parents

110	Attendance rates	Elementary	
111		Middle	
112		Senior	

Enrollment shares

113	Public	
114	Vocational	
115	Private	
116	Dropped	

115/116	$/pupil by catagory	2300 salaries		equipment	
117/118		2100 salaries		class supplies	
119/120		textbooks		library books	

Library vs. ALA standards

		local	norm
121	Elementary		
122	Middle		
123	Senior		

Staffing ratios (student/teacher)

		elementary	middle		senior
124/125	instruction			130	
126/127	counseling			131	
128/129	administrative			132	

EDUCATIONAL INDICATORS FOR SCHOOL SYSTEMS
II
(Statistics available from System)

SCHOOL YEAR 1990-1991

PROCESS INDICATORS (WHAT THE SYSTEM AND COMMUNITY DO)

BUDGET

200	% for professional development	
201	% for program development	

203	Number of volunteers	elementary	
204		middle	
205		senior	

206	$ from gifts	
207	Average teacher salary	
208	Teacher attendance rate	
209	% certified	
210	% long term substitute	

Race/ethnicity of staff

		Male	Female
211	Caucasian		
212	Hispanic		
213	Oriental		
214	Black		
215	Other		

216	Pre-school services	
217	% students working excess hours	
218	% students involved with courts	

State Assessments

219		elementary	
220		middle	
221		senior	

EDUCATIONAL INDICATORS FOR SCHOOL SYSTEMS
III

Mass Assessment results

grade 4

260/261	reading	
262/263	math	
264/265	science	
266/267	social studies	

grade 8

reading	
math	
science	
social studies	

grade12

268	reading
269	math
270	science
271	social studies

Mass Basic Skills results

grade 3

275/276	reading	
277/278	math	
279/280	writing	

grade 6

reading	
math	
writing	

grade9

281	reading
282	math
283	writing

High School completion standards

		no. of years
285	english	
286	math	
287	science	
288	social studies	
289	physical ed	

Special population

		gifted	bilingual	at-risk	low-income
290	elementary				
291	middle				
292	senior				

Appendix D

Key Dimensions of the 50 State Performance Accountability Systems

Table 7.
KEY DIMENSIONS OF THE 50 STATE PERFORMANCE ACCOUNTABILITY SYSTEMS

State	Is the system State, local or mixed State and local? Level	Is there a comprehensive system of indicators? Indicator System	What types of tests are used? Test Type	Does State publicly report data on schools, districts, the State? Public Report: School	District	State	Does State report comparisons or in a form that allows comparisons? Compare	Is data reported in context of demographic factors? Context	Does performance trigger rewards, sanctions or other consequences? Policy Links
Alabama	State	No	Both	Yes	Yes	Yes	Yes	No	No
Alaska	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Arizona	State	No	Achievement	Yes	Yes	Yes	Yes	No	No
Arkansas	State	No	Both	No	Yes	Yes	Yes	Yes	Yes
California	Mixed	Yes	Both	Yes	Yes	Yes	Yes	Yes	Yes
Colorado	Mixed	Yes	Achievement	No	Yes	Yes	Yes	Yes	No
Connecticut	State	Yes	Achievement	No	Yes	Yes	Yes	Yes	Yes
Delaware	State	No	Achievement	Yes	Yes	Yes	Yes	No	No
DC	State[1]	No	Both	Yes	Yes	Yes[1]	Yes	No	Yes
Florida	State	Yes	Both	Yes	Yes	Yes	Yes	Yes	Yes
Georgia	State	No	Both	Yes	Yes	Yes	Yes	Yes	Yes
Hawaii	State[1]	Yes	Both	Yes	Yes	Yes[1]	Yes	Yes	Yes
Idaho	State	No	Achievement	No	No	No	No	No	No
Illinois	Mixed	Yes	Achievement	Yes	Yes	Yes	Yes	No	Yes
Indiana	State	Yes	Both	Yes	Yes	Yes	Yes	Yes	Yes
Iowa	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Kansas	State	Yes	Achievement	No	Yes	Yes	No	Yes	No
Kentucky	State	Yes	Both	Yes	Yes	Yes	Yes	Yes	Yes
Louisiana	State	No	Both	Yes	Yes	Yes	Yes	Yes	Yes
Maine	State	No	Achievement	Yes	Yes	Yes	Yes	No	No
Maryland	State	No	Both	Yes	Yes	Yes	Yes	No	No
Massachusetts	State	No	Both	Yes	Yes	Yes	Yes	Yes	Yes
Michigan	State	No	Achievement	Yes	Yes	Yes	Yes	No	Yes
Minnesota	Local	No	Achievement	No	Yes	Yes	Yes	No	Yes
Mississippi	State	Yes	Both	Yes	Yes	Yes	Yes	Yes	Yes
Missouri	State	No	Both	No[2]	Yes	Yes	No	No	No
Montana	None	No	Achievement[3]	No	No	No	N/A	N/A	N/A
Nebraska	None	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nevada	State	Yes	Both	No	Yes	Yes	Yes	No	No
New Hampshire	State	No	Achievement	No	No	No	Yes	No	No

State	Level	Indicator System	Test Type	Public Report			Compare	Context	Policy Links
				School	District	State			
New Jersey	State	No	Both	Yes	Yes	Yes	Yes	Yes	Yes
New Mexico	Mixed	Yes	Both	No	No	Yes	Yes	Yes	Yes
New York	State	Yes	Both	Yes	Yes	Yes	Yes	No	Yes
North Carolina	State	No	Both	Yes	Yes	Yes	Yes	Yes	Yes
North Dakota	None	No	Achievement[3]	No[2]	No[2]	Yes	Yes	No	No
Ohio	Mixed	Yes	Both	Yes	Yes	Yes	No	No	No
Oklahoma	State	No	Achievement	No	Yes	Yes	Yes	No	Yes
Oregon	Mixed	Yes	Both	No	No	Yes	No	No	No
Pennsylvania	State	Yes	Both	Yes	Yes	Yes	Yes	Yes	Yes
Rhode Island	State	Yes	Achievement	Yes	Yes	Yes	Yes	No	No
South Carolina	State	Yes	Both	Yes	Yes	Yes	Yes	Yes	Yes
South Dakota	State	No	Achievement	No	No	No	No	No	No
Tennessee	State	No	Both	No	Yes	Yes	Yes	No	No
Texas	State	Yes	Both	Yes	Yes	Yes	Yes	Yes	Yes
Utah	Mixed	Yes	Both	No	No	Yes	Yes	Yes	No
Vermont	Local	Yes	Competency	No	No	N/A	N/A	No	No
Virginia	State	No	Both	No	Yes	Yes	Yes	No	Yes
Washington	State	Yes	Achievement	No	Yes	Yes	Yes	Yes	Yes
West Virginia	Mixed	Yes	Both	No	Yes	Yes	Yes	No	No
Wisconsin	Mixed	No	Both	No	No	Yes	No	No	No
Wyoming	State	No	Achievement	No	No	Yes	No	No	No
Totals	S=35 L=2 M=9 None=5	Yes=23 No=25 N/A=3	A=18 C=1 Both=29 N/A=3	Yes=25 No=23 N/A=3	Yes=37 No=11 N/A=3	Yes=43 No=4 N/A=4	Yes=38 No=8 N/A=5	Yes=21 No=26 N/A=4	Yes=25 No=22 N/A=4

SOURCE: Council of Chief State School Officers 1987 Survey and related State documents.

1 The District of Columbia and Hawaii each operate a single system in which the State and the district are the same.
2 Missouri and North Dakota send school—(plus North Dakota district)—level data to parents but not to the press.
3 Montana and North Dakota offer local districts the option of using a State achievement test.

Source: Creating Responsible and Responsive Accountability Systems OERI State Accountability Study Group. U.S. Dept. of Ed., 1989.

Appendix E

Example of Content and Student Performance Standards

NCTM Standards for the Elementary Grades

The NCTM standards for the elementary grades are excerpted below. By the end of the fourth grade, students should be able to do what is described in these standards. The reader is advised to see the full discussion in the NCTM *Standards*.

Standard 1: Mathematics as Problem Solving
In grades K-4, the study of mathematics should emphasize problem solving so the students can–

- use problem-solving approaches to investigate and understand mathematical content;
- formulate problems from everyday and mathematical situations;
- develop and apply strategies to solve a wide variety of problems;
- verify and interpret results with respect to the original problem;
- acquire confidence in using mathematics meaningfully.

Standard 2: Mathematics as Communication
In grades K-4, the study of mathematics should include numerous opportunities for communication so the students can–

- relate physical materials, pictures, and diagrams to mathematical ideas;
- reflect on and clarify their thinking about mathematical ideas and situations;
- relate their everyday language to mathematical language and symbols;
- realize that representing, discussing, reading, writing, and listening to mathematics are a vital part of learning and using mathematics.

Standard 3: Mathematics as Reasoning
In grades K-4, the study of mathematics should emphasize reasoning so the students can–

- draw logical conclusions about mathematics;
- use models, known facts, properties, and relationships to explain their thinking;
- justify their answers and solution processes;
- use patterns and relationships to analyze mathematical situations;
- believe that mathematics makes sense.

Standard 4: Mathematical Connections
In grades K-4, the study of mathematics should opportunities to make connections so the students can–

- link conceptual and procedural knowledge;
- relate various representations of concepts or procedures to one another;
- recognize relationships among different topics in mathematics;
- use mathematics in other curriculum areas;
- use mathematics in their daily lives.

Standard 5: Estimation
In grades K-4, the curriculum should include estimation so the students can–

- explore estimation strategies;
- recognize when an estimate is appropriate;
- determine the reasonableness of results;
- apply estimation in working with quantities, measurement, computation, and problem solving.

Standard 6: Number Sense and Numeration
In grades K-4, the mathematics curriculum should include whole number concepts and skills so the students can–

- construct number meanings through real-world experiences and the use of physical materials;
- understand our numeration system by relating counting, grouping, and place-value concepts;
- develop number sense;
- interpret the multiple uses of numbers encountered in the real world.

Standard 7: Concepts of Whole Number Operations
In grades K-4, the mathematics curriculum should include concepts of addition, subtraction, multiplication and division of whole numbers so that students can–

- develop meaning for the operations by modeling and discussing a rich variety of problem situations;
- relate the mathematical language and symbolism of operations to problem situations and informal language;
- recognize that a wide variety of problem structures can be represented by a single operation;
- develop operation sense.

Excerpts from *Curriculum and Evaluation Standards for School Mathematics*. Working groups of the Commission on Standards for School Mathematics of NCTM. Reston, VA: NCTM, 1989.

Standard 8: Whole Number Computation
In grades K-4, the mathematics curriculum should develop whole number computation so the students can–

- model, explain, and develop reasonable proficiency with basic facts and algorithms;
- use a variety of mental computation and estimation techniques;
- use calculators in appropriate computational situations;
- select and use computation techniques appropriate to specific problems and determine whether the results are reasonable.

Standard 9: Geometry and Spatial Sense
In grades K-4, the mathematics curriculum should include two- and three-dimensional geometry so the students can–

- describe, model, draw, and classify shapes;
- investigate and predict the results of combining, subdividing, and changing shapes;
- develop spatial sense;
- relate geometric ideas to number and measurement ideas;
- recognize and appreciate geometry in their world.

Standard 10: Measurement
In grades K-4, the mathematics curriculum should measurements so the students can–

- understand the attributes of length, capacity, weight, area, volume, time, temperature, and angle;
- develop the process of measuring and concepts related to units of measurement;
- make and use estimates of measurement;
- make and use measurements in problem and everyday situations.

Standard 11: Statistics and Probability
In grades K-4, the mathematics curriculum should include experiences with data analysis and probability so the students can–

- collect, organize, and describe data;
- construct, read, and interpret displays of data;
- formulate and solve problems that involve collecting and analyzing data;
- explore concepts of chance.

Standard 12: Fractions and Decimals
In grades K-4, the mathematics curriculum should include fractions and decimals so the students can–

- develop concepts of fractions, mixed numbers, and decimals;
- develop number sense for fractions and decimals;
- use models to relate fractions to decimals and to find equivalent fractions;
- use models to explore operations on fractions and decimals;
- apply fractions and decimals to problem situations.

Standard 13: Patterns and Relationships
In grades K-4, the mathematics curriculum should include the study of patterns and relationships so the students can–

- recognize, describe, extend, and create a wide variety of patterns;
- represent and describe mathematical relationships;
- explore the use of variables and open sentences to express relationships.

MATHEMATICS

OBJECTIVES

1991

Seeds University Elementary School
University of California, Los Angeles
405 Hilgard
Los Angeles, CA 90024

NOTE TO TEACHERS

The enclosed mathematics objectives were prepared during the 1989-90 school year by a group of Seeds UES teachers representing all four levels of the school. It was the intent of that committee to collect objectives from Mathematics Their Way, from the State Framework, and from present classroom practice.

It was decided by ARGUE to follow the recommendation of this group to distribute the objectives to you at the beginning of the school year, and let you work with them for a year to see how appropriate they are for your level.

The strands of the California State Mathematics Framework are represented, broken down into levels. Each level represents two years of work, as the children are expected to stay in a level for a year. In addition, there is an example provided next to each objective, to clarify the intent of the objective. These examples are by no means lesson plans, and are intended only for clarification of the meaning of the objective.

Each level is also being presented with a copy of the National Council of Teachers of Mathematics Standards for School Mathematics. This excellent reference will further clarify the meaning of the strands for you.

GEOMETRY

Early Childhood	Lower	Middle	Upper
Match real objects in the students' environment to representative shapes	Identify geometric shapes using concrete materials	Identify and classify 2 and 3 dimensional objects	Identify and describe polygons: triangles, quadrilaterals, pentagons, hexagons, and octagons
Recognize and classify geometric shapes by manipulating concrete materials	Recognize and identify attributes of 3 dimensional shapes using concrete objects	Construct 3 dimensional objects from 2 dimensional representations	Identify and describe the attributes of 3 dimensional figures: cones, cubes, pyramids, spheres, cylinders, and rectangular prisms
Sort and classify objects by attributes using concrete materials	Explore differencies between 2 and 3 dimensional objects	Sort objects by attributes	Identify various perspective of 3 dimensional objects
Explore ways geometric shapes combine into other figures	Sort objects by visual attributes using manipulatives	Recognize similar and congruent figures	Explore the tiling of a plane
Explore ways to measure objects in the environment using geometric shapes	Construct geometric shapes using concrete materials	Recognize patterns of symmetry using concrete materials	Describe the relationship between points, lines, rays, and segments, and their symbols
Demonstrate an understanding of geometric concepts using concrete materials in problem solving situations	Demonstrate an understanding of geometric concepts using concrete materials in problem solving situations	Use a variety of geometric shapes to tile a plane	Identify right, acute, and obtuse angles
	Use concrete materials to explore ways geometric shapes combine to make other shapes	Construct 2 dimensional representations using concrete materials and/or straight edge and compass	Identify triangles as right, ososceles, scalene, or equilateral
	Explore ways to measure objects using geometric shapes	Construct a cube or a rectangular solid using concrete materials	Identify the center, radius, diameter, arcs, chords, degrees, and circumference of a circle
	Explore congruent and similar figures using concrete materials	Recognize points, lines, line segments, angles, rays, and their symbols	Use a protractor, compass, and straight edge to construct and/or measure 2 and 3 dimensional figures
	Classify objects by attributes	Identify the center, radius diameter, and circumference of a circle	Identify terms of 3 dimensional shapes: faces, edges, vertices
	Explore the geometric relationships of	Identify polygons: triangle, quadrilateral, pentagon, hexagon, octagon	Select symmetrical figures and demonstrate their symmetry
	Demonstrate an understanding of geometric concepts using concrete materials in problem solving situations	Identify cones, spheres, cuber, cylinders, pyramids, and rectangular prisons	Describe and generalize relationships between congruent and similar figures
		Explore the various perspective of 3 dimensional objects	Explore transformations: translations, rotations, refections and dilations using concrete materials
		Explore parallel, perpendicular, and intersecting lines in the environment	Discover relationships within geometric figures by measuring and looking for patterns
		Classify angles as either right, acute, or obtuse angles	Explore ways geometric shapes and models combine or separate into other shapes
			Demonstrate an understanding of geometric concepts in problem solving situations

GEOMETRY

Early Childhood	Lower	Middle	Upper
	Recognize patterns of symmetry using manipulatives Explore the tiling of a plane using concrete materials Use concrete materials to explore ways geometric shapes combines to make other shapes Discover relationships within geometric figures by measuring and looking for a pattern	Explore ways geometric shapes and models combine or separate into other shapes Explore the properties of scalene, isosceles, right or equilateral triangles Discover relationships within geometric shapes by measuring and looking for a pattern Explore transformation: translation, rotation, and dilation using concrete materials	Construct 3 dimensional models from 2 dimensional and explore their properties and vice versa Identify parallel, perpendicular, and intersecting lines and planes Partition new figures to discover a geometric fact Describe and generalize relationships between congruent/similar figures Demonstrate all points or lines of symmetry for a given figure Identify approximate measure in degrees of an angle Discover relationships within geometric figure by measuring and looking for Demonstrate an understanding of geometric concepts in problem solving

NUMBER

Early Childhood	Lower	Middle	Upper
Count to 20 with and without manipulatives	Count and write by 1's, 2's, 5's, 10's to 100 or more with and without manipulatives	Read, write, order and compare numbers up to 9,999 or more	Read, write, order and compare numbers, decimals, fractions
Read and write numerals to 20	Read and write numbers to 100 and more	Count by any given number	Identify place values for any digit to millions or thousandths
Match corresponding numerals to sets of objects	Match corresponding numerals to sets of objects	Demonstrate an understanding of ordinal number to compare and order quantities	Round off numbers to the nearest ten thousand or thousandth
Draw objects to complete a set for a given number	Name and use ordinal number	Use the concept of place value to identify the value represented by a digit within a number	Calculate sums or differences for any combination of whole numbers and decimals
Use ordinal numbers	Order a set of numbers	Write any number in expanded notation	Multiply any combination of whole numbers and decimals
Count by 10's to 100	Name a number that comes before, after, or between numbers to 100	Round off whole numbers	Divide a number up to 4 digits with a number up to 2 digits with and without manipulatives
Group objects by a given number	Group objects by a given number	Perform addition and subtraction of whole numbers to 3 digits with and without regrouping	Interpret remainders
Compare amounts	Identify equivalent and non-equivalent sets	Know the multiplication and division facts through 12	Divide a decimal by a 1 digit whole number
Explore methods of counting a group of objects	Use Comparative terms (<, =, >)	Demonstrate knowledge of commutative and associative properties of addition and multiplication	Apply the distributive property to solve 2 place multiplication problems
Explore addition with manipulatives	Form true statements using mathematical symbols or terminology	Estimate then divide a two-digit number by a one-digit number	Recognize even, odd, prime, and composite numbers
Explore subtraction with manipulatives	Explore the reasonableness of answers	Use calculators to extend understanding of the four basic operations	Use exponents for repeated multiplication
	Add whole numbers with addends up to 12 with and without manipulatives	Apply numerical operations in a problem solving situation	Recognize and apply the rules for divisibility by 2, 5, and 10
	Subtract whole numbers to 20 with and without manipulatives	Identify, read, and compare fractional portions of an object	Find multiples, factors, and prime factorization of a number
	Add 3 1-digit numbers whose sum is less than 10	Add and subtract like fractions using manipulatives	Find the least common multiple of two or three numbers
	Explore addition and subtraction of two 2-digit numbers using manipulatives	Use manipulatives to read and write decimal notation for tenths and hundredths	Express fractions in lowest terms
	Explore the concept of commutativity	Apply numerical operations in a problem solving situtation	Perform addition, subtraction, multiplication and division on any combination of whole numbers, proper fractions, and mixed numbers
	Interpret word problems by using role playing, pictures, models, and rephrasing		Find equivalent expressions for decimals and fractions
	Write a mathematical statement to represent a situation		Write a ratio in 3 ways
	Recognize, represent, and compare halves, thirds, fourths using manipulatives		Find equivalent ratios
	Approach problem solving systematically and creatively		Determine if two ratios form a proportion
			Solissing term in a proportion
			Solve problems using proportions

NUMBER

Early Childhood	Lower	Middle	Upper
	Read numbers to 999 and more	Read, write, order and compare whole numbers, decimals, and fractions	Apply the rules for the order or operations
	Demonstrate an understanding of ordinal numbers to compare and order quantities	Identify place value for any digit to ten thousand or thousandths	Explore closure for a set of numbers
	Place numbers between, before, or after any number up to 999	Write whole numbers in expanded notation	Apply the rules for divisibility
	Recognize place value of ones, tens, and hundreds	Round off whole numbers to nearest thousand or hundredth	Convert fractions to decimals and vice versa
	Form true statements using mathematical terminology or symbols	Perform addition and subtraction on any combination of whole numbers and decimals	Write, reduce, or expand a ratio
	Perform addition and subtraction on one, two, and three digit numbers with no regrouping	Multiply a 1, 2, or 3 digit number by a 1 digit number with carrying	Solve proportions
	Perform addition and subtraction on one, two, and three digit numbers with regrouping	Divide a 2 digit number by a 1 digit number with and without regrouping	Develop an understanding of percents
	Demonstrate the commutative and associative properties of addition	Multiply decimals up to hundredths by a 1 digit whole number	Form equivalent fractions, decimals, and percents
	Use manipulatives to demonstrate multiplication of two one-digit numbers	Divide a decimal up to hundredths by a 1 digit whole number	Solve for an unknown in a percent problem
	Use manipulatives to explore division of a number by a single digit	Explore the distributive property	Solve for problems involving percents
	Read fractions	Recognize even, odd, prime, and composite numbers	Evaluate expressions with positive integral exponents ($2^3 \times 4^2$)
		Define a exponent and its base	Demonstrate an understanding of numerical concepts in problem solving situations
		Explore the rules of divisibility for 2, 5, and 10	
		List multiples, factors, and prime factors for a number	
		Find the greatest common factor for two or more numbers	
		Find the least common multiple for two or more numbers	
		Choose a fraction form that corresponds to a part of a whole object or set of objects	
		Express fractions in lowest terms	
		Use manipulatives to add fractions with unlike denominators	
		Add and subtract unlike proper fractions	
		Add two mixed number with like denominators	
		Multiply proper fractions and whole numbers with and without manipulatives	

LOGIC

Early Childhood	Lower	Middle	Upper
Collect and sort objects by various attributes Develop precise statements Explore a series of logical arguments to reach a valid conclusion	Classify and sort objects by various attributes State precisely conjectures and conclusions Use a series of logical arguments to reach a valid conclusion Determine a logical plan to sort objects Begin to use Venn diagrams	Observe similarities and differences of concrete materials Classify, using one or more attributes to make generalizations Use precise words such as all, some, none, not, and, or, every, many, if...then Explore the use of a series of logical arguments to reach a valid conclusion Organize information and solve simple logic problems by role playing or diagrams Recognize valid inferences drawn from everyday experiences	Form precise conjectures and conclusions Recognize the use of a series of logical arguments to reach a valid conclusion Organize information and solve problems by role playing or diagrams, using matrices, tables and Venn diagrams to solve simple logic problems.

MEASUREMENT

Early Childhood	Lower	Middle	Upper
Estimate and compare length, position, size and weight of objects	Demonstrate an understanding of comparative words for quantity, length, position, size, and weight of real objects	Choose an appropriate unit of measure for a given situation	Use various standard measuring instruments
Choose an appropriate nonstandard unit of measure for a given real life situation	Choose an appropriate nonstandard unit of measure for a given situation	Calculate the perimeter of a 3, 4, and 5 sided polygon	Select appropriate units of measurement
Estimate and measure real objects using nonstandard units	Estimate and measure real objects using nonstandard units	Identify volume units: pints, quarts, gallons, liters	Estimate and measure length, area, weight, volume in metric and customary units
Tell time by hour intervals	Recognize different standard units of length: US and metric	Determine if measurement needs to be accurate for a given situation	Convert standard units within a system
Recognize US coins using real coins	Estimate and measure length of real objects to nearest whole unit	Estimate and measure various properties of real and pictured objects	Determine the degree of accuracy needed in various situations
Identify seasons of the year	Tell time to the nearest hour and half-hour using standard or digital clock	Convert one standard unit to another within a system for length, weight, volume and time	Measure various figures and derive the appropriate formulas for perimeter, area and volume using manipulatives
Explore the calendar	Read and fill in a monthly calendar	Read and interpret temperatures (°C and °F)	Estimate and calculate perimeter, area and volume using manipulatives
Apply measurement concepts in context of concrete problem solving situations	Recognize US coins and their value	Read, write and tell time	Form or read a scale drawing, map or model
	Count and add money to $1.00	Add or subtract hour or half-hour from time represented on a clock	Estimate and calculate perimeter, circumference and area of polygons and circles, and volume and surface area of a rectangular solid using manipulatives
	Form a scale drawing or model using nonstandard manipulative objects	Make simple comparisons of volume and weight using manipulatives	Develop an understanding of the relationships among lengths, widths, perimeters, areas, and volumes
	Apply measurement concepts in context of problem solving situations	Demonstrate an understanding of relative size	Explore ways to find perimeter, area or volume of irregular geometric figures
	Choose an appropriate standard unit of measurement for a given situation	Interpret a calendar	Explore the approximate nature of measurement and the degree of error
	Estimate and measure length and weight to nearest whole standard and metric units	Count, add, subtract, multiply money	
	Measure and calculate perimeter of simple objects using non-standard and standard units	Use tools: scales, protractors, compasses, cups, etc.	
	Determine if measurement needs to be accurate for a given situation	Select an appropriate standard unit of measure	
	Tell time to hour, half hour, and quarter hour	Estimate and measure area in standard units	
	Read written notation to tell time	Convert standard units within a system	
	Develop conversions for days, weeks, months, years, minutes, hours	Use calendar for problem solving, planning	
	Count, add, subtract values of money using manipulatives	Demonstrate how various denominations of money represent equivalent amounts	
	Read a thermometer, Celsius and Fahrenheit	Measure figures and determine formulas to find perimeter and area using manipulatives	
	Determine the area of a figure by counting square units	Develop an understanding of volume using manipulatives	
	Apply measurement skills	Draw or read a scale drawing, map or model	

DATA ANALYSIS

Early Childhood	Lower	Middle	Upper
Collect data cooperatively	Collect data cooperatively	Collect data	Collect and represent data
Organize data into cooperative charts	Explore when a sample is appropriate and sufficient	Select a random sample	Interpret, analyze and draw conclusions from data and graphs
Interpret data collectively	Organize data into cooperative charts, tables, lists, picture and bar charts	Organize the data	Refute or defend an inference
Use data to generalize, predict, etc.	Interpret the data cooperatively	Interpret and analyze the data	Use mean, median, mode, and range
State reasons why an inference may be invalid	Use data to predict, generalize, and notice trends	Refute or defend an inference	Use all possible outcomes to formulate probability of an event
Explore possible outcomes of an experiment	State reasons why an inference may be involved	Formulate all expected outcomes of an experiment	State the range of probability values
	List expected outcomes of an experiment	Explore probability through activities	Calculate the expected values of an experiment and compare with actual values
	Recognize the difference between a sample and a population	Determine whether a population or samples is appropriate	Critique inferences
	Organize the data	Interpret and analyze data and graphs	
	Interpret the data	Use mean, median, mode, and range	
	Use the data to predict and make comparisons	Formulate all possible outcomes of an experiment	
	State reasons why an inference may be involved	State the probability of a simple event	
	List expected outcomes	Explore expected values of an experiment	
	Explore probability through activities	Determine whether a population or sample is appropriate for a given situation	

ALGEBRA

Early Childhood	Lower	Middle	Upper
Show the relationship between a variable and a number using manipulatives Explore equality of sets Explore the formation of an equivalent set, given a set of objects less than ten	Express numerical relationships using manipulatives Match sets having the same number of objects using the term equal Explore the formation of an equivalent set, using manipulatives Explore the concept of variables and number sentences using arithmetic Form equivalent sets, using manipulatives Explore the concept that operations on numbers are the same as operations on variables	Number sentences Form equivalent sets, using arithmetic operations Explore the concept that operations on numbers are the same as operations on variables Represent arithmetic relationships using variables in algebraic expressions Find replacements for variables that make number sentences true Demonstrate the principle of substitution for simple formulas Express simple word problems or sentences as algebraic expressions	Represent arithmetic relationships using variables in algebraic expressions Explore the three types of number sentences: true, false, and open Find replacements for variables that make number sentences true Demonstrate the principle of substitution with formulas Express simple word problems or sentences as algebraic expressions Demonstrate an understanding that numerical relationships between numbers can be represented through variables Use variables to represent basic properties of numbers Identify the three types of open sentences: contradictions, identities, and conditionals Use the principle of substitution on algebraic expressions Select solutions for equations or inequalities from a set of numbers Demonstrate an understanding of simple formulas Represent mathematical patterns using variables

PATTERNS AND FUNCTIONS

Early Childhood	Lower	Middle	Upper
Use concrete models to create a pattern	Use concrete models to create a pattern and represent that pattern symbolically	Find a pattern in a sequence of whole numbers or objects and extend the sequence	Analyze and predict numerical patterns
Look for patterns in the environment	Extend and verbalize a pattern in a sequence of objects	Extend patterns represented in tables as ordered pairs and propose a rule to describe the relationship	Find a pattern in a sequence of whole numbers or ordered pairs and propose a rule to describe the relationship
Extend and verbalize a pattern in a sequence of objects	Identify patterns on a number line of 20	Use a coordinate graph to analyze problems	Extend a pattern in more than one way
Interpret patterns in another way	Analyze the relationship between two quantities in order to predict the number that will come next	Apply the functional relationship between two quantities in a problem solving situation	Apply the functional relationship between two quantities
	Use concrete models to create a pattern and represent that pattern symbolically	Translate patterns to a variety of settings	Use a coordinate graph to analyze problems
	Extend and verbalize a pattern in a sequence of objects	Recognize and develop patterns with whole numbers and manipulatives	Identify similar patterns in a variety of situations
	Identify patterns within numbers	Extend a pattern in more than one way	Use the generalization of a patttern
	Describe the relationship of pairs of related numbers in a given table	Use a coordinate graph to analyze problems	Graph simple functions and relations in all quadrants of the coordinate plane
	Determine a location on a grid by using ordered pairs	Identify similar patterns in a variety of settings	Analyze the underlying reasons for a patten
	Explore the functional relationship between two quantities		
	Translate patterns to a variety of settings		
	Use concrete models to create a pattern and represent that pattern numerically		

CAP

Performance Standards for Student Work

Level	*Standard to be achieved for performance at specified level*
6	**Fully achieves the purpose of the task, while insightfully interpreting, extending beyond the task, or raising provocative questions.** Demonstrates an in-depth understanding of concepts and content. Communicates effectively and clearly to various audiences, using dynamic and diverse means.
5	**Accomplishes the purposes of the task.** Shows clear understanding of concepts. Communicates effectively.
4	**Substantially completes purposes of the task.** Displays understanding of major concepts, even though some less important ideas may be missing. Communicates successfully.
3	**Purpose of the task not fully achieved; needs elaboration; some strategies may be ineffectual or not appropriate; assumptions about the purposes may be flawed.** Gaps in conceptual understanding are evident. Limits communication to some important ideas; results may be incomplete or not clearly presented.
2	**Important purposes of the task not achieved; work may need redirection; approach to task may lead away from its completion.** Presents fragmented understanding of concepts; results may be incomplete or arguments may be weak. Attempts communication.
1	**Purposes of the task not accomplished.** Shows little evidence of appropriate reasoning. Does not successfully communicate relevant ideas; presents extraneous information.

Excerpts from: *A sampler of mathematics assessment.* Sacramento, CA: California Dept. of Ed., 1991.

Smoking Survey Task Rubric

Level	*Description of working each performance level*
6	The student states five conclusions or interpretations, several of which evidence insightful comparison or synthesis, predict trends, discuss sampling techniques, demonstrate thinking about other issues for research, or in some way offer provocative questions. The response reflects analysis of the data and reveals unusual insight and variety of dimensions. Observations or interpretations are presented effectively either in a list of statements or in the format of an article.
5	The student demonstrates various dimensions of thought in completing the task of giving five conclusions or interpretations of the data. For example, stating that 29 percent (11 plus 18) of those surveyed made a decision about smoking within the last year is a different dimension from reporting that 38 percent had never smoked, or even adding 18 to 9 to get the fact that 27 percent had quit smoking. The student understands that extrapolation from the sample to the total student population mandates addressing sample reliability issues. Conclusions and interpretations are expressed effectively in either a list of statements or an article.
4	The student gives five conclusions or interpretations which are correct in concept but may have minor errors. The student understands the major implications of the survey and recognizes the possibility of bias in the sample. The explanation is successful, but it may lack detail.
3	The student gives an incomplete or superficial list of conclusions or interpretations, one or more of which may have major errors. For example, the response extrapolates to the entire student body without qualification. The conclusions or interpretations may be derived from the same line of reasoning. For example, changing each of the five numbers to percents of those surveyed or of the student body would give five conclusions from the same dimension or line of thought. The results are, on a whole, given coherently.
2	The student attempts to interpret or draw conclusions from the data but makes major conceptual errors or omissions. The response may make no reference to either the sample set or an extrapolation to the whole student body. For example, the student may simply state that 38 percent had never smoked. The student attempts to communicate, but the statements are unclear or fragmented.
1	The student copies the data or attempts to restate information given in the problem. No conclusions or interpretations are attempted, and the response reflects no understanding of the mathematical concepts. Any communication attempted is muddled, irrelevant, or superfluous.

Excerpt from: *A sampler of mathematics assessment*. Sacramento, California. California Department of Education, 1991.

Appendix F

Exchange of Permanent Records Electronically for Students and Schools (EXPRESS)

EXCHANGE OF PERMANENT RECORDS ELECTRONICALLY FOR STUDENTS AND SCHOOLS (ExPRESS)

Council of Chief State School Officers
State Education Assessment Center
One Massachusetts Avenue, N.W., Suite 700
Washington, DC 20001-1431
(202) 408-5505 Telephone/(202) 408-8072 Facsimile

In 1989, a task force sponsored by the National Center of Education Statistics began meeting to examine the feasibility and benefits of a nationwide electronic records transfer system. The Center took this step in the belief that such a system would provide a practical tool benefiting school practitioners. In addition, it was hoped that the system would promote State/local information system capacity and comparability in support of the National Cooperative Education Statistics System. Participants in the task force include school district and sate education agency personnel from the states of Florida, California, New York, Texas and Washington as well as staff from the National Center for Education Statistics and the Council of Chief State School Officers.

The anticipated benefits of the proposed national system include:

- promotion of greater compatibility and standardization of student information across state and local information systems;
- more timely request and receipt of student records through an electronic network as opposed to mail;
- more timely availability of data for use in determining the educational placement and the initiation of support services required for enrolling students;
- increased reliability and consistency in the interpretation of student records;
- greater efficiency for districts with automated student information systems, by enabling them to receive machine-readable records which eliminate key-entry;
- increased protection of student records which will be less subject to tampering when transferred through a network containing security procedures;
- reduced total cost to transfer records; and
- the availability to educational agencies of a multi-function network which can be used for other purposes such as reporting data from districts to other districts or the state, reporting data from the state to the federal government, and for sending transcripts to postsecondary institutions and employers.

Project activities included the development of a set of data elements and definitions in American National Standards Institute format to be used in the pilot electronic transfer of student records between districts and from districts to postsecondary institutions. These data elements include both required and recommended information to be included in the student's record.

Data elements are included for five different areas:

1. Demographics (student name, residential data, grade level, race/ethnicity, home language, guardian's name)

2. Academic History (previous school, course work, grades and credits awarded, grade point average, rank in class, attendance)

3. Special Programs and Services (program type, funding source, placement dates, placement criteria, eligibility determination/status)

4. Health (immunization, health condition, screening, medical treatment)

5. Test Information (test identity, test date, norming period, subject area, test scores)

The data element definitions, wherever possible, are standards definitions established by NCES, CCSSO, or other national organizations. Prior to the completion of the project, national and federal organizations will be asked to review the information in which they have a constituent interest for appropriateness and accuracy of definitions and code values.

Future activities call for revisions to be made to the guidelines after the pilot transmission of data. Together the task force and the American Association of Collegiate Registrars and Admissions Officers' (AACRAO) task force (the comparable postsecondary group) will submit the data set and guidelines for approval by the American National Standards Institute.

Administration of the system, development of a governance structure, and sponsorship of task force activities is now a part of the Education Data System Implementation Project at the Council of Chief State School Officers. Information about the project may be obtained from the Project Director, Barbara Clements or Project Associate, Kathleen Lantz.

Appendix G

California Student Information System (CSIS)/Categories of Data

Draft

California Student Information System

Project Description
(Revised April 13, 1992)

Project Mission Statement:

A comprehensive vision for the future use of technology in education must include strategies that support the delivery of appropriate programs and services to all children in California. In order to better serve the needs of children and policymakers at all levels within the educational system, the mission of the California Student Information System is to establish and maintain a cost effective method of transferring critical student-level information between district and county offices of education, the California Department of Education, postsecondary institutions, and providers of social and health services to children in California.

Project Goals/Benefits:

The goals/benefits of the California Student Information System are:

- Eliminate redundant data entry of information for transferring students.
- Replace, automate or eliminate current redundant collection of student information by the State.
- Eliminate unnecessary manipulation of data at the local level before submission to the State.
- Create compatible data standards for educational information that allows assessment of equivalency in coursework, dropout reporting, program participation, and demographic reporting.
- Increase local, state, and national awareness of student demographics and trends in student achievement related to program participation.
- Improve the capacity of state and local educators to respond to the needs of an increasingly diverse and mobile student population.
- Improve student access to appropriate educational programs and other social and health services.
- Reduce the likelihood of individual students "falling through the cracks."

Project Scope:

There are two aspects to the scope of this project:

1. To establish compatible data standards and a process for local education agencies to electronically share student records between themselves in a timely and cost effective manner: and

Source: *Program Evaluation and Research Division.* California Department of Education.

2. To establish a process for local education agencies to share aggregated student-level information with state agencies, as appropriate, to more efficiently meet state and federal reporting requirements, and to improve the availability of information for educational research and evaluation purposes.

Tentative Implementation Plan:

The approach outlined in this project for such a state-wide "system" refers more to the *process of record transfer* than to a new physical data system, as traditionally envisioned in such efforts. A guiding principle in the development of this paradigm should always be to make the most efficient use of local resources, including the data systems that currently exist in local educational agencies. This requires careful planning and significant input by local school districts and county offices of education. To ensure that long-term fiscal support by the state legislature will be forthcoming, it is necessary to demonstrate the feasibility of electronic record transfer and its potential benefits, and to phase-in the system over time. The project will, therefore, proceed in the following stages:

1991-92 Conduct a feasibility study, including the development of an initial set of data standards and an assessment of the "readiness" of districts and county offices to participate in the electronic transfer of students records. (Phase I report due July 1992)

1992-93 Conduct demonstration project with local education agencies representing various "readiness" levels to more accurately determine costs and local impact.

1993 Evaluate demonstration projects, revision system, as necessary, and plan for state-wide phased implementation. (Phase II report due November 1, 1993)

1993-94 Begin phased implementation, over a three-year period, of all districts and county offices of education.

1996-97 Tentative first year of state-wide participation in electronic student record transfer and reporting to the State.

TYPES OF DATA

The following are suggested *categories* for data elements in a standard student record for California:

A. Demographic
- Student name
- Residential data
- Grade level
- Entry/exit dates
- Exit reasons
- Birthdate
- Gender
- Race/ethnicity
- Birth location
- Citizenship
- Home language
- Marital status
- Guardian

B. Academic History
- Previous schools
- Coursework
- Grades awarded
- Credits
- Grade point average
- Rank in class
- Attendance
- Degrees/diplomas

C. Health
- Immunizations
- Health conditions
- Screening
- Dates
- Medical treatment
- Contact

D. Special Programs
- Program type
- Funding source
- Eligibility determination/status
- Placement criteria
- Placement dates

E. Test Scores
- Test identity
- Test date
- Norming period
- Test language
- Subject area
- Test scores

Appendix H

Resource Organizations and Contact Information

Resource Organizations and Contact Information

Southwest Regional Laboratory, (SWRL), 4665 Lampson Avenue, Los Alamitos, California, 90720, (310) 598-7661. SWRL provides technical assistance to local education agencies to plan effective information use and assessment development.

The Urban Strategies Council, 672 13th Street, Suite 200, Oakland, California, 944612, (510) 893-2404. This group was formed by the Oakland Public School's Commission for Positive Change. Its purpose is to establish a research agenda and to identify appropriate indicators for describing student achievement to the community.

The Stuart Foundation, 425 Market Street, Suite 2835, San Francisco, California, 94105, (415) 495-1144. A philanthropic organization that wants to develop a prototype for evaluating the effectiveness of its improvement efforts and projects in at-risk schools.

Far West Laboratory for Educational Research and Development, 730 Harrison Street, San Francisco, California, 94107, (415) 565-3000. Contact: Steve Mills. Far West provides technical assistance to local education agencies to plan and implement effective accountability and performance assessment systems. FWL has a School Effectiveness Analysis package, which enables building administrators and teachers to analyze core structural and management weaknesses in the school and classroom. FWL also facilitates formation of regional consortia by providing consultation and assistance, and by making referrals to other individuals, agencies and organizations. It publishes a newsletter on exemplary assessment practices, "Assessment Matters."

John D. and Catherine T. MacArthur Foundation, 140 S. Dearborn, Suite 1100, Chicago, IL, 60603, (312) 726-8000. Have funded New Standards Project, Commission on Chapter 1. (Peter Gerber, Director of Education Program.)

US Department of Education Eisenhower Grant Program, 555 New Jersey Avenue, NW, Room 522, Washington, DC, 20208-5524, (202) 219-1496

Edna McConnell Clark Foundation, 250 Park Avenue, Suite 900, New York, New York, 10177-0026, (212) 986-7050. Contact: Hayes Mizell: Director of Program for Disadvantaged Youth.

National Center for Research on Evaluation, Standards, and Student Testing, CRESST/ UCLA Graduate School of Education, 145 Moore Hall, 405 Hilgard Avenue, Los Angeles, California, 90024-1522, (213) 825-4711. CRESST publishes a newsletter on assessment and has an Alternative Assessments in Practice Data Base with actual tasks.

NorthWest Regional Eductional Laboratory (NWREL), 101 SW Main Street, Suite 500, Portland, Oregon, 97204. Director: Richard Stiggins. Specializes in performance assessment methodology and classroom assessment. NWREL has a performance assessment data base with actual tasks. It conducts teacher training on classroom assessment.

National Center for Fair & Open Testing, 342 Broadway, Cambridge, MA, 02139-1802, (617) 864-4810. Publishes quarterly newsletter *Fair Test Examiner*.

Center for the Study of Testing, Evaluation and Educational Policy, Boston College, Campion Hall, Room 323, Chestnut Hill, MA, 02167, (617) 552-4521.

Appendix I

Criteria for Evaluation of Student Assessment Systems

National Forum on Assessment

Co-Chairs: Monty Neill
Fair Test
342 Broadway
Cambridge, MA 02139
(617) 864-4810

Ruth Mitchell
Council for Basic Education
725 15th St., N.W.
Washington, DC 20005
(202) 347-4171

CRITERIA FOR EVALUATION OF STUDENT ASSESSMENT SYSTEMS

At all levels of education–individual, classroom, school, district, state, and nation–we need dependable information about what students are and are not learning. To meet this need, several groups have advanced proposals for new national assessment programs. Meanwhile, changes are also being made or suggested in state and local assessment systems.

The members of the education, civil rights, and advocacy communities who comprise the National Forum on Assessment support fundamental changes in assessment, but we believe the tests will not necessarily provide the kind of information that is needed. The Forum itself takes no position for or against a new national examination system.

Because assessment affects educational standards, instructional methods, curricula, school structure, and governance, assessment decisions should not be made without consideration of these factors. To provide guidelines for evaluating existing and proposed assessment systems at any level, we offer the following criteria:

1. Educational standards specifying what students should know and be able to do should be clearly defined before assessment procedures and exercises are developed.

   For assessment information to be valid and useful, assessment must be based on a consensus definition of what students are expected to learn, and the expected level of performance, at various developmental stages. Such standards, which might also be called intellectual competencies, are not discrete pieces of information or isolated skills, but important abilities, such as the ability to solve various kinds of problems or to apply knowledge appropriately.

   The standards should be determined through open discussion among subject-matter experts, educators, parents, policymakers, and others, including those concerned with the relationship between school learning and life outside of school. Without a consensus on standards, there is little likelihood of valid assessment.

2. The primary purpose of the assessment systems should be to assist both educators and policymakers to improve instruction and advance student learning.

   Students, educators, parents, policymakers, and others have different needs for assessment and different uses for assessment information. For example, teachers, students and their parents want information on individual achievement, while policymakers and the public want information for accountability purposes. In all cases, the system should be designed to provide not just number or ratings, but useful information on the particular abilities students have or have not developed.

   All purposes and uses of assessment should be beneficial to students. For example, the results should be used to overcome systemic inequalities. If assessments cannot be shown to beneficial, they should not be used at all.

3. Assessment standards, tasks, procedures, and uses should be fair to all students.

Because individual assessment results often affect students' present situation and future opportunities, the assessment system, the standards on which it is based, and all its parts must treat students equally. Assessment tasks and procedures must be sensitive to cultural, racial, class and gender differences, and to disabilities, and must be valid for and not penalize any groups. To ensure fairness, students should have multiple opportunities to meet standards and should be able to meet them in different ways. No student's fate should depend upon a single test score.

Assessment information should also be used fairly. It should be accompanied by information about access to the curriculum and about opportunities to meet the standards. Students should not be held responsible for inequities in the system.

4. The assessment exercises or tasks should be valid and appropriate representations of the standards students are expected to achieve.

A sound assessment system provides information about a full range of knowledge and abilities considered valuable and important for students to learn, and therefore requires a variety of assessment methods. Multiple-choice tests, the type of assessment most commonly used at present, are inadequate to measure many of the most important educational outcomes, and do not allow for diversity in learning styles or cultural differences. More appropriate tools include portfolios, open-ended questions, extended reading and writing experiences which include rough drafts and revisions, individual and group projects, and exhibitions.

5. Assessment results should be reported in the context of other relevant information.

Information about student performance should be one part of a system of multiple indicators of the quality of education. Multiple indicators permit educators and policymakers to examine the relationship among context factors (such as the type of community, socioeconomic status of students, and school climate), resources (such as expenditure per student, physical plant, staffing, and money for materials and equipment), programs and processes (such as curriculum, instructional methods, class size, and grouping), and outcomes (such as students performance, dropout rates, employment, and further education). Statements about educational quality should not be made without reference to this information.

6. Teachers should be involved in designing and using the assessment system.

For an assessment system to help improve learning outcomes, teachers must fully understand its purposes and procedures and must be committed to, and use, the standards on which it is based. Therefore teachers should participate in the design, administration, scoring and use of assessment tasks and exercises.

7. Assessment procedure and results should be understandable.

Assessment information should be in a form that is useful to those who need it– students, teachers parents, legislators, employers, postsecondary institutions, and the general public. At present, test results are often reported in technical terms that are confusing and misleading, such as grade-level equivalents, stanines, and percentiles. Instead, they should be reported in terms of educational standards.

8. The assessment system should be subject to continuous review and improvement.

Large-scale, complex systems are rarely perfect, and even well-designed systems must be modified to adapt to changing conditions. Plans for the assessment system should provide for a continuing review process in which all concerned participate.

Appendix J

CRESST:
Assessments in Practice Database Protocol

CRESST

ALTERNATIVE ASSESSMENTS IN PRACTICE
DATA BASE PROTOCOL

CRESST'S Assessments in Practice Data Base is intended as a repository of current efforts to develop alternative assessments, i.e., alternatives to norm-referenced multiple choice tests which are intended to assess students' higher-order thinking skills.

Directions: Please fill out one set of these forms for each distinct subject area assessment you have developed and/or are using (e.g., elementary mathematics, high school government, middle school science, interdisciplinary humanities) and are willing to have included in our Assessments in Practice Data Base. On this page indicate the appropriate contact person for additional information about the assessment; the subsequent four pages gather descriptive information about your assessment. Please complete these pages, in order, for each distinct formal included (essay, experiment, portfolio, expanded multiple choice, etc.) in each subject assessment. If possible, attach a sample of all your assessment materials. Feel free to make copies of these forms or call us for additional sets. Or if you prefer to have us fill out the forms, call us for an interview.

Return all material to:

Dr. Joan Herman
CRESST
145 Moore Hall
405 Hilgard Ave.
Los Angeles, CA 90024-1522

For additional information or assistance, call (213) 825-4711; fax (213) 825-3883.

CONTACT INFORMATION:

Sponsoring Organization: _____

Point of Contact: Name: _____ Phone: _____

Title: _____

Address: _____

City _____ State: _____ Zip: _____

Developer: _____

Date: _____

Secondary Student Response Mode:

- ❑ Selected response items (e.g., multiple choice)
- ❑ Short answer
- ❑ Essay
- ❑ Report
- ❑ Other written product
- ❑ Portfolio
- ❑ Art or graphic product
- ❑ Hands-on performance, (e.g., an experiment)
- ❑ Demonstration/Using manipulatives to solve a problem
- ❑ Other: _____
- ❑ Physical performance, (e.g., dance, swimming, etc.)
- ❑ Oral performance, (e.g., speech, reading aloud, acting)
- ❑ Group discussion
- ❑ Simulation (computer or non-computer)
- ❑ Computer-administered: (name of system _____)

Tasks Performed Individually or in Groups:

❑ Small Group ❑ Large Group (6 or more) ❑ Individual ❑ Other: _____

Measures Group or Individual Performance:

❑ Group ❑ Individual ❑ Both

8. ADMINISTRATION CONDITIONS:

Individual or Group Administration:

❑ Group ❑ Individual ❑ Other: _____

Ratio of Assessment Administrators/Record Keepers to Students: _____ to _____

Time Requirements:

Is there a time limit? ❑ Yes ❑ No

Estimated time for administration (if individually administered, report amount of time needed or each child): _____ total minutes
_____ days for administration

Special Requirements:

Special Material Required? ❑ Yes ❑ No (Check and/or list):

❑ Audio tape ❑ Video tape ❑ Computer ❑ Equipment ❑ Other: _____

Special Room or Space Arrangements? ❑ Yes ❑ No List or provide examples, e.g., multiple testing stations; outdoor area:

9. CHARACTERISTICS OF SCORING:

Records Required to Provide a Score:

- ❑ Individual student product or records
- ❑ Group products or records
- ❑ Observer check lists or ratings
- ❑ Anecdotal records or notes
- ❑ Structured protocols, completed by_____
- ❑ Computer records
- ❑ Videotape records
- ❑ Audiotape records
- ❑ Other

Type of Rating/Scoring:

❑ Process ratings	❑ Holistic ratings	❑ Individual ratings	❑ Cutoff score for passing
❑ Product ratings	❑ Analytical ratings	❑ Group ratings	❑ Other _____

Nature of Rating Process:

- ❑ Explicit, prespecified criteria
- ❑ More than one rater per performance
- ❑ Rater training provided
- ❑ Scoring guide available
- ❑ Other _____
- ❑ Rating not required, machine scored

10. DEVELOPMENTAL STATUS OF ASSESSMENT

Status:

- ❑ Exploratory–no empirical data anticipated
- ❑ Prototype under development, with data collection in process or planned
- ❑ Final field tested version
- ❑ In regular use. Specify for how long? _____ Years

Confidence in Measurement Quality of Current Form of Assessment:

❑ Very High ❑ High ❑ Fair ❑ Uncertain ❑ Low

Available Data on the Measure:

- ❑ Teacher reactions
- ❑ Descriptive statistics/Normative data (means and standard deviations)
- ❑ Staff development and/or teaching strategies & materials
- ❑ Student reactions
- ❑ Validity studies (e.g., comparisons with other tests or judgments)
- ❑ Rater agreement
- ❑ Inferential statistics (power of measure for predicting other outcomes)

Test Specifications:

- ❑ Manual available: ❑ Free Cost $ _____
- ❑ Report available: ❑ Free Cost $ _____
- ❑ Update planned: Date: _____

11. ESTIMATED ADMINISTRATION, SCORING, AND REPORTING COSTS (for 28 students):

- ❑ Estimated special administration costs (e.g., salaries): $_____
- ❑ Material costs (e.g., equipment, test forms): $_____
- ❑ Estimated scoring costs: $ _____
- ❑ Estimated reporting costs: $_____
- ❑ Copyrighted ❑ Public Domain

Availability: ❑ Public ❑ Under Secure Conditions ❑ Not Available

Please attach samples of materials

Appendix K

National Education Goals

Goal 1: By the year 2000, all children in America will start school ready to learn.

Objectives:

- All disadvantaged and disabled children will have access to high quality and developmentally appropriate preschool programs the help prepare children for school.
- Every parent in America will be a child's first teacher and devote time each day to helping his or her preschool child learn; parents will have access to the training and support they need.
- Children will receive the nutrition and health care needed to arrive at school with healthy minds and bodies, and the number of low-birthweight babies will be significantly reduced through enhanced prenatal health systems.

Goal 2: By the year 2000, the high school graduation rate will increase to at least 90 percent.

Objectives:

- The nation must dramatically reduce its dropout rate, and 75 percent of those students who do drop out will successfully complete a high school degree or its equivalent.
- The gap in high school graduation rates between American students from minority backgrounds and their non-minority counterparts will be eliminated.

Goal 3: By the year 2000, American students will leave grades four, eight, and twelve have demonstrated competency in challenging subject matter including English mathematics, science, history, and geography; and every school in America will ensure that all students learn to use their minds well, so they may be prepared for responsible citizenship, further learning, and productive employment in our modern economy.

Objectives:

- The academic performance of elementary and secondary students will increase significantly in every quartile, and the distribution of minority students in each level will more closely reflect the student population as a whole.
- The percentage of students who demonstrate the ability to reason, solve problems, apply knowledge, and write and communicate effectively will increase substantially.
- All students will be involved in activities that promote and demonstrate good citizenship, community service, and personal responsibility.
- The percentage of students who are competent in more than one language will substantially increase.
- All students will be knowledgeable about the diverse cultural heritage of this nation and about the world community.

Source: *The National Education Goals Report*. Washington, DC. National Education Goals Panel, 1991.

Goal 4: By the year 2000, U.S. students will be first in the world in science and mathematics achievement.

Objectives:

- Math and science education will be strengthened throughout the system, especially in the early grades.
- The number of teachers with a substantive background in mathematics and science will increase by 50 percent.
- The number of U.S. undergraduates and graduate students, especially women and minorities, who complete degrees in mathematics, science, and engineering, will increase significantly.

Goal 5: By the year 2000, every adult American will be literate and will possess the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship.

Objectives:

- Every major American business will be involved in strengthening the connection between education and work.
- All workers will have the opportunity to acquire the knowledge and skills, from basic to highly technical, needed to adapt to emerging new technologies, work methods, and markets through public and private educational, vocational, technical, workplace or other programs.
- The number of quality programs, including those at libraries that are designed to serve more effectively the needs of the growing number of part-time and mid-career students will increase substantially.
- The proportion of those qualified students (especially minorities) who enter college, who complete at least two years, and who complete their degree programs will increase substantially.
- The proportion of college graduates who demonstrate an advanced ability to think critically, communicate effectively, and solve problems will increase substantially.

Goal 6: By the year 2000, every school in America will be free of drugs and violence and will offer a disciplined environment conducive to learning.

Objectives:

- Every school will implement a firm and fair policy on use, possession, and distribution of drugs and alcohol.
- Parents, businesses, and community organizations will work together to ensure that schools are a safe haven for all children.
- Every school district will develop a comprehensive K-12 drug and alcohol prevention education program. Drug and alcohol curriculum should be taught as an integral part of health education. In addition, community-based teams should be organized to provide students and teachers with needed support.

Goal 3: Student Achievement and Citizenship

What we now know:

Competency in Mathematics

- This report reveals for the first time how many American students can be considered competent in mathematics. Fewer than one out of every five students in Grades 4, 8, and 12 has reached the National Education Goal of demonstrating competency in mathematics.(See Exhibit 4.)

- Mathematics competency among race/ethnic groups varied considerably in 1990. At 8th grade, for example, the proportions of students demonstrating competency ranges from 4% for Blacks to 39% for Asians/Pacific Islanders. (See Exhibits 5-7.)

Advanced Placement Results

- For every 1,000 11th and 12th graders enrolled in 1991, 70 Advanced Placement examinations were taken in the core subjects of English, mathematics, science, and history. Over 60% of the exams were graded at 3 or higher, which is generally high enough to make students eligible for college credit. The number of examinations taken in English and history were substantially higher that the numbers taken in mathematics and science. (See Exhibit 8.)

- Over the past ten years, the number of Advanced Placement examinations taken by 11th and 12th graders has sharply increased in the core subjects of English, mathematics, science, and history. Increases have been greatest in mathematics and science. (See Exhibit 9.)

- Between 1986 and 1991, the number of Advanced Placement examinations taken in the core subjects increased 51%. Rates of increase were greatest among minority students. (See Exhibit 9.)

Citizenship

- In 1988, nearly all 12th graders had a basic knowledge of civics, such as election, laws, and constitutional rights. However, only about half understood specific government structures and functions, such as separation of powers, and only 6% had a detailed knowledge of institutions of government, such as the Cabinet and the judiciary. (See Exhibit 10.)

- In 1988, slightly less than half of the nation's 18- to 20-year-old were registered to vote, compared to 70% of all U.S. citizens 18 years or older. (See Exhibit 11.)

What we still need to know:

We still need to know the competency of students in Grades 4, 8, and 12 in the five core subjects, as measured against world-class standards of performance. Only then can the nation and individual states determine where educational efforts are falling short and where student performance must improve.

To address this issue, the Panel worked with Congress to establish the National Council on Education Standards and Testing. Over the next year, the Panel will be reviewing the Council's recommendations for developing world-class standards and a system of national examinations for determining whether these standards are being met.

Goal 3
Student Achievement and Citizenship

By the year 2000, American students will leave grades four, eight, and twelve having demonstrated competency in challenging subject matter, including English, mathematics, science, history, and geography; and every school in America will ensure that all students learn to use their minds well, so they may be prepared for responsible citizenship, further learning, and productive employment in our modern economy.

Creating a world-class education system means finding out what students actually know and can do. But determining this is not so simple. The kind of information needed goes beyond traditional methods of testing and reporting. We need to specify our expectations for student performance, making sure that they are high enough to match the highest levels in the world and we need to determine how many students meet these expectations.

The third National Education Goal focuses on the five subjects of English, science, mathematics, history, and geography. They represent the core content that all students need to master as they move through formal school — the subjects that provide them with a foundation for future academic study and competence in their subsequent jobs. This report reveals for the first time the gap between how our students actually perform in one of these subjects — mathematics — and how they should perform to be considered competent for their grade. This gap is enormous.

While these five subjects constitute an important part of what schools should offer students, they are not all that schools need to offer. A full appreciation of the fine arts and mastery of one or more foreign languages are examples of additional competencies that our schools must foster if we are to produce fully educated and well-rounded citizens of tomorrow.

We are also reporting some disappointing information about signs of good citizenship among young Americans. Citizenship represents another outcome of schooling that is, in many ways, as essential for our future as is competence in subject areas. The social, ethical, and political challenges that confront Americans today, as well as the diversity of our people, make it more important than ever that, as a nation of learners, we become an informed and involved people.

> *"The results in this report are sobering. Only 18 percent of American eighth graders have the math knowledge they need."*
>
> Roy Romer
> Governor of Colorado

What We Now Know

- Fewer than one in five students in grades four, eight, and twelve has reached the competency standard in mathematics.
- However, the number of Advanced Placement exams taken by high school juniors and seniors in English, mathematics, science, and history has increased by 51 percent since 1986.
- Only 48 percent of young adults between 18 and 20 years of age are registered to vote, compared to 70 percent of all U.S. Citizens 18 or older.

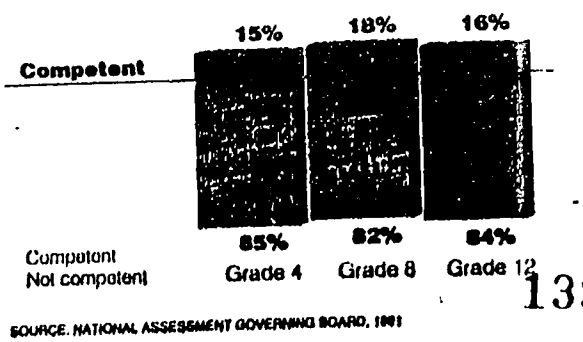
What We Still Need to Know

We have only a limited profile so far of student mastery of the five subjects in our third Goal. We know the most about proficiency in mathematics, where an initial standard of competence has been established. But no such standards of performance exist in the other subject areas. We need to establish these standards, along with a voluntary national system of examinations (not a single national test) to tell us whether or not the standards are being met. Only then will we see where our educational efforts are succeeding and where they are falling short.

FEWER THAN ONE IN FIVE STUDENTS IN GRADES 4, 8, AND 12 HAS REACHED THE NATIONAL EDUCATION GOAL OF DEMONSTRATING COMPETENCY IN MATHEMATICS.

Competency in Mathematics

Percent of 4th, 8th, and 12th graders who are competent in mathematics, 1990

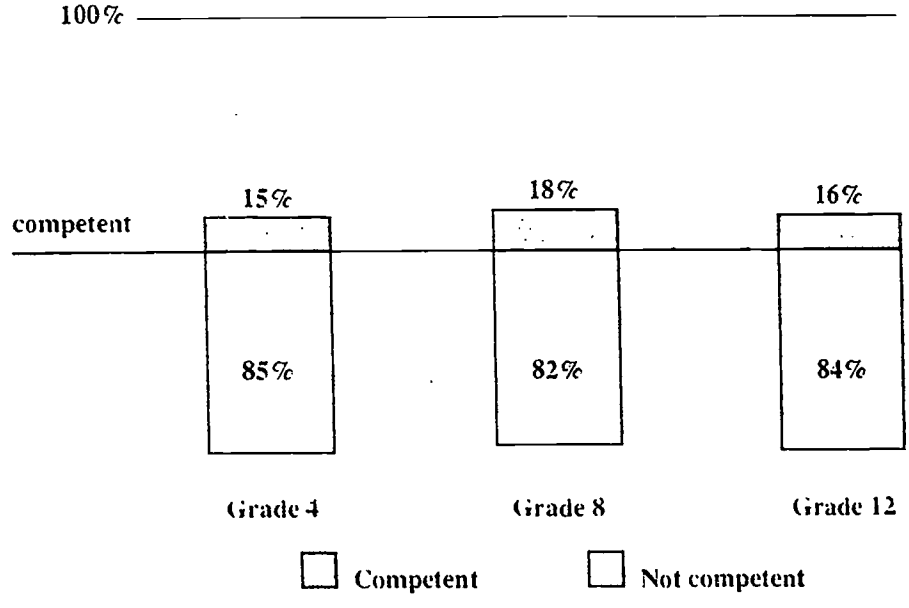


SOURCE: NATIONAL ASSESSMENT GOVERNING BOARD, 1991

Exhibit 4

Competency in Mathematics

Percent of 4th, 8th, and 12th graders who are competent[1] in mathematics, 1990



[1]A complete description of "competency" can be found in Appendix B.

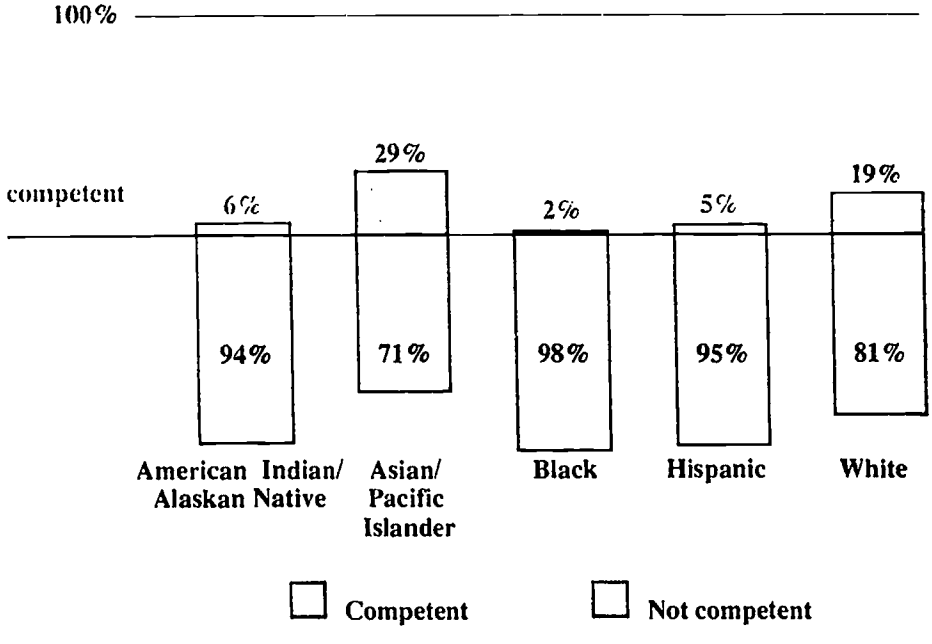
Fewer than one out of every five students in Grades 4, 8, and 12 has reached the National Education Goal of demonstrating competency in mathematics.

Source: National Assessment Governing Board, 1991

Exhibit 5

Competency in Mathematics - Grade 4

Percent of 4th graders who are competent[1] in mathematics, 1990



[1]A complete description of "competency" can be found in Appendix B.

Source: National Assessment Governing Board, 1991

Goal 6: Safe, Disciplined, and Drug-free Schools

By the year 2000, every school in America will be free of drugs and violence and will offer a disciplined environment conducive to learning.

Objectives

- Every school will implement a firm and fair policy on use, possession, and distribution of drugs and alcohol.
- Parents, businesses, and community organizations will work together to ensure that schools are a safe haven for all hildren.
- Every school district will develop a comprehensive K-12 drug and alcohol prevention education program. Drug and alcohol curriculum should be taught as an integral part of health education. In addition, community-based teams should be organized to provide students and teachers with needed support.

Goal 6: Safe, Disciplined, and Drug-free Schools

Additional important points:

Student Drug Use

- Since 1980, overall student drug use has declined noticeably. However, alcohol is still used by most 12th graders and is by far the most commonly used drug. Alcohol and marijuana use is substantially higher among White 12th graders than among Black or Hispanic 12th graders. (See Exhibits 63 and 64.)

- Although 78% of 1990 high school seniors disapproved of adults taking one or two drinks nearly every day, 32% reported having five or more drinks in a row within the previous two weeks.[13,14]

Discipline in Schools

- In 1988, about one-third of all high school teachers felt that they had little or no disciplinary control over students in their classrooms. (See Exhibit 65.)

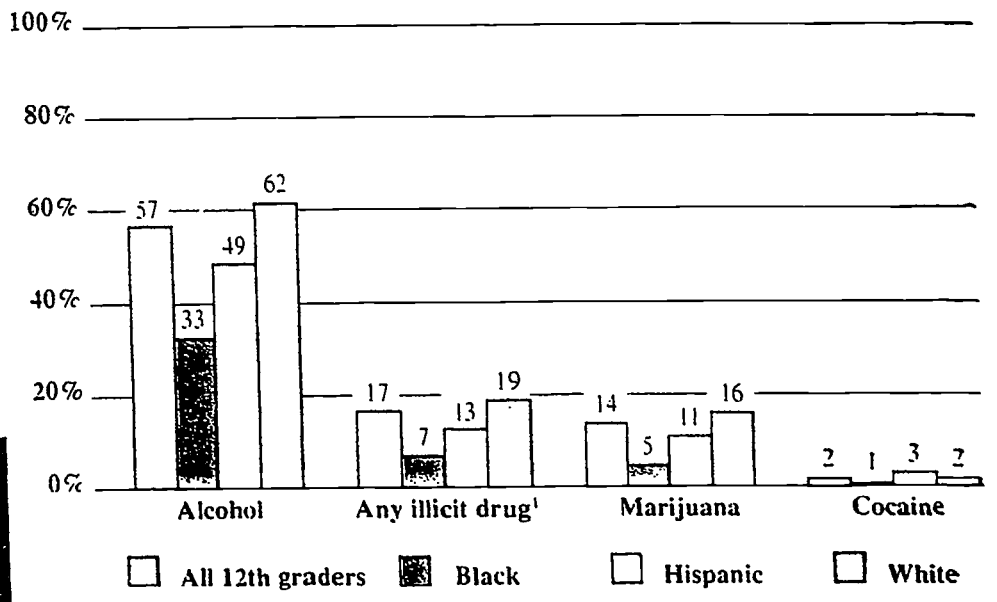
- In 1988, over 40% of high school teachers felt that the amount of student tardiness, class cutting, and student misbehavior in their schools interfered with their teaching. Eight out of ten teachers believed that their principal consistently enforced school rules, but only half felt that other teachers did so.[15]

- Skipping school and classes is a common practice among high school seniors. In 1990, 30% reported that they skipped school, and 33% reported that they skipped at least one class, during the previous month. Skipping school and classes was most common among Hispanics and least common among Blacks. (See Exhibit 66.)

Exhibit 63

Student Drug Use

Percent of 12th graders who reported using the following during the previous thirty days, 1990



[1]Includes marijuana, hallucinogens, cocaine, heroin, stimulants, and tranquilizers; does not include alcohol.

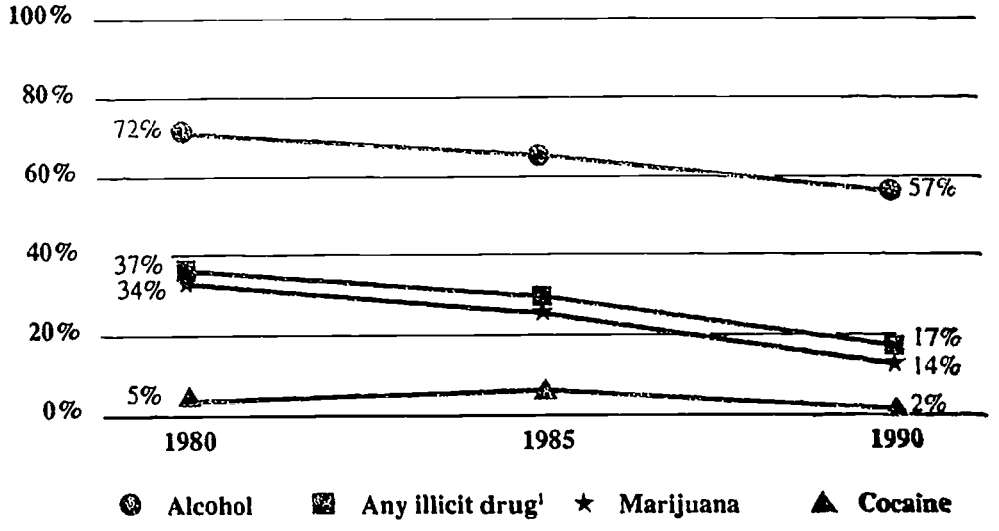
Alcohol is used by more than half of all 12th graders and is by far the most commonly used drug.

Source: University of Michigan, 1991

Exhibit 64

Trends in Student Drug Use

Percent of 12th graders who reported using the following during the previous thirty days, 1980 to 1990



[1]Includes marijuana, hallucinogens, cocaine, heroin, stimulants, and tranquilizers; does not include alcohol.

Since 1980, drug and alcohol use by high school seniors has declined noticeably.

Source: University of Michigan, 1991

Colorado

Measuring Progress Toward the Goals

Goal 1: Readiness for School

No comparable state data currently available

Goal 2: High School Completion

No comparable state data currently available

Goal 3: Student Achievement and Citizenship

1. Percent of public school 8th grade students who are competent in mathematics (1990)[16]	18%
2. Number of Advanced Placement examinations taken in the core subjects (per 1,000 11th and 12th graders enrolled, 1991)[17]	97
3. Number of Advanced Placement examinatins taken in the core subjects receiving a grade of 3 or higher (per 1,000 11th and 12th graders enrolled, 1991)[18]	62

Goal 4: Science and Mathematics

No comparable state data currently available

Goal 5: Adult Literacy and Lifelong Learning

No comparable state data currently available

Goal 6: Safe, Disciplined, and Drug-free Schools

1. Percent of all high school teachers who reported that the following were problems in their schools (1988):[19]

Physical abuse of teachers	22%
Verbal abuse of teachers	80%
Robbery or theft	78%
Vandalism of school property	80%

Colorado

Additional Important Information Related to the Goals and Objectives

Goal 1: Readiness for School

1. Number of births (per 1,000 in 1988):[20]

a) at or above 5.5 pounds	922
b) between 3.3 and 5.5 pounds	68
c) below 3.3 pounds	10

2. Number of mothers (per 1,000 in 1988) receiving:[21]

a) some prenatal care before the 3rd trimester of pregnancy	946
b) first prenatal care during the 3rd trimester of pregnancy	41
c) no prenatal care	13

Goal 2: High School Completion

No comparable state data currently available

Goal 3: Student Achievement and Citizenship

1. Percent of public school 8th graders who scored within the following levels in mathematics (1990):[22]

Below Basic		34%
Basic		48%
Proficient	Goals Panel	17%
Advanced	Standard for Competence	1%

2. Estimated percent of public high school students taking the following courses (1988):[23]

Algebra I	—
Algebra II	—
Calculus	—
Biology	—
Chemistry	—
Physics	—

3. Number of foreign language Advanced Placement examinations taken (per 1,000 11th and 12th graders enrolled, 1991)[24]

Number receiving grades of 3 or higher	9
	6

4. Number of fine arts Advanced Placement examinations taken (per 1,000 11th and 12th graders enrolled, 1991)[25]

Number receiving grades of 3 or higher	1
	<1

Goal 4: Science and Mathematics

1. Percent of all high school science teachers who hold a degree in science (1988)[26] [*]

2. Percent of all high school mathematics teachers who hold a degree in mathematics (1988)[27] 27%

3. Percent of public school 8th graders (1990):[28]

a) who do these activities in mathematics class:

work in small groups at least once a week	69%
work with rulers, blocks, or geometric shapes at least once a week	34%
write reports or do projects during the school year	57%

b) whose mathematics teachers heavily emphasize:

Algebra and functions	51%
reasoning and analytic skill	50%
communicating mathematics ideas	45%

c) who have computers available in their mathematics classroom 16%

d) who use calculators in class several times per week 46%

Goal 5: Adult Literacy and Lifelong Learning

No comparable state data currently available

Goal 6: Safe, Disciplined, and Drug-free Schools

1. Percent of all high school students who reported (1990):[29]

a) Using the following at least once during the past 30 days:

marijuana	16%
cocaine	2%

b) Having five or more drinks in a row during the past 30 days 38%

2. Percent of all high school teachers agreeing with the following statements (1988):[30]

a) the level of student misbehavior in this school interferes with my teaching	44%
b) the amount of student tardiness and class-cutting interferes with my teaching	61%
c) rules for student behavior are consistently enforced by teachers in this school, even for students who are not in their classes	43%

3. Percent of all high school teachers who reported that they have little or no control disciplining students in their classrooms (1988)[31] 26%

[*] Sample size too small to permit reliable estimate

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