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An investigation of the relationships between Gaston County's instructional management system (MAC) and California Achievement Test scores

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AN INVESTIGATION OF THE RELATIONSHIPS BETWEEN GASTON COUNTY'S INSTRUCTIONAL MANAGEMENT SYSTEM (MAC) AND CALIFORNIA ACHIEVEMENT TEST SCORES

by

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APPROVAL PAGE

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The purpose of this research was to determine if students whose teachers were a part of the Gaston County instructional management system for math and communication skills (MAC) -- a criterion-referenced test-based management system scored higher on the California Achievement Test (CAT) -- a norm-referenced test than did students whose teachers were not in the MAC system. In addition, the researcher investigated the independent variables of gender, race, parental education level, and longevity in the MAC Program to determine if scores on the CAT differed between MAC and Non-MAC students. The sample consisted of 420 sixth-grade students in Gaston County Public Schools during the 1988-89 school year.

The focus of the literature review narrowed the topic of educational reform to more specific topics of accountability and testing. Special emphasis was given to educational reforms in North Carolina in the 1980s.

The researcher used previously collected data for analyses in this quasi-experimental study. Although quasi-experimental, the study followed a posttest only design in its methodology. T-tests, ANOVA, and reliability were the primary statistical procedures used to analyze data.

The findings show that in no case did students in the MAC Program outperform students not in the MAC Program.

Regardless of independent variable tested (e.g., gender, race, parental education level, years of MAC participation) students not in the MAC Program outperform students in the MAC Program.

The findings support the conclusions that the MAC Program should be discontinued in Gaston County until further evidence shows that the program is helping to improve student test scores. The findings also support the possibility that a sex bias exists in the MAC Program against sixth grade males. This study was not designed to examine bias in depth; therefore, further investigation would be required to confirm the existence of such a bias. Finally, the MAC Program with its measurement-driven instruction removes far too many decisions from the classroom teacher regarding instruction violating many of the postulates of effective school research and of current educational reforms in North Carolina.

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I wish to thank Drs. Achilles, Brubaker, Forbes, and Olson for their time, energy, and devotion to this research effort. The wisdom and expertise offered during my doctoral studies have strengthened both my study, my knowledge of research, and have enhanced my personal growth and development in the field of education.

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CHAPTER I

INTRODUCTION

Overview of Educational Reform

"Our Nation is at risk. Our once unchallenged preeminence in commerce, industry, science, and technological innovation is being overtaken by competitors throughout the world."[1] A Nation At Risk[2], the source of this quotation, set the tone for the 1980's educational reform movement in America. This politically motivated report by the National Commission on Excellence in Education was a comprehensive assessment of the state of education in America. The Commission found severe inadequacies in major components of education including curriculum and teaching. Recommending sweeping changes in curriculum, teacher preparation, standards of performance for students and teachers, and fiscal support to implement these changes, the Commission prepared a blueprint for educational reform in American schools.

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[1]National Commission on Excellence in Education, A Nation At Risk, April 1983, 4.

[2]Ibid.

"Educational reform operates on three loosely connected levels: policy, administration, and practice."[3] The domain of educational practice is the classroom, and it "consists of the fine-grained instructional decisions necessary to teach the content, manage a classroom, diagnose and treat learning problems, and evaluate one's own performance and the performance of one's students."[4] Although changes must be made in policy and administration, the classroom is the focal point for sustained change in education. In order to effect these changes, restructuring must take place making classroom teachers a more important element in the decision making process. This is in keeping with beliefs about site-based decision making held by leading researchers in the field such as Sirotnik and others that the school should be the center of change.[5]

In the early 1970s, school districts such as Clovis, California, began to experiment with restructuring schools. By the mid 1980s, Dade County, Florida; Chesterfield, Missouri; Hammond, Indiana; and others joined Clovis, and began restructuring experiments allowing more decision

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[3]Richard F. Elmore and Milbrey Wallin McLaughlin, <u>Steady Work: Policy, Practice, and the Reform of American Education</u> (Santa Monica, California: The Rand Corporation, 1988), 5.

[4]Ibid., 5.

[5]Kenneth A. Sirotnik and Richard W. Clark, "School-Centered Decision Making and Renewal," <u>Phi Delta Kappan</u> 69 (May 1988): 660-664.

making to occur at the individual school level. The common goal of these restructuring experiments was clear: "an improved educational program for all students."[6]

The Carnegie Task Force on Teaching as a Profession presented a plan that reaffirmed the previous research done by the Commission on Excellence in Education. The Task Force listed as one of its purposes for producing the report "that a remarkable window of opportunity lies before us in the next decade to reform education, an opportunity that may not present itself again until well into the next century."[7] The Carnegie Plan called for increasing the role of teachers by "providing a professional environment for teaching while holding them accountable for student progress."[8]

Six years after A Nation At Risk sounded the "alarm", President Bush brought the nation's governors together at Charlottesville, Virginia, for an Education Summit. The purpose of the summit was to address the ills of the American educational system and set goals for improvement. The goals set during this summit "focus on ensuring that all young children are ready to start school; improving American

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[6]Gerald Dreyfuss, "Dade County Opens Doors to Site Decisions," The School Administrator 45 (August 1988): 12.

[7]Task Force on Teaching as a Profession, A Nation Prepared: Teachers for the 21st Century (New York: Carnegie Corporation, May 1986), 7.

[8]"A System of Pay, Autonomy, Career Opportunities," Education Week, 21 May 1986, 11.

students' performance in international assessments; reducing dropout rates; increasing adult literacy; ensuring that workers are trained for today's high-tech jobs; and establishing safe, drug-free schools."[9] In addition to the goals set by the participants at the summit, several initiatives were launched. Restructuring the schools and establishing clear measures of performance were among the most notable initiatives approved.

First, the idea of restructuring school systems to allow more authority at the school level is not new to education, nor is it without support in the literature. It often is referred to as school-based management or site-based management. To accomplish lasting effects, reform must be sustained. "Sustained reform requires active involvement of educators at the building level."[10]

The second initiative, establishing clear measures of performance, is also a topic that has been debated in educational circles for many years. In 1983, A Nation At Risk pointed out the need for "more rigorous and measurable standards, and higher expectations for academic

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[9]"Summit's Promise: 'Social Compact' for Reforms," Education Week, 4 October 1989, sec. 1, 10.

[10]James W. Guthrie, "School-Based Management: The Next Needed Education Reform," Phi Delta Kappan 68 (December 1986): 306.

performance."[11] Once again, the issues of expectations and standards of performance surfaced under the guise of accountability.

The current reform movement has now filtered down to the state and local levels. It is the prevailing influence on educational legislation and policy in many states, especially North Carolina. Shortly after A Nation At Risk brought national attention to the ills of education, the Committee on Education and Economic Growth focused attention on the ills of education in North Carolina. As a result, the North Carolina State Board of Education presented a comprehensive program to meet and exceed the basic needs for education in North Carolina. This plan, known as the Basic Education Plan, was presented to the North Carolina General Assembly on October 15, 1984. In June of 1985, the General Assembly enacted legislation directing the State Board of Education to adopt a basic education program.

The Basic Education Plan has not cured the ills of education in North Carolina. The call for reform is still loud and clear. During the 1989 session of the General Assembly, legislation known as Senate Bill 2 was enacted. This bill, entitled School Improvement And Accountability Act of 1989, establishes the Performance-based Accountability Program. Senate Bill 2 offers flexibility in

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[11]National Commission on Excellence in Education, A Nation At Risk, 29.

funding and differentiated pay. In return, accountability for student performance to the school system and state is required. An integral part of this accountability is measurable student performance objectives.

County educators also saw the need for educational reform. As early as 1983, the administrative personnel in Gaston County recognized that testing was an important element of the education reform that was emanating from the North Carolina Department of Public Instruction (NCDPI).

Test scores of Gaston County students were not in line with other districts throughout North Carolina. It became apparent to educators that Gaston County needed to develop a program to help teachers focus on student academic strengths and weaknesses, which, in turn, would lead to improved test scores on the state-sponsored tests. In 1983, Gaston County personnel began development of a computerized instructional management system that would help educators meet the individual instructional needs of students and, thus, raise achievement test scores in the areas of math and communications. The acronym for this "tailor-made" management system is MAC which stands for Math and Communication.

The MAC Program employs the computer to manage, analyze, and report results on test data. By receiving instant feedback county educators believed that teachers would focus their energies on student achievement. The MAC

Program was designed for grades K-12 and incorporated appropriate objectives of the *California Achievement Test* (CAT) and the North Carolina Standard Course of Study. The rationale for such an instructional management system was stated in the accompanying literature distributed by the Gaston County Testing Department to the schools in the MAC Program.

> MAC was developed to insure that each student in Gaston County would be provided with the same chance to have a coordinated and sequential skills development.
>
> MAC was developed, not only to diagnose individual skill needs, but also to meet the needs of teachers who were feeling the frustrations of trying to determine what those "needed skills" were. To date, teachers have had several different sources which held them accountable for teaching specific skills: county and state curriculum guides, the CAT test objectives, textbooks, and the State Basic Education Program standards.... MAC is an attempt to assimilate the required skills, giving the teacher one source which lists in a simplified manner those skills the students should master at particular intervals in their development.[12]

Testing in the areas of math and communication skills was to be an integral part of the MAC Program. A committee of Gaston County educators was charged with the task of developing the test items for the MAC Program. The committee consisted of classroom teachers, content area supervisors, assistant principals, and principals. The items were to be different ways to measure knowledge of each

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[12]"MAC User Manual", 1990, p. 4, Gaston County Schools Testing Department.

objective from simple recognition to application in isolation and in context. Although scholars in testing such as Hopkins and Stanley[13] suggest that objectives should be tested on several levels of cognitive skill for mastery, the committee determined that only four items per objective would be written. Other issues that influence the number of items used when testing an objective are the importance and the complexity of the objective being tested. Complex objectives require more test items than simple objectives.[14]

The test items were developed using numerous resources as references. Among the most noted references were the *CTB McGraw-Hill Classroom Management Guide to the CAT, Scoring High*, and the North Carolina Standard Course of Study. Institute for Educational Research (IER) Criterion-Referenced Language Arts Objective, a test item bank, was purchased from the Institute for Educational Research, Glen Ellyn, Illinois, as a source of quality test items.

After the tests were constructed, a field test was conducted using 32 classes in grades one through eight across Gaston County. All Gaston County's socio-economic and demographic elements related to school-age children were included in the field-test sample. All academic ability

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[13]Kenneth D. Hopkins and Julian C. Stanley, Educational And Psychological Measurement And Evaluation, 6th ed. (Englewood Cliffs, N. J.: Prentice-Hall, 1981), 189.

[14]Conversation between Bert Goldman, Professor, UNC-G and David Shellman, 16 November 1990.

levels also were included in the field-test sample. Item analyses of the test items were performed. Results from these analyses were used to determine items that were too hard, too easy, or unclear, and necessary changes were made. As a result of a survey of teachers involved in the field test, the MAC tests were shortened by reducing the number of items required for mastery rather than have a test that exceeded 200 questions.[15] Currently, one to three test items per objective are used to determine mastery, with mastery being defined as responses for each objective to be 100% correct.

Statement of Problem

The problems facing Gaston County were test scores that were six to eight percentiles below the North Carolina average on the CAT. North Carolina's sixth grade students scored 62 on the national percentile scale compared to 50 for the national percentile average. Another problem was a concerned group of Gaston County citizens, politicians, and educators demanding improvement in those CAT scores.

Statement of Purpose

The purpose of this study was to determine if students whose teachers were a part of the Gaston County instructional management system for math and communication

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[15]Brenda Benton memo to David Shellman, 8 October 1990.

skills (MAC) -- a criterion-referenced test-based system -- scored higher on the *California Achievement Test*, a norm-referenced test than did students whose teachers were not a part of the MAC Program. The researcher also investigated selected samples of student test scores to determine differences that may exist for these selected groups (e.g., sex, race, parental educational background) with respect to participation or non-participation in the MAC Program. The researcher investigated longitudinal data in both the composite and aggregate samples to determine if years of student participation in the MAC Program showed improvement in student CAT scores. The importance of this study was to gather empirical data to substantiate or not to substantiate the MAC Program as an instrument to help teachers provide instruction to improve student achievement test scores in Gaston County Schools. The magnitude of Gaston County's investment mandates that a program evaluation be conducted to estimate the efficacy of the MAC Program in providing help in improving instruction, and thereby, in improving achievement test scores on the CAT.

Significance of Study

The Gaston County school system is the fifth largest school district in North Carolina and among the 200 largest systems in the United States. Each year, more than 30,000 students attend the Gaston County public schools in grades

K-12. During each year, more than 110,000 tests are administered to students as a part of a comprehensive testing program. Many other school systems are confronted with similar testing situations. With such a magnitude of tests being given in schools and the public perceptions of the imperfections in the educational system, it is natural for the citizenry to demand to know how local student achievement compares with that of students in North Carolina and/or across the nation.

Parents are not the only people interested in the issue of student performance. The General Assembly of North Carolina, in its role as major funder for education in North Carolina, also professes interest in student performance. The General Assembly recently passed legislation granting more flexibility in state funding in return for more accountability. One indicator of accountability is student performance as measured by test scores. The North Carolina Department of Public Instruction at present requires educators to administer the CAT to all North Carolina students in grades three, six, and eight.

In addition to parental and General Assembly interest in student performance, the Gaston County Board of Commissioners, as the second largest financial contributor to Gaston County's public education, has shown a strong interest in student performance. During recent past budget negotiations with the Board of Education, the Commissioners agreed to increase funding for Gaston County Schools over the next four years to attain the state average for per pupil expenditures, contingent on improvement of student performance. Like many school districts across the country, Gaston County uses the CAT as its indicator of student performance relative to national norms.

School districts in North Carolina and in other parts of the nation are hard pressed for funding. Schools can ill afford to spend large sums of money on programs that do not produce desired results. Gaston County is no exception to this need to ensure results for investments in programs. The schools made a significant investment in the MAC Program. Since 1983, more than $1,000,000 has been spent in Gaston County to develop and implement the MAC Program in grades K through eight. At the time the data were gathered for this study, the program was available only to about half of the students in Gaston County. Currently, the MAC Program is implemented for all Gaston County students for whom it was intended.

An instructional management program, such as the MAC Program, may be a valuable tool to meet the individual educational needs of students. The MAC Program is limited to the skills of language, reading, and math; however, educators in other disciplines easily could develop valid criteria and tests for measurement and adapt the MAC Program to help improve instruction in other content areas.

The MAC Program was developed to help teachers improve their instruction and thus, improve achievement scores of their pupils on the CAT. With that in mind, the developers included in the MAC Program all the objectives on the CAT and the objectives in the North Carolina Standard Course of Study. The MAC Program never has been validated or evaluated against the CAT to verify improvement. If the MAC Program can contribute to improvement on pupil CAT scores in Gaston County, school districts in North Carolina and in other states with similar learning objectives could possibly benefit from this instructional management program.

Because North Carolina is scheduled to dispense with the CAT in grades three, six, and eight as the main instrument for testing in 1992, a new system of End-of-Grade tests will then be used to measure student achievement at each grade level. After 1992, in addition to the End-of-Grade tests, a randomly selected sample of North Carolina students will participate in a national assessment of student achievement. This process will provide empirical data that will help educators across the state plan, monitor, and implement programs in North Carolina to keep our students in step with students across the nation.

Although after 1992 not all students in grades three, six, and eight will be tested using the CAT, some Gaston County students still will be tested using the CAT, and others will be tested in the national assessment program.

Current plans in the Chapter I Reading Program call for continuation of the CAT as the main instrument to evaluate student achievement in reading. Other specialty groups such as the Exceptional Children's Program also use the CAT to evaluate students. Therefore, Gaston County students still need to be prepared for these national normed tests so that educators will have evidence that students in our schools are or are not in line with students across the state, region, and nation.

The researcher used a quasi-experimental research design to evaluate the data in this study. Results of the study provide critical information to the Gaston County school district on possible differences in CAT achievement scores as a result of the MAC Program feedback. This feedback is designed to help teachers improve instruction for the students in the experimental groups as opposed to no feedback in the control groups. The study also furnished data on possible differences in achievement between groups such as gender, race, and parental educational level within the samples.

This study is, therefore, significant to Gaston County. In sum, it provided empirical data on student achievement on a nationally-validated test for students who were and were not in the MAC Program. Based on the results one could draw conclusions and make recommendations on the program as an effective method to help teachers improve instruction, thus, improving Gaston County student achievement. Second, the MAC Program, through its pre-test/post-test format, provides a means for teachers to document increased student progress as a result of instruction during a given year.

Hypotheses

The study addressed the purposes stated above by testing the following hypotheses. Hypotheses were rejected or not rejected based upon an Alpha level of $p \leq 0.05$.

$H_0 1$ There is no difference between the experimental (MAC) and control (Non-MAC) groups on CAT scores.

$H_0 2$ There is no difference between the experimental (MAC) and control (Non-MAC) groups on CAT scores as a function of gender, race, or parental educational level.

$H_0 3$ There is no difference between the experimental (MAC) and control (Non-MAC) groups on California Achievement Test scores as a function of years of participation in the MAC Program.

Definitions

CAT - abbreviation for *California Achievement Test*, a norm-referenced test.

Gender - sex of the child reported on the CAT.

<u>MAC</u> - an acronym for Gaston County's Instructional Management System in Math And Communications skills.

<u>MAC Program</u> - for the purposes of this study the term MAC Program will refer to the computerized instructional management system used in Gaston County in grades K-8. The program has several elements including:

- A pretest in math and communication skills;
- Numerous reports designed to help teachers improve instruction and meet the individual, as well as, group needs of students;
- Interim testing capabilities;
- Posttest in math and communication skills.

<u>Parental Education Level</u> - parental education level was divided into three categories: less than high school education, high school education, and some college or technical training. These data were based on the student's believed knowledge of parental education level taken from the CAT data.

<u>Race</u> - for the purposes of this study race was divided into two categories: Caucasian and non-Caucasian. The racial composition of Gaston County Schools reported by sixth graders on the CAT in 1989 was 83.1% White; 16% Black; 0.4% American Indian; 0.3% others. Only 0.2% did not report their race.

<u>School-based management</u> - a system in which educational decisions are made on the school level.

Socio-economic background (SES) - for the purposes of this study, SES categories were determined by parental education level.

Theoretical Framework of Study

Educational reform in America has as its goal an educational system that prepares its students to face the challenges of the 21st century. To prepare students for tomorrow, educators need continually to study and improve the instructional delivery system. Educators must find a way to challenge the academically talented, continue to maintain students who are developing at the appropriate rate, and either remediate students who have fallen behind in achievement or assure that students don't fall behind. This is not an easy task. Educators must use innovative techniques and technology to expedite the solutions to such diverse problems. The computer with software designed to manage instruction, rather than manual methods often used, offers an expedient way to assess current student educational levels and to prescribe resources available to improve their education.

Instructional improvement is not enough to calm the educational reform movement of the 1980s. Accountability now is the cry. Educators, politicians, and the general public are looking for a "yardstick", a measurable way to evaluate teacher performance and student progress. Testing, generally of basic skills, has been the popular answer to the "yardstick". One test used to evaluate student progress and compare that progress to students across the nation is the *California Achievement Test*, (CAT). The CAT is administered in grades three, six, and eight in North Carolina as a measure of student performance. Although not recommended by the test developer, results of this test are used as one of the criteria for student placement in advanced curricula or for recommendation for summer school or for retention in North Carolina. As an instructional management program, the MAC Program was designed to help address the public's demands for better scores on the CAT.

The MAC Program meets two criteria of educational reform. First, it offers the tools to assess and diagnose educational strengths and/or weaknesses. It employs a computer to assist in the analysis and maintenance of large quantities of data, freeing the teacher for instruction. Second, it provides a means of measuring individual student progress.

If teachers and students are going to be evaluated, so should programs. Instructional programs often are the "brain child" of educators who no longer are in the classroom. Many times programs are mandated by central staff. The future of a generation and the professional careers of many teachers are riding on the educational programs used in our schools. Accurate, sound evaluation of these educational programs is imperative to ensure our students get quality programs and our teachers have effective methods of instruction.

The MAC Program offers students in Gaston County the opportunity to be tested in an environment similar to a CAT testing environment and on the general objectives that are measured on the CAT and the North Carolina Course of Study. This opportunity is in keeping with research which supports procedures allowing students to practice on tests that are similar in form to the achievement tests used for formal measurement. At this point the MAC Program employs pre- and posttests to evaluate student progress; however, the capabilities for intermediate tests are available. The MAC Program, therefore, provides for the frequent monitoring of student progress. Effective Schools research supports frequent monitoring as an effective measure of program evaluation.[16]

Limitations

The MAC Program is designed for grades K through eight; however, this study dealt with sixth grade students in Gaston County Schools during the 1988-89 school year. Several factors limited the generalizability of this study to large groups. One of these factors was the use of

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[16]Ronald R. Edmonds, "Programs of School Improvement: An Overview," Educational Leadership 40 (December 1982): 4.

historical data in an experimental framework. The second factor was the inability to randomize the subjects prior to treatment rather than randomly assigning subjects ex post facto. No attempt was made to verify the degree of use of the MAC Program by the teachers involved in the study. Another limitation was the lack of MAC scores for the control group.

Due to lack of empirical data to support the reliability and validity of the MAC Program tests, these tests must be included in this study as a limitation. Rationale for such a decision is based on the less-than-scientific procedures used to construct the tests. The fact that the tests were only reviewed for clarity and for appropriate grade-level placement and not for difficulty level or discrimination index supports the rationale to include the tests as a limitation to the study. This rationale is supported by the fact that the tests only use from one to three test items to determine mastery of objectives. Popham says, "It is technically impossible to get a decent fix on an examinee's status with respect to a particular skill by using only a handful of items."[17]

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[17]W. James Popham, "Well-Crafted Criterion-Referenced Tests," Educational Leadership 36 (November 1978): 92.

Assumptions

The major assumption in this study was that schools assigned to participate in the MAC Program implemented the program as it was intended. In other words, it was assumed that teachers were administering, scoring, and reporting the results of the tests, and using those results to plan instruction for their students.

Study Organization

Chapter I includes the problem to be studied, the purpose of study and its significance, the hypotheses to be tested, definition essential terms, limitations that may prevent generalizability, and an outline the organization of the study.

Chapter II includes a discussion of educational reform in America, educational reform in North Carolina, issues of accountability and testing, and discussion of criterion-referenced and norm-referenced tests.

Chapter III consists of a brief review of the purpose, the population and sample, design, instrumentation, procedures, and data analysis used in the study.

Chapter IV contains a description and analysis of data for specific hypotheses tested in the study.

Chapter V concludes the study with a summary of the findings, presentation of conclusions, and recommendations for further study.

CHAPTER II

REVIEW OF THE LITERATURE

The purpose of this study was to examine relationships between the Gaston County instructional management system (MAC) and scores on the *California Achievement Test* (CAT) in grade six. In order to understand the significance of any relationships that may exist, it is equally important to understand the underlying factors that contribute to the importance of student achievement levels.

A Profile History of Educational Reform

Pre-1980 Educational Reforms

Educational reform in the United States is not unique to the decade of the 1980s. As early as 1892, efforts were made to reform the educational system in the United States. These calls for reform have not always "arisen as responses to dependable information about the performance and effectiveness of the schools." They often were stimulated by "conditions and events that have had little direct connection with education."[18] The reform of education has often been stimulated by industrial or political requirements. "Industry has played a major role in the reform, directly by the technological advances provided for

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[18]Ralph W. Tyler, "Education Reforms," Phi Delta Kappan 69 (December 1987): 277.

education, and indirectly by influencing curriculum development for job fulfillment."[19] "Political aspirations have an immediate, direct effect on educational alterations especially because of the monetary clout."[20] The early reform movements in 1892, 1912, and the 1930s were stimulated by an economic recession or depression.

> The best-known educational report of the nineteenth century was that of the Committee of Ten on Secondary School Studies, issued in 1893. Chaired by Charles W. Eliot, president of Harvard University, the committee was established by the National Education Association to study high schools and make recommendations for improving them.[21]

In 1913, the National Education Association appointed a Commission on the Reorganization of Secondary Education.

No further significant education reform movements materialized until the 1930s. "The Eight-Year Study was initiated by the Progressive Education Association in 1933 in response to calls for reform that were inspired by the Great Depression."[22] The curricular reforms in the sixties

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[19]Mary Lee Schnuth, Historical Perspective of Educational Reform, (February 1986) Bethesda, MD: ERIC Processing and Reference Facility, ED 275 598, 2.

[20]Ibid., 11.

[21]Robert O. Slater and Donald R. Warren, "The Triumph of School Reform," Education and Urban Society 17 (February 1985): 122.

[22]Tyler, "Education Reform," 279.

were a result of the Soviet Union's successful launch of Sputnik I. The primary focus of these curricula reforms was in the areas of science, mathematics, and foreign languages. The federal government spent in excess of $100 million on high school curricula in these three areas.[23]

Social reforms in America found their way into the public schools in the late 1950s and early 1960s. Desegregation in the schools was a result of Supreme Court rulings in the mid-1950s. In the case of Brown v. Board of Education, the United States Supreme Court rendered its decision "that in the field of public education the doctrine of 'separate-but-equal' has no place." The Court ordered the schools desegregated "with all deliberate speed". It took 15 years after Brown v. Board of Education for the Court to demand that "all school districts in the south become unitary without further delay."[24]

In the late 1960s and early 1970s, other social issues became a part of education reform. Title IX dealt with sex discrimination and PL 94-142 dealt with the rights of handicapped children.

> In 1964 a Task Force on Education, appointed by President Lyndon Johnson, examined evidence obtained from a variety of sources regarding serious educational

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[23]Tyler, "Educational Reform," 277-279.

[24]Kern Alexander and M. David Alexander, The Law of Schools, Students, and Teachers (St. Paul: West Publishing Company, 1984), 165-170.

> problems. The task force found one such problem in schools that enrolled a large number of children from families below the poverty line: the children were making little or no academic progress.[25]

The result of this task force was Title I - "the flagship of Lyndon Johnson's Great Society education program. The federal government would distribute a large amount of money, beginning with $1 billion per year in 1965 and reaching over $2 billion in 1980, to localities based on the incidence of poverty, and require that those funds be used to supplement the education of disadvantaged children."[26]

In 1974, the social issue of bilingual instruction was decided by the Supreme Court of the United States in the case of Lau v. Nichols. In its ruling, the Court required bilingual instruction for minority students with a non-English background.[27]

In the 1970s, society's dissatisfaction with the educational product resulted in a new model for educational reform with new leadership. "In the minimum competency testing movement of the 1970s, governors and chief state school officers led the way."[28] Brandt pointed out the

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[25]Tyler, "Education Reform," 279.

[26]Elmore and McLaughlin, Steady Work, 24.

[27]Kern Alexander and M.David Alexander, American Public School Law, 2d ed., (St. Paul: West Publishing Company, 1985), 268-270.

[28]Tyler, "Education Reform," 278.

historical trends that led us to the reform movements of the 1970s.

> After the Second World War, there seemed to be a change in the way people conceived of education. The prevailing metaphor for schools became the factory or the production model; it may have come out of McNamara's Defense Department mentality of objective-based management and so on.
>
> The other movement, particularly in the '70s was a demand for accountability.[29]

Educational Reforms of the '80s

As with earlier reforms, the reforms of the 1980s are a result of commissions and committees established by politicians or foundations to investigate the ills of education and recommend changes for the future. These politically motivated commissions and committees are a result of the challenge of the American economy in the world market.[30]

On August 26, 1981, then Secretary of Education T. H. Bell, created the National Commission on Excellence in Education. The Secretary gave the Commission 18 months to examine the quality of education in the United States and to report to him and the nation on its findings.

The Commission's charter contained several specific charges including:

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[29]Ron Brandt, "On Misuse of Testing: A Conversation with George Madaus," Educational Leadership 46 (April 1989): 27.

[30]National Commission on Excellence in Education, A Nation at Risk.

- the assessment of learning and teaching in all levels of education both, public and private;
- comparing American schools and colleges with those of other advanced nations;
- studying the relationships between college admission requirements and student high achievement;
- identifying programs that produce successful college students;
- assessing the impact of major social and educational changes in the last quarter-century on student achievement, and;
- defining problems that must be faced and overcome to achieve excellence in education.

The Commission used a variety of sources in its quest for information to arrive at its findings. The Commission concluded that "declines in educational performance are in large part the results of disturbing inadequacies in the way the educational process itself is often conducted."[31] The four major aspects of the educational process addressed were content, expectations, time, and teaching.

In the area of content, the Commission found a secondary curriculum that had been diluted and diffused

[31]National Commission on Excellence in Education, A Nation at Risk, 19.

without a central purpose.[32] The Commission found that too often students were able to choose easier levels of a subject and the easier path for graduation rather than the more rigorous courses.

Expectations were less than desirable. The amount of homework for seniors had decreased. A paradox appeared, with grades showing an increase while achievement was on the decline. Students in other countries in the higher math and science courses received three times the amount of instruction given the best U.S. students. Finally, in 13 states students could satisfy graduation requirements by having 50% or more of their units as electives.

The effect of lack of expectation in the secondary schools was not limited to that educational level. Colleges also reported less qualified students were applying and being admitted into their programs. This trend forced colleges and universities to address the remedial needs of the students rather than emphasizing excellence.

The Commission reported that American students spent less time engaged in the educational process than those in other countries. The time spent in the classroom and on homework often was ineffective due to lack of study skills.[33]

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[32]Ibid.

[33]National Commission on Excellence in Education, A Nation At Risk.

Finally, the Commission reported that the teaching profession was not attracting its share of academically talented students; teacher preparation programs were inadequate; the professional working life of a teacher was unacceptable; and serious shortages of teachers existed in key academic fields.

As a result of the findings, the Commission made strong recommendations in the four areas of its investigation. In content, it recommended that state and local high school graduation requirements be strengthened by requiring a minimum of four years of English; three years each of mathematics, science, and social studies; and half a year of computer science.

In the area of expectations, the Commission called for more rigorous and measurable standards, higher expectations for academic performance and student conduct, and higher admissions requirements for four year colleges and universities.

The Commission's recommendations on time called for significantly more time to be devoted to learning the New Basics, which include English, mathematics, science, social studies, and computer science. This would require more effective use of the existing school day, a longer school day, or a longer school year.

Recommendations to improve the teaching profession were included in the report by the Commission. Teacher preparation programs needed to be improved, and strong efforts should be made to make teaching a more rewarding and respected profession.

Finally, the Commission recommended that citizens hold educators and elected officials responsible for achievement of these reforms. The citizens also should provide the fiscal support necessary to implement these recommendations. The call for excellence was echoed by other groups.

> One week after the National Commission on Excellence in Education issued its report, an educational task force of the Twentieth Century Fund called the school "the nation's most important institution for the shaping of future citizens," warning that "threatened disaster can be averted only if there is a national commitment to excellence in the public schools."[34]

> A Nation at Risk made a monumental impact on education. On May 11, 1984, President Reagan told former members of the National Commission on Excellence in Education assembled on the South Lawn of the White House that "it's not overstating things at all to say that your report changed history by changing the way we look at education and putting it back on the American agenda."[35]

In support of his affirmation of the commission, "the President released another report from the Education Department, The Nation Responds, documenting a 'tidal wave of reform' in the schools."[36] Many of the recommendations

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[34]Milton Goldberg, "A Report That Changed History," Childhood Education 61 (November-December 1984): 86.

[35]Ibid., 85.

[36]Ibid.

presented in A Nation at Risk were being addressed in A Nation Responds.

Not all educators agree fully with the findings of the National Commission on Excellence in Education. Altbach states "the reports and commissions leave many questions unanswered. Excellence sounds like a good thing, and there is universal agreement that schools do need some added attention and perhaps some significant changes."[37] Altbach agrees that schools need attention and changes are required, but cautions that the unanimity of the current reformers should be considered. Ascher offers numerous examples of educational reforms that have no effect on student outcomes. The purpose of his study was to examine these reforms and to identify what he claimed were the real goals. He states, "Let us examine the possibility that the real goals of educational reform are not equal opportunity, but are continued control by the elite."[38]

In 1986, the Task Force on Teaching as a Profession, a committee funded by the Carnegie Foundation, presented its report, A Nation Prepared: Teachers for The 21st Century.

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[37]Philip G. Altbach, "'A Nation at Risk': the Educational Reform Debate in the United States," Prospects: Quarterly Review of Education 16 (1986): 347.

[38]Gordon Ascher, "Artifacts of Educational Reform: Explaining the Unexpected," Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, California, 10 April 1979, Photocopied.

This report proposed a new framework for teachers that had as its goal:

> a system in which school districts can offer the pay, autonomy, and career opportunities necessary to attract to teaching highly qualified people who would otherwise take up other professional careers. In return, teachers would agree to higher standards for teachers and real accountability for student performance.[39]

The Task Force recognized the delicate balance between autonomy and accountability and recommended that teachers be allowed to make decisions in matters over which they currently have no control. "Teachers have to accept a greater degree of accountability in return for this increased discretion."[40] The Carnegie Report also recommended higher expectations of teachers and a more professional environment for teaching. Among the issues addressed in this report were:

- create a national board of professional teaching standards;
- restructure schools to provide a professional environment for teachers;
- introduce a new category of lead teachers and restructure the current teaching force;

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[39]"A System of Pay, Autonomy, Career Opportunities," Education Week 21 May 1986, 11.

[40]Ibid., 12.

- require a bachelor of arts or sciences degree as a prerequisite for the professional study of teaching;
- develop a professional teaching curriculum for a master's program in graduate school;
- prepare the nation's minority students for teaching;
- relate incentives to school-wide performance and provide the tools to make teachers more productive; and
- make teacher salaries and career opportunities competitive with other professions.

Whether or not the two major reports, A Nation at Risk and A Nation Prepared, initiated the reforms that occurred in the 1980s is immaterial. The points are that reform has occurred, and, in many instances, the reforms called for in these two reports and in numerous other reports were addressed in the various reform movements.

State leaders began to increase expectations of students and teachers in their education systems. Agee reported that "the major thrust of the educational reform strategy in California is to raise expectations for students, teachers, and schools."[41]

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[41]Janice Agee, Challenge of Excellence. Annual Report, 1986 (Sacramento: Bureau of Publications, California State Department of Education, [1987]), 5.

The issue of teacher expectations was addressed in both reports. A Nation Prepared called for a more professional environment to teach. Achilles suggested that one way to attract and maintain capable teachers was to "employ the professional model and reduce the bureaucratic model."[42] The professional model suggested by Achilles was presented by Conley and has the following elements:

- Treats uncertainty as a "given" in professional practice.
- Emphasizes strategies to help deal with daily uncertainty.
- Teacher is a decision maker who creatively adapts knowledge to unique/varied problem situations (found problems), expands skills beyond text knowledge; continuously refines professional judgement initiating decision making.[43]

The Metropolitan Life Survey conducted in 1986 was used in Texas to support the reform movement for better working conditions for teachers. The survey concluded that "skimpy pay, bad working conditions, and lack of respect are causing teachers to switch to more satisfying and more profitable careers."[44] In Massachusetts, similar findings were

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[42]C. M. Achilles, "Why Teachers Leave The Profession," Presentation of a Point of View to Participants in the Education Seminar Series of the Clovis Unified School District, Clovis, California, 8 February 1989, 15.

[43]Achilles, "Why Teachers Leave The Profession," 13.

[44]June Buhler and Flora Roebuck, Effects of Legislated Educational Reforms on In-Service Teachers' Perceptions of Self, Students, and Career, Paper presented at the Annual Meeting of the Association of Teacher Educators (Houston, TX, February 22-26, 1987), 3, BRS, ERIC, ED 283 802, Photocopied.

reported by the Commission on the Conditions of Teaching. As a result of the finding, the Commission proposed new initiatives to improve the conditions of teaching and learning. The Commission sought more empowerment and support for teachers, and more involvement and accountability for schools.[45]

Working conditions of teachers was not the only issue addressed. Teacher preparation and the attraction of highly qualified students also were issues. To satisfy the issue of teacher preparation, California enacted the Ryan Act requiring an academic major as a prerequisite for any teaching credential.[46]

A Nation Prepared called for a reform that shook the foundation of the decision making process. The restructuring efforts that evolved took many names -- site-based management, school-based management, and participative decision making, to name a few. Each variety had its own special niche, but regardless of what it was called or the peculiarity that existed, the central theme was the same --

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[45]The Special Commission on the Conditions of Teaching Report. Leading the Way., Massachusetts State Legislature, Boston. Special Commission on REACH and School Improvement, (August 1987) 11, BRS, ERIC, ED 293 935, Photocopied.

[46]Diana Hiatt, Post-Sputnik Educational Reform Era: To Dream The Impossible Dream. Paper presented at the Annual Meeting of the California Educational Research Association (Los Angeles, CA, 1986), 6, BRS, ERIC, ED 277 160, Photocopied.

decision making by principals and teachers at the building level. Site-based management is not a new concept.

> While around for a long time, this idea has become much more popular in the last decade for two reasons: the importance ascribed to school-site management by research on school effectiveness and so-called second wave (Guthrie, 1986) of educational reform concerned with deregulation and decentralization.[47]

The concept of site-based management "flew in the face" of central office personnel. Central office staff would "often find it difficult to visualize ways to manage site-based management without loss of accountability, diminished emphasis on district goals, and loss of consistency throughout the system."[48]

According to Burns and Howes, the research literature supported the concepts proposed in site-based management. They stated that,

> The practice of site-based management is grounded in the following research principles:
> - The school is the primary unit of change.
> - A healthy school climate is an important prerequisite for effective improvement.
> - A positive social climate, high trust level, open communications, and a holistic concern for people promote effective improvement efforts.
> - Significant and lasting improvement takes considerable time.

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[47]Rex A. Carr, "Second-Wave Reforms Crest at Local Initiative," The School Administrator 45 (August 1988): 16.

[48]Sarah D. Caldwell and Fred H. Wood, "School-Based Improvement -- Are We Ready?" Educational Leadership 46 (October 1988): 50.

- School improvement requires personal and group commitment to new performance norms.
- In effective schools, teachers and principals believe that all students can master the basic learning objectives.
- The role of the principal is the key to effective improvement.
- Collaboration, dialogue, school decision making, and adaptability characterize school improvement.
- Efforts to change schools have been most effective when they have been focused toward influencing the entire school culture in a risk-free, collegial atmosphere.
- Change in the total organization is fostered through worker participation in project planning and implementation with strong, active encouragement, and the acceptance of the results from superiors.[49]

The concept of the school building as the arena for real, sustained change in the educational system is supported by the literature. Guthrie states that, "sustained school reform requires the active involvement of educators at the building level."[50] Carr shared Guthrie's point of view and stated that, "despite the promises and early successes of many school reform efforts, experts agree that reform may be difficult to sustain without powerful local initiatives."[51] A study done in Hammond, Indiana, where site-based management is being practiced, affirmed the beliefs that "those most closely affected by the decisions

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[49]Leonard T. Burns and Jeanne Howes, "Handing Control to Local Schools," The School Administrator 45 (August 1988): 8.

[50]Guthrie, "School-based Management," 306.

[51]Carr, "Second-Wave Reforms Crest at Local Initiative," 16.

should have a major role in making them and that reforms are most effective when carried out by people who feel a sense of ownership of them."[52]

Educators in some school districts such as Hammond, Indiana; Dade County, Florida; and Clovis, California have implemented site-based decision making with some success. Other school leaders across the nation are investigating the possibilities of site-based decision making. Carr states, "The time is ripe to implement a school-based management strategy to sustain school reforms through active involvement of educators at the building level."[53] Carr is not alone in his emphasis on the school building being the locus of change. Guthrie[54] and Pipho[55] agreed with the concept of the school being the center of change, as did Sirotnik and Clark: "if we don't understand the significance of the school as the center of change, we will continue to see it only as the target of change."[56]

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[52]Jill Casner-Lotto, "Expanding the Teacher's Role: Hammond's School Improvement Process," Phi Delta Kappan 69 (January 1988): 350.

[53]Carr, "Second-Wave Reforms Crest at Local Initiatives," 16.

[54]Guthrie, "School-Based Management: The Next Needed Education Reform," 306.

[55]Chris Pipho, "Restructured School: Rhetoric on the Rebound?" Phi Delta Kappan 69 (June 1988): 711.

[56]Sirotnik and Clark, "School-Centered Decision Making and Renewal," 664.

Sirotnik and Clark further state, "the ultimate power to change is -- and always has been -- in the heads, hands and hearts of the educators who work in the schools. Decisions must be made where the action is."[57]

The last major reform effort for the 1980s was President Bush's Education Summit held September 27-28, 1989 in Charlottesville, Virginia.

> The joint statement released at the close of the summit said the goals will focus on ensuring that all young children are ready to start school; improving American students' performance in international assessments; reducing dropout rates; ensuring a supply of qualified teachers by improving training and their working environment; ensuring that workers are trained for today's high-tech jobs; and establishing safe, drug-free schools.[58]

In addition to the goals, several initiatives also were launched.

- Reduce federal regulations, thus giving states more latitude in using federal education funds.
- Pursue higher funding for federal programs for young or disadvantaged children.
- Restructure schools giving more authority to the school level.
- Establish clear measures of performance.[59]

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[57]Ibid.

[58]"Summit's Promise," 10.

[59]Ibid.

The results of this summit are yet to be realized. Goals have been set, but to date no recommendations have been made. The goals and initiatives presented are not new, nor are they without merit. The implementation is yet to come. The issue of accountability and site-based decision making is imbedded in some goals of this summit.

Educational Reform in North Carolina

The cries for educational reform have not fallen on deaf ears in North Carolina. In the last ten years, numerous initiatives have shed new light on the needs of the North Carolina citizens and in particular the student population in North Carolina Public Schools. These initiatives emanated from many sources: from educators attempting to better their profession, from foundations attempting to cure the ills of society through education, and from politicians attempting to accommodate their constituent's demands for better education for their children.

In North Carolina, the major funder of public education is the North Carolina General Assembly. With the General Assembly being the source of funds, the position of State Superintendent of Public Instruction being an elected position, and the State Board of Education being an appointed board, it is inevitable that education is an issue in the political arena. High levels of state government play a vital role in the success of educational programs in North Carolina.

There is great disparity in spending on education from county to county in North Carolina. Like many states, North Carolina has counties with economic affluence that can use local tax dollars to supplement the state funds for education. Likewise, North Carolina due to its rural and agrarian background, has many counties that are economically deprived and can ill-afford to supplement state funds for education. One form of educational reform that addresses this disparity is the Basic Education Program (BEP). In the early 1980s, the North Carolina General Assembly charged the State Board of Education with the tasks of defining and costing a basic education program for North Carolina. The BEP was designed to deliver basic education program to all students in North Carolina regardless of their home county or regardless of the economic condition of that county.[60]

The BEP addresses curriculum, programs, materials and support, minimum standards, and staffing. Assessment is a major component of the program. The BEP specifies that the Annual Testing Program in Basic Skills, End-of-Course Tests in high school courses, and North Carolina Competency Tests

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[60]North Carolina State Board of Education, The Basic Education Program For North Carolina's Public Schools,(Raleigh, NC: February 1988), 1.

are a part of the BEP.[61] The BEP is legislation designed to help rural areas provide the basic educational needs of its citizens. Forbes, in his paper presented at the National Rural Education Forum in August, 1985 emphasizes the impact that educational reform might have on rural education. He states, "rural education might be the big winner. Concerns have focused on improving education for all students regardless of where they live, a direction not emphasized in most previous movements."[62]

Although the BEP provided for the basic education needs of students across North Carolina, other legislation was required to answer the cries of restructuring for proponents of the Carnegie Report. In 1987, as a result of studies done by the Public School Forum of North Carolina, the North Carolina General Assembly enacted Senate Bill 948. The purpose of the bill was to establish the Lead Teacher Pilot Program. This piece of legislation has been called "the best piece of legislation for education ever written."[63] The bill gave the pilot school systems unparalleled latitude in decision-making on the local level. Total flexibility

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[61]Ibid., 23.

[62]Roy H. Forbes, "State Policy Trends and Impacts on Rural School Districts," Paper presented at the National Rural Education Forum (Kansas City, MO, August 12-14, 1985), 4, BRS, ERIC, ED 258 787, Photocopied.

[63]Interview with Jim Martin, Superintendent Stanly County Schools, Albemarle, NC, 27 July 1989.

was given to the pilot systems regarding state funds. This flexibility allowed the local school to decide the best use of the funds to satisfy the educational needs of each school in the project. The school systems in the Lead Teacher Project experienced no restraints from the State Department of Public Instruction with respect to regulations or policies. The only requirement in the bill was that plans developed by local educators must be approved by the local boards of education. The Lead Teacher Project was successfully implemented in three counties in North Carolina, but the project was not adopted for statewide use. The Lead Teacher Project was the beginning of a more extensive program that was adopted by the North Carolina General Assembly in 1989. This more extensive legislation is known as Senate Bill 2.

Like many acts adopted by the General Assembly, the two houses of the legislature had differing ideas about educational reform. The School Improvement and Accountability Act (Senate Bill 2) resulted from a compromise between House Bill 1510 and Senate Bill 2. The resulting legislation provided for flexible funding and differentiated pay in return for accountability for student performance. The bill provided for end-of-grade and end-of-course testing to serve as the measure of progress toward selected competencies in the North Carolina Standard Course of Study. The end-of-course tests would also serve as a baseline for future performance indicators.

Senate Bill 2 gave the State Board of Education the power to issue an annual 'report card' for the State and each local school administrative unit assessing each unit's efforts to improve student performance and taking into account progress over the previous years' level of performance in comparison with other states.[64] Twenty-four of the thirty indicators addressed on the report card involved test score results.

Accountability

The research and educational reform movements of the 1980s call for more decision making by those closest to instruction. Neither research nor education reform proponents are willing to support the decision making by local-site educators without some form of accountability to ensure quality education for the children of America. One intent of every major educational reform since the turn of the century has been to help public-school students to reach their full potential. Many approaches have been proposed to accomplish this task. In the late sixties and early seventies the public became frustrated and disillusioned over the efforts to reform practiced during this period of

[64]Raleigh, N.C., School Improvement and Accountability Act of 1989, (1989) sec. 115C-16.

time. The public began to demand that educators present increasingly more technical information about student progress rather than just the process controls associated with strategies and activities to improve learning.[65] The general public is not the only segment of the population concerned with quality education. Research by Sullivan showed that lack of accountability is one of the five major issues that concerns business about education.[66] The federal government, one investor in education, has an interest in accountability for student outcomes. Fox reports,

> Nowhere is the concern for accountability in reading more apparent than in a recent education law -- The Augustus F. Hawkins - Robert T. Stafford Elementary and Secondary Education Improvement Amendments of 1988 (U.S. Law 100-297). This law significantly increases Federally mandated testing in reading, provides for testing in smaller groups of students than in years past, and establishes a system of accountability that directly links assessment results to a series of steps for changing school reading programs, in this case federally funded Chapter I programs.[67]

In many states, such as California, Massachusetts, West Virginia, and North Carolina, accountability has become a

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[65]Laura Hersh Salganik, "Why Testing Reforms Are So Popular and How They Are Changing Education," Phi Delta Kappan 43 (May 1985): 607.

[66]Michael F. Sullivan, "Here's What Really Worries Business About Your Schools," Executive Educator 12 (May 1990): 24, 25.

[67]Barbara J. Fox, "Teaching Reading in the 1990s: The Strengthened Focus on Accountability," Journal of Reading 33 (February 1990): 336.

burning issue and an integral part of educational reform. California was the first state to have a statewide accountability program. "The major thrust of education reform in California is to raise standards and expectations for students, teachers, and schools."[68] In Massachusetts, the plan for improvement is depicted by a simple formula: empowerment plus accountability equals achievement. This formula and its underlying beliefs are the foundation on which the "Carnegie Schools" in Massachusetts are based. In West Virginia, during the midst of the development of a master plan for excellence in education, the public's discontent over inequities in funding for education erupted into a civil suit. The courts eventually ruled in favor of the plaintiffs and in the process defined excellence in education and the role that funding should play in accommodating excellence. Embedded in this plan, as in the others, is an accountability component and a strong testing program to monitor student progress.[69] Courts in Kentucky have generally followed the West Virginia format.

In 1989, the North Carolina General Assembly passed the Performance-Based Accountability Program (Senate Bill 2). This law connects school-based performance with flexibility

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[68]Agee, Challenge of Excellence. Annual Report.

[69]John Ralph Pisapia, "A Legacy of Excellence," Paper presented at the Annual Meeting of the American Educational Research Association (New Orleans, LA, April 23-27, 1984), BRS, ERIC, ED 251 916, Photocopied.

and state allocated education funds and differentiated pay for educators. The bill authorized the State Board of Education to issue a report card each year reporting to the public the status of education in the state. The report card presents a comparison of each local school administrative unit's performance with that of the state and other administrative units in the state similar in size and demographics. Scores on state-mandated tests are the most prevalent indicators on this report card. To qualify for flexible funding and differentiated pay, the local education unit must present an improvement plan that addresses the indicators on the report card. To receive differentiated pay, the local unit must demonstrate satisfactory progress toward attaining its goals outlined in the improvement plan. Assessment as an integral part of the accountability plan can provide meaningful information for the improvement of education. "Assessment is the driving force within any realistic, systematic plan for institutional progress and development."[70]

The call for accountability and assessment has adversaries as well as advocates. Assessment should produce meaningful information that can be useful to those being assessed in order to improve education. Cross argues that

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[70]Darrell W. Krueger and Margarita L. Heisserer, "Assessment and Involvement: Investments to Enhance Learning," New Directions For Higher Education 15 (Fall, 1987): 45.

"the type of assessment information collected should be related to the type of decisions that it is possible to make. Since decisions about instruction are made by teachers, assessment should include information helpful in making decisions in the classroom."[71] The danger inherent in statewide assessment is the possibility of limiting the curriculum to tested material and in turn inhibiting the creative and inquisitive minds of teachers and the students. Wood noted that in science instruction

> the unintended results of the centralized policy of emphasizing performance-based instruction and student achievement are to reduce science content to a series of discrete skills, to alter teachers' instruction in ways that do not provide improved teaching practices but do alienate them from their work, and to reduce student understanding and interest in science. The implementation of performance objectives and competency tests in other settings may have similar effects, and any attempt to induce change in curriculum and teacher behavior may be in the wrong direction.[72]

There seems to be a paradox developing in the midst of the current education reform movement. On one hand there is site-based decision making and on the other is accountability in the form of measurement-driven instruction. Brandt reports from his interview with George

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[71]K. Patricia Cross, "Using Assessment to Improve Instruction," Paper presented at the forty-seventh ETS Invitational Conference, New York, NY, October 25, 1986), 8, BRS, ERIC, ED 284 896.

[72]Terry Wood, "State-Mandated Accountability As a Constraint On Teaching And Learning Science," Journal of Research In Science Teaching 25 (November 1988): 641.

Madaus that "any move to school-based management will have to examine closely the implications of high-stakes measurement-driven instruction for school-based decision making."[73] This paradox discussed by Brandt is also reported by Livingston, Castle, and Nations. In Dalton, Georgia, the Westwood School participated in the NEA's Mastery in Learning Project for several years. While involved in this project, faculty members became concerned about the developmental appropriateness of the state-mandated curriculum. Logical inconsistencies were noted between and among the curriculum, textbooks, and state-mandated standardized tests. As the Mastery in Learning Project proceeded teachers saw constraints of curriculum and instruction increase by the need to teach to the test. As a result of investigation at Westwood several negative aspects of testing were noted:

- The standardized test became the foundation for curriculum;
- Test-driven curriculum is an ineffective focus of time and money for improving schools;
- Teachers became frustrated trying to work within the system and at the same time do what's ethically and fundamentally sound for the student;

[73]Brandt, "On Misuse of Testing," 27.

- Deprofessionalization of the teaching staff occurred when teacher judgment and yearlong documentation of student progress is invalidated by as single test score;
- Learning for many students was relegated to rote learning as teachers pounded the skills into the students.[74]

Accountability has not solved the woes of education despite amassed statistics of improved test scores. If the stakeholders in education can "broaden their conceptions of effective schools, perhaps reliance on testing will diminish and education reform can proceed."[75]

One underlying motivation for testing as the key element in the accountability module of most education reform movements is its political overtones. As politics enters the picture, "test scores then become not an apolitical measurement of how much students know, but a powerful weapon in political debates at all levels. Politicians and educators point to test scores when they want to prove that the schools are good or that they may have improved the schools."[76] With many state

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[74]Carol Livingston, Sharon Castle, and Jimmy Nations, "Testing and Curriculum Reform: One School's Experience," Educational Leadership 46 (April 1989): 23-25.

[75]Livingston, "Testing and Curriculum Reform," 25.

[76]Salganik, "Why Testing Reforms Are Sc Popular," 608.

accountability programs reporting to the public a comparison of one district's scores to another, many superintendents are increasing the number and frequency of intermediate tests in order to be able to predict the outcomes on state-mandated tests. West states, "A superintendent who is going to survive during the era of the 'Report Card', must find an effective way to monitor the progress of students throughout the year on a timely schedule in order to make adjustment in instruction prior to mandated tests."[77]

Testing

Testing as a form of assessment and accountability is wide-spread in American education. Howard reports that at this particular point in history more than 2000 different tests are administered to more than 200 million people annually.[78] Airasian stated the rationale for testing in education when he concluded:

> in the past 20 or so years, a number of trends in the wider society have led to educational growth, to shifts in the locus of school control, and to the politicization of educational decision making. As new roles and expectations emerged in response to these changes, new roles and expectations for standardized

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[77]Interview with Edwin L. West, Jr., Superintendent, Gaston County Schools, 16 October, 1990.

[78]Melvin Howard, "Testing: Illusions of Measurement," Bethesda, Md., [1987]: ERIC Processing and Reference Facility, ED 300 393 3, Photocopied.

testing also emerged to complement altered educational priorities.[79]

Edmonds, Lezotte, and other researchers believe that frequent monitoring of student progress is one of several factors in effective schools. In a report on the SHAL Project in St. Louis, Achilles and Young reported that pupils in the four schools that implemented frequent monitoring of student performance had higher scores on the California Achievement Test (CAT) and the Basic Education Skills Test (BEST) after implementation of such procedures than prior to implementation. The frequent monitoring of student progress through testing allowed students to become "test wise". Frequent monitoring gave students practice on tests similar to the CAT and BEST which in turn helped them to score higher.[80] Porter reports that a system of monitoring student progress tied to instructional objectives is a major component of an effective school. Porter states, "Within the context of the other four factors, the role of testing in creating effective schools seems to fit better with an accountability perspective than with a diagnostic

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[79]Peter W. Airasian, "State Mandated Testing and Educational Reform: Context and Consequences," American Journal of Education 95 (May 1987): 393.

[80]C. M. Achilles and Rufus Young, Jr., "Effective Schooling Implementation Takes Time, But Results Grow: Project SHAL," AASA Research Report (March 1985).

and prescriptive perspective."[81] Cuban strikes a note of caution concerning effective schools and the tendency to uniform the curriculum. He states, "Embracing the effective schools research will shove the curriculum toward a more uniform track for all students."[82] This tendency may leave individual student needs unattended.

Achievement tests are used extensively to measure a student's progress in school. These tests fall into two major categories: criterion-referenced and norm-referenced tests. The criterion-referenced test (CRT) measures gain within individuals, while norm-referenced tests (NRT) measure between-individual differences against a norm. An individual test may be used as either a CRT or NRT. The major difference come in the interpretation of the results.[83]

Criterion-Referenced Tests

The idea of testing individual performance against preset standards is not a new concept. For centuries teachers have been testing to measure students' performance

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[81]Andrew C. Porter, "The Role Of Testing In Effective Schools," American Education 19 (January-February 1983): 26.

[82]Larry Cuban, "Effective Schools: A Friendly But Cautionary Note," Phi Delta Kappan 64 (June 1983): 696.

[83]Ronald P. Carver, "Two Dimensions of Tests," American Psychologist 29 (July 1974): 512-18.

against criterion performance.[84] Glaser is credited with coining the term "criterion-referenced tests". In doing so he gave the following definition: "criterion-referenced tests are those instruments constructed to yield measures that are directly interpretable in terms of 'prespecified performance criteria'."[85] "In criterion-measurement -- unlike norm-referenced measure -- scores are interpreted as having some absolute meaning."[86] This meaning may take the form of level of performance or amount of achievement or degree of mastery. Comparing one student's performance to another student's performance is not the intent of criterion-referenced tests.

Popham suggests that all well constructed criterion-referenced tests should have the following characteristics:

- an unambiguous descriptive scheme;
- an adequate number of test items per objective;
- a sufficiently limited focus;
- reliability;
- validity;
- comparative data.[87]

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[84]Marilyn W. Van Valkenburgh, "A Study of the Relationship Between Norm-Referenced Tests And Criterion-Referenced Tests" (Ed.D. diss, Western Michigan University, 1974), 13, citing F.B. Davis, "Criterion-referenced tests," Paper presented at the annual meeting of the American Research Association, New York, (February 1971).

[85]Hopkins and Stanley, Educational And Psychological Measurement and Evaluation, 182.

[86]Marion F. Shaycoft, Handbook of Criterion-Referenced Testing: Development, Evaluation, and Use (New York: Garland STPM Press, 1979), 15, BRS, ERIC, ED 217 048), Photocopied.

[87]Popham, "Well-Crafted Criterion-Referenced Tests".

Popham defines an unambiguous description scheme as the information about the test, directions for administering the test, and directions for taking the test. The number of items for each objective tested should not be limited to three or four items. This theory is suggested by Popham and supported further by Hambleton et al. They state,

> the length of a criterion-referenced test (or, of greater importance the number of items measuring each objective in a test) is directly related to the usefulness of the criterion-referenced test scores obtained from the test.[88]

In addition to number of items selected for the CRT, Popham suggests that care should be taken to focus the number of objectives tested at one time.

Reliability and validity of CRT require special consideration. Normal parametric procedures should not be employed to determine the reliability or validity without consideration to variance. "If everyone or nearly everyone, succeeds (on the CRT) you will find the variance in the test scores approaches zero or is zero. Under such circumstances traditional reliability estimates are either incalculable or meaninglessly low."[89] Several methods to determine

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[88]Ronald K. Hambleton, Hariharan Swaminathan, James Algina, and Douglas Bill Coulson, "Criterion-Referenced Testing and Measurement: A Review of Technical Issues and Developments," Review of Educational Research 48 (Winter 1978): 23-24.

[89]Sharon Shrock, Ramesh H. Mansukhani, William Coscarelli, and Sam Palmer, "An Overview of Criterion-Referenced Test Development," Performance and Instruction Journal 25 (August

reliability are suggested to determine the reliability of CRTs. Marshall and Haertel suggest the mean split-half coefficient of agreement,[90] Lovett suggests an ANOVA to determine the reliability,[91] and Shaycroft suggests that if variability is present in the scores, the Kuder-Richardson Method 20 is an acceptable method to determine the reliability of a CRT. Statistically, validity issues with CRTs are similar to those of reliability. Validity simply refers to the fact that the test is measuring what it is supposed to measure. "Ideally, the test designer will establish both concurrent and content validity for a CRT."[92]

Popham's "sixth and final characteristic of a well-constructed criterion-referenced tests is interestingly, the availability of normative data that will permit educators to answer the more sensible question: 'How good is good enough?'."[93] Good comparative data are useful in

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1986): 6.

[90]J. Laird Marshall and Edward H. Haertel, "A Single-Administered Reliability Index for Criterion-Referenced Tests: The Mean Split-Half Coefficient of Agreement," Paper presented at the Annual Meeting of the American Educational Research Association (Washington, DC, March 30 - April 3, 1975), BRS, ERIC, ED 118 618, Photocopied.

[91]Hubert T. Lovett, "Criterion-Referenced Reliability Estimated By ANOVA," Educational and Psychological Measurement 37 (1977).

[92]Shrock, "An Overview of Criterion-Reference Test Development," 7.

[93]Popham, "Well-Crafted Criterion-Referenced Tests," 95.

determining if the test is measuring student progress on the desired level.

Carver suggests that item selection for a CRT should be based on different standards than used to select items for norm-referenced tests. Norm referenced tests would consider items with a *p* value around 0.5. The best items for criterion-referenced tests would have "*p* values approaching .00 prior to treatment condition and *p* values approaching 1.00 subsequent to the treatment condition."[94]

Ebel adds a seventh characteristic to well-constructed CRTs and NRTs. That seventh characteristic is bias. The tests must be as free from bias against any group as possible to measure achievement effectively.[95]

Norm-Referenced Tests

Norm-referenced tests are designed to measure differences between groups of students. The same characteristics of reliability, validity, item selection, and bias are necessary for NRTs but with a different focus. Reliability for a NRT can be established by any number of the classical methods such as KR-20. Validity also can be established by classical application of correlational models. Item selection for NRTs many times is based on Item

[94]Carver, "Two Dimensions of Tests," 513.

[95]Robert L. Ebel, "Educational Tests: Valid? Biased? Useful?," Phi Delta Kappan 57 (October, 75): 83-88.

Response Theory. For norm-referenced tests the *p* value of the items should approximate .05. Finally, bias in testing is as undesirable in norm-referenced testing as it is in criterion-referenced testing.

The California Achievement Test (CAT) is one of the most widely-used tests in education. The CAT is a norm-referenced test that measures pupil achievement in Reading, Language, Spelling, and Math. A composite score, known as Total Battery, combines the scores of Reading, Language, and Math and is the overall score of achievement on the CAT. Data from the publisher, CTB/MCGraw-Hill, show that the CAT reliably measures achievement in the subjects tested. Validity of the CAT for North Carolina was done prior to re-norming of the CAT and no work has been done since 1985 to determine if the CAT is a valid measure of North Carolina curriculum. The publisher also presents evidence that the CAT is not ethnically or sexually biased in its measurement of achievement.[96]

North Carolina Testing Program

North Carolina uses both NRTs and CRTs to assess student progress for comparing a school district's pupil scores with that of the State's average score or with other districts with similar characteristics. The Annual Testing Program in North Carolina uses the CAT to monitor student

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[96]Technical Report (Montery, Ca.: [1985]).

progress. Each spring, all students in grades 3, 6, and 8 are given the CAT and the North Carolina Science and Social Studies Tests. Students who score below the 25th percentile are required to take the North Carolina Minimum Skills Diagnostic Test (Phase II) to determine if they must attend summer school in order to advance a grade level. If a student goes to summer school, the student must go through Phase III testing at the end of summer school. North Carolina Competency Tests are administered to ninth grade students. These tests measure the minimum skills for competency in reading, math, and writing and are a requirement for graduation at the present time (1991). Students who do not pass the competency tests in the ninth grade must continue to take the tests until they pass all three tests. In high school, students are required to take end-of-course tests in Algebra I, Algebra II, Geometry, U.S. History, Biology, Physics, and Chemistry. More end-of-course tests are to be added each year until fourteen tests are implemented.

In the near future, the NCDPI will be field testing end-of-grade tests for grades three through eight. These test will employ some multiple choice test questions similar to those used in Phase II and end-of-course tests. These tests will also have questions with a new open-ended format. The purpose of this new format is to test the students on higher-order thinking skills.

Gaston County Testing Program

Gaston County complies with all of the state mandated testing required by the North Carolina SDPI. In addition to the state-mandated tests, Gaston County has an instructional management system that requires CRTs to be administered in a pretest-posttest format for grades two through eight. The areas tested for each of these grade levels are Communication Skills and Math Skills. The procedures followed in this testing require the pretest to be administered during the first month of school. The purpose of the pretest is to assess the strengths and weaknesses of the students and locate them in the proper sequence according to the North Carolina Course of Study. A second purpose is to provide for the students a testing environment similar to the state-mandated tests required by the North Carolina Testing Program. The third purpose of the pretest is to determine which of the objectives tested are mastered at the beginning of the year.

During the last month of school the same test given as the pretest is administered as the posttest. In addition to the rationale for the pretest, the posttest allows the teacher to determine how much progress the student has made during the year.

Each year the student takes a new pretest and posttest, appropriate for his/her grade level, to determine the number of items mastered during that year. At the end of the tests, teachers can print reports that identify students' strengths and weaknesses on the objectives tested on the MAC Communication Skills and Math tests. These reports provide valuable information to teachers and administrators for grouping students, verifying students' strengths and weaknesses, identifying resources available for use in instruction, and assigning students to instructors for the coming year.

CHAPTER III

METHODOLOGY

Hypotheses Study

Population and Sample

The population of this study consisted of sixth grade students (N=2255) in the Gaston County public schools during the 1988-89 school year. The division of this sixth grade population into "control" and "experimental" groups began in 1986. In 1986, the Math and Communication (MAC) Program was implemented for the first time in a non-experimental setting. Schools with computer capabilities powerful enough to support both the Student Information Management System (SIMS) and a computerized instructional management system (MAC) were chosen to begin the MAC Program. The first year, six schools with sixth graders were in the MAC Program. The second year, 1987-88, six additional schools with sixth graders were added to the MAC Program. In the 1988-89 school year, no additional sixth graders were added to the program; the control group, non-MAC students (N=1306), represented approximately fifty-eight percent (58%) of the total sixth grade population; and experimental group of MAC students (N=949), represented approximately forty-two percent (42%) of the population. To accommodate a balanced design, 210 students from each subpopulation were selected randomly as participants in the study. This sample size was higher than that recommended by McNamara in his work on required sample sizes necessary to yield a β value that approximates an α value of 0.05.[97]

Instrumentation

The four instruments used in this study to gather data were: *California Achievement Test*, *Test of Cognitive Skills*, MAC Math Test Sixth Grade, and MAC Communication Skills Test Sixth Grade.

California Achievement Test Level 16 Form E/F

The *California Achievement Test* (CAT) is a nationally norm referenced instrument used to measure achievement. This particular test is the instrument of choice of the North Carolina State Department of Public Instruction (SPDI) to measure achievement on the objectives of the North Carolina Course of Study as a part of the North Carolina Testing Program in grades three, six, and eight.

A recent phone conversation with Rod Moore in the SDPI Testing Division, found that no validity data were available relative to the CAT as a measure of the North Carolina Course of Study. Information gained from the division indicated that in 1985, when the CAT contract was renewed

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[97]James F. McNamara, "Statistical Power in Educational Research," National Forum of Applied Educational Research Journal 3 (1991): 23-36.

with CTB/McGraw-Hill, research was done on the validity of the CAT and the North Carolina Course of Study. At that time it was determined that the CAT was an adequate instrument for measuring achievement on the North Carolina Course of Study. However, the division further stated that since 1985 the curriculum has changed and validity studies have not been conducted.[98]

The most recent CAT validation studies in North Carolina were done in 1985 with the renorming of the tests. The CAT also was normed for various times of the year (i.e., fall, winter, spring). Level 16 is the appropriate difficulty level of the CAT for the sixth grade. The tests used in this study were administered in the spring of 1989; therefore, the norms for spring were applied to this study. At the sixth grade level, the reliability coefficients range from 0.86 to 0.98 on each of the subtests as estimated by the Kuder-Richardson Formula 20 Method (KR-20).[99]

Test of Cognitive Skills Level 3

"The *Test of Cognitive Skills* (TCS) is an ability test designed to assess a student's aptitude and thereby predict

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[98]Rod Moore, Interviewed by David W. Shellman, 15 October 1990, telephone conversation, North Carolina Department of Education, Testing Division, Raleigh, N.C.

[99]California Achievement Tests Forms E and F Technical Report, (Monterey, California: CTB/McGraw-Hill, 1987), 6-9.

his or her level of success in school."[100] The TCS is divided into five levels, and each level includes four subtests: Sequences, Analogies, Memory, and Verbal Reasoning. Each of the subtests is designed to measure a particular skill. The Sequence subtest measures the student's ability to recognize a pattern or sequence of figures, letters, or numbers. The Analogies subtest measures the student's ability to recognize relationships that may be literal or symbolic. The Memory subtest measures the student's ability to recall previously presented material. Finally, the Verbal Reasoning subtest measures the student's ability to reason logically and discern relationships between pictures and words.

The appropriate level of the TCS for sixth graders is Level 3 which covers grades 5-7. It was the level of the test used to measure academic aptitude in this study.

The TCS was developed using the Item Response Theory and used the following parameters in the model: discrimination, location, and guessing. The _discrimination_ parameter represents an item's ability to differentiate between examinees of high ability and low ability on the trait being measured. The _location_ parameter describes an item's difficulty in terms of the examinee's ability level at which the item discriminates best. The _guessing_

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[100] _Test of Cognitive Skills Technical Report_, (Monterey, California: CTB/McGraw-Hill, (1983), 1.

parameter is the probability that a student with very low ability on the trait being tested will answer the item correctly.

Reliability coefficients for each subtest of the TCS level 3 (Grade 6), as measured by the KR-20 method, are: Sequences - 0.86; Analogies - 0.75; Memory - 0.84; Verbal Reasoning - 0.81. The standard errors of measurement for these subtests are 1.72, 1.77, 1.93, and 1.87, respectively. These errors of measurement are reasonably low, thus allowing more confidence to these measurements.[101]

Research Design

The data for this study were collected during the 1988-89 school year. Although quasi-experimental in nature, because of the intact groups from which the subjects were selected, the study employed an experimental design using the Posttest Only format. The Posttest Only design is by far the strongest of the experimental designs in terms of negating threats to internal and external validity related to testing and treatment interaction.[102]

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[101]Ibid., 1-2, 51.

[102]Donald T. Campbell and Julian C. Stanley, Experimental and Quasi-Experimental Designs For Research (Boston: Houghton Mifflin Company, 1978), 25-34.

It is depicted by the following format:

R	X	O_1
R		O_2

Students in the experimental group were selected randomly from the population of elementary schools in Gaston County participating in the MAC Program as of 1989. Students in the control group were selected randomly from the population not participating in the MAC Program. In this study, the treatment (X) was the participation of the students in the MAC Program. Observation 1 (O_1) was the CAT scores for the sixth graders in the experimental or MAC Program students. Observation 2 (O_2) was the CAT scores for the sixth graders in the control group or non-MAC Program students.

Procedures

This study estimated the efficacy of the MAC Program on the results of the CAT scores. Three hypotheses were tested at the $\alpha = 0.05$ level of significance to aid in the determination of this efficacy.

Hypothesis One

There is no difference between the experimental and control groups on CAT scores. In order to determine the degree of success the MAC Program has on students' CAT scores, any differences between the experimental and control groups must be identified initially to provide a baseline for the beginning of the study. The participants' sixth-grade aptitude score, as measured by the TCS, was used to establish this baseline for measurement in this study. Gaston County test results show that over the past three years the aptitude scores for students as a group changed only two points from the third to sixth grade. If there are no significant differences in the aptitude scores of the experimental and control groups in the sixth grade, it is assumed that there would be no differences in their third grade scores.

Analyses were done to determine if the mean IQ scores in various elements of this population, as measured by the TCS, were different at the α=.05 level of significance. Results of the t-Tests for two independent means are presented in Table 1.

The only analysis that produced a result approaching significance was the t-Test on the experimental (M=102.97) and control (M=104.26) populations. This result may be explained by the large value for the degrees of freedom. The data confirm that there is no difference between the mean IQ scores of the experimental and control groups at the α=.05 level of significance. As a result of these analyses, t-tests were the procedure of choice to test the hypotheses.

Table 1
t-Tests on TCS Scores for Various Segments of The Population
Gaston County Schools Sixth Grade 1988-89

Group	N	Mean	Std. Dev.	Std. Error	D.F.	α
Control Population	1274	104.26	16.47	0.46	2199	0.069
Experimental Population	927	102.97	16.27	0.53		
Non-Sample Experimental	723	103.40	16.54	0.62	925	0.132
Sample Experimental	204	101.46	15.20	1.06		
Non-Sample Control	1070	104.44	16.57	0.51	1272	0.370
Sample Control	204	103.32	15.96	1.12		
Non-Sample Control	1070	104.44	16.57	0.51	1791	0.192
Non-Sample Experimental	723	103.40	16.54	0.06		
Sample Control	204	103.32	15.96	1.12	406	0.231
Sample Experimental	204	101.46	15.20	1.06		

Hypothesis Two

There is no difference between the experimental and control groups on CAT scores as a function of gender, race, or parental education level. For this hypothesis the researcher tested for differences between segments of the population to determine if any of the targeted segments of the population did better on the CAT.

Hypothesis Three

There is no difference between the experimental and control groups on CAT scores as a function of years of participation in the MAC Program. The researcher analyzed data to determine if student scores on the CAT improved as the number of years of participation in the MAC Program increased.

Data Collection

In the spring, usually in late March or early April, students in grades three, six, and eight take the CAT as a part of the North Carolina Testing Program. The tests are shipped to CTB/McGraw-Hill for scoring and data analysis. Reports on these data are sent to Gaston County as part of the North Carolina Testing Program. CTB gives the local units the option to purchase the data for further analysis of test scores. The data, purchased from CTB on 3.5 inch diskette, are transferred to an IBM PS/2 Model 60 microcomputer and maintained using a software package known as *Testmate*[103] for testing. These data include demographic information about the students as well as the test results. The demographic information includes the student's sex, race, and parental education level. The test scores include scale scores and percentile ranks for each of the subtests

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[103]Testmate is a trademark of DataGuide Systems, Inc.

on the CAT. In addition, the data include the aptitude score for the students as measured by the TCS.

Testmate, through its data import and report generation modules, allows the user to transfer test results from other sources into the program to produce reports. It also allows the user, through its data capture module, to produce an ASCII (American Standard Code for Information Interchange) file that can used by other software packages. An ASCII file is the standard parameter for file transfer on the microcomputer.

The data in the ASCII file produced by *Testmate* were transferred into SPSS, a statistical software package. This statistical package was used to analyze the data and calculate the appropriate statistical information to test the significance of the hypotheses.

Data Analysis

Hypothesis One

For the Posttest Only Design, the statistical procedure of choice for measuring differences between the mean scores of two groups is the t-test for independent samples. The populations used in this study met the three assumptions of the t-test which are: (1) the scores of the two populations were normally distributed; (2) the two populations' variances were equal; and (3) the individual observations were independent. Consideration must be given to violations of the three assumptions of the t-test procedure if they occur. T-tests are robust with respect to violations of normality and homoscedasticity when the two N values are equal. T-tests are also robust with respect to independence when random selection is used. Hypothesis One ($H_0 1$) posits that there are no differences in the mean scale scores between the experimental and control groups with respect to scores on the subtests of the CAT. The following formula was used to compute the t-tests for each CAT subtests:

$$t = \frac{\overline{X}_1 - \overline{X}_2}{s_{\overline{X}_1 - \overline{X}_2}}$$

Hypothesis Two

Hypothesis two ($H_0 2$) posits no differences among segments of the population. The statistical procedure of choice is the t-test for independent means. This procedure used the same equation as used in hypothesis one. The data were analyzed using each value for the variables of gender, race, and parental educational level (e.g. gender - male, female; race - non-Caucasian, Caucasian; parental education level - less than high school, high school, more than high school) to determine if differences between the experimental and control groups were statistically significant.

Hypothesis Three

Hypothesis three ($H_0 3$) posits that longevity in the MAC Program makes no difference in CAT scores. The intervals of zero years, control group, two years, and three years were used in this study. The statistical procedure of choice is an Analysis of Variance or ANOVA. The ANOVA has the same assumptions as the t-Test and they were satisfied by this sample. The ANOVA "is a powerful statistical technique."[104] "ANOVA offers three definite advantages over separate t-tests when J>2: (1) It yields an accurate and known type-I error probability, whereas the actual alpha for the set of several separate t-tests is high and yet undetermined; (2) It is more powerful (when alpha is held constant) - that is, if the null hypothesis is false, it is more likely to be rejected; (3) It can assess the effects of two or more independent variables simultaneously."[105] The ANOVA calculations used the scale score of the subtests as the dependent variable and years of participation in the MAC Program as the independent variable. The following equation represents the One-way ANOVA:

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[104]Gene V. Glass and Kenneth D. Hopkins, Statistical Methods in Education and Psychology, 2nd ed., (Englewood Cliffs, New Jersey: Prentice-Hall, 1984), 325.

[105]Ibid.

$$F = \frac{SSW}{SSB} = \frac{\sum_{i=1}^{k} (N_i - 1) s_i^2}{\sum_{i=1}^{k} N_i (\overline{X}_i - \overline{X})^2}$$

The experimental and control groups were collapsed into a single group for analysis for the test of hypothesis three. The divisions within the group were distinguished by the year the student entered the MAC Program. Students that entered the MAC Program in 1986 had 3 years in the program, students who entered in 1987 had two years in the program, and students who entered during or after 1989 had zero years in the program. The 1986 and 1987 students were formerly the experimental group in the previous hypotheses tests, and the 1989 and 1990 students were formerly the control group for these tests. Scheffé tests were used to determine contrasts between the groups in order to identify which of the three groups exhibited significance if, in fact, significance existed at the $\alpha = .05$ level.

MAC Program Tests Reliability Study

Sample

An additional sample was selected to determine the reliability coefficients for the sixth grade MAC Program math test and the sixth grade MAC Program communication skills tests. A stratified random sample was drawn from seven classrooms of students who were not participants in either the experimental or control groups. They were drawn from the Gaston County schools sixth-grade population during the 1990-91 school year.

Instrumentation

The math and communication skills tests are a part of the Gaston County MAC Program. The system centers around both formal and informal assessment. Informal assessment is done by the classroom teacher to evaluate mastery levels in grades K-1. Grades 2-8 use formal criterion-referenced tests (CRT) for assessment of mastery levels.

Students who participate in the MAC Program take a pretest in both communication skills and math during the first month of school. After the pretest is given and scored by trained personnel in the local schools, eleven different reports on student progress are available to the teachers in the schools. The reports range from individual and class reports to grade-level summaries for the entire school. The Group Student Report provides the teacher the status of mastered objectives and a list of available teaching resources that might be used to help students with strengths and weaknesses. Information allows teachers to customize instruction for individual students or groups of students to match their educational needs. The student continues with this type of instruction for the remainder of the school year.

During the last month of school, the students are administered the same MAC tests used in the pretest as the posttest for the current year. Teachers then can see the results of their instruction by determining the increase or decrease in mastery levels on math and communication skills objectives for the members of their classes.

In the sixth grade, two CRTs, the MAC Math Skills Test and the MAC Communication Skills Test, are used to assess student progress related to mastery levels attained by the students. No empirical data were available related to the reliability or the validity of either of these tests.

MAC Program Communication Skills Test Grade Six

The communication skills test for the sixth grade measures the mastery level on 79 objectives. The test is composed of 173 multiple-choice questions. Each question has from three to four distractors from which the student must choose the correct response. Mastery of an objective is obtained by a student if 100% of the question(s) related to that objective are answered correctly. Each objective has from one to three questions. A copy of the sixth-grade communication skills test is included in Appendix A. A list of the communication skills objectives tested on the sixth-grade test appears in Appendix B.

MAC Program Math Test Grade Six

The math test for the sixth grade measures the mastery level on 83 objectives. The test includes 194 multiple-choice questions with each question having four distractors for the student to select the correct answer. The math test (Appendix C) follows the same criteria for mastery as the communication skills test. A list of the math objectives tested on the sixth-grade test is in Appendix D.

Procedures

The student population used to determine the reliability coefficients of the sixth-grade MAC math and communication skills tests was the sixth-grade population of Gaston County Schools during the 1990-91 school year. The district was divided into seven high school feeder groups to draw the stratified random sample. One elementary school from each feeder group with a sixth-grade population was selected randomly to participate in the validation of the MAC tests. From each school chosen, a sixth-grade teacher's class was selected randomly as the participants in the study. All students in the selected teacher's class were included in the sample to determine the reliability coefficients. The reliability study used the Kuder-Richardson Method 20 (KR-20) for data analysis to determine the internal consistency of the tests. The test results were gathered from the participating students and analyzed using a statistical package designed for the personal computer, *Statistical Package for Social Sciences* (SPSSPC).[106]

Data Collection

After the pretests were administered the first month of school, the researcher visited the individual schools and secured the tests of the individual students selected randomly as participants in the reliability portion of this study. The tests were scored electronically by means of a scanner and microcomputer.

Data Analysis

The data were analyzed on a microcomputer using SPSSPC. The estimate of the reliability coefficient employed the Kuder Richardson Formula 20 (KR20) method:

$$r_{KR20}=\frac{k}{k-1}\left(1-\frac{\sum p_i q_i}{s^2}\right)$$

[106] Statistical Package for Social Sciences is a trademark of SPSS, Inc.

CHAPTER IV

STUDY FINDINGS

In the early 1980's, students in Gaston County schools were not scoring as high on the California Achievement Test (CAT) as their counterparts in other school districts across North Carolina. In an attempt to remedy this problem, educators in Gaston County developed an instructional management program that centered on math and communication skills. The acronym derived for this program was MAC.

The purpose of this evaluative study was to determine whether students whose teachers were participating in the MAC Program (experimental group) scored higher on the CAT than students whose teachers did not participate in the MAC Program (control group). The researcher also investigated differences between mean scores of the control and experimental groups for subgroups of the population (e.g. gender, race, parental education level). Finally, the researcher investigated longitudinal data in the composite and aggregate samples to determine whether years of participation in the MAC Program produced differences in mean CAT scores.

The sample is composed of randomly-selected students from two intact groups of students whose teachers did or did not participate in the MAC Program. Two hundred ten students were selected randomly from the pool of students whose teachers did not participate in the MAC Program to form the control group. An equal number of students was selected randomly from the pool of students whose teachers did participate in the MAC Program to form the experimental group.

Proper analysis of the data requires several different statistical procedures including frequency distributions, means, medians, variances, standard deviations, t-tests, and oneway analysis of variance (ANOVA).

Chapter four has two major divisions: Hypotheses Tests and the Reliability Study. The Hypotheses Tests division contains three sections representing hypotheses one, two, and three. Each division has a brief introduction followed by discussion of the results pertinent to the data being analyzed, and concluding with a brief summary.

The Reliability Study division presents the reliability estimates for the MAC Program Math and Communication Skills Tests, each having its own section.

Hypotheses Tests

Description Of The Population and Sample

The Gaston County Schools sixth grade population for the 1988-89 school year was divided into experimental and control groups based on whether or not individual school, and thus the school's teachers were participating in the MAC

Program. Students in schools participating in the MAC Program were considered to be in the experimental subpopulation, and students in schools not participating in the MAC Program were considered to be in the control subpopulation. The experimental subpopulation consisted of 949 students representing 42.1% of the 1988-89 sixth-grade population. The control subpopulation consisted of 1306 students representing 57.9% of this same sixth-grade population.

This study considers four major independent variables in addition to the experimental and control groups to test hypotheses two and three. These variables include gender, race, and parental educational level for Hypothesis Two, and years of participation in the MAC Program for Hypothesis Three. A frequency distribution of each of these variables for the sixth-grade population (Table 2) suggests the necessity to combine groups in the ethnic and parental education categories in order to have N values large enough for analysis. The numbers of children in the American Indian and Other ethnic groups were not great enough to be analyzed when the sample was drawn. These two groups are combined with the black group and renamed "non-Caucasian". The combination occurring in the parental education level is the Eighth Grade or Less category and the More Than Eighth Grade - Less Than High School category. This category is now renamed Less Than High School.

Table 2
Gaston County Schools Sixth Grade Population 1988-89
Distribution by Gender, Race, Parental Education Level,
Years of MAC Participation

	N	%
Subpopulation		
Non-MAC Students	1306	57.9%
MAC Students	949	42.1%
Gender		
Female	1103	48.9%
Male	1152	51.1%
Race		
American Indian	6	.3%
Black	360	16.0%
White	1875	83.3%
Other	10	.4%
Parental Education Level		
Eighth Grade or Less	104	4.7%
More Than Eighth Grade - Less Than HS	456	20.4%
High School Educated	747	33.5%
Some Education After High School	926	41.5%
Years of MAC Participation		
3 Yrs	465	20.6%
2 Yrs	484	21.5%
0 Yrs	1306	57.9%

The population (N = 2255) with respect to gender is 48.9% female and 51.1% male. The racial balance prior to combination of groups is 0.3% American Indian, 16.0% Black, 83.3% White, and 0.4% Other. Of the 2255 students in the sixth-grade population, only four students did not have their race reported. The data for parental education level reported by the sixth-grade students on the CAT answer sheets show the following distribution: approximately 25.1% of the parents have less than a high school education, 33.5%

of the parents have only a high school education, and 41.5 % of the parents have some education beyond high school. Twenty-two students in the population did not report their parents' educational levels. Data for the Years of Participation in the MAC Program show that in the 1988-89 sixth-grade population approximately 20% of the students have been in the MAC Program for 3 years, 21% for 2 years, and 58% for 0 years. Data for the dependent variables (CAT subtest scores) are presented in Table 3.

Table 3
Gaston County Schools Sixth Grade Population 1988-89
CAT Scale Scores by Subpopulation

CAT Subtest	Subpopulation					
	Non-MAC Students (Control)			MAC Students (Experimental)		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.
Vocabulary	1304	733.47	49.78	948	729.05	47.71
Comprehension	1302	739.20	33.39	948	736.02	31.96
Spelling	1306	733.78	32.22	948	731.10	31.44
Language Mechanics	1306	726.25	39.44	949	721.86	34.81
Language Expression	1306	724.70	55.76	949	718.39	53.59
Math Computation	1306	776.43	45.39	949	766.92	38.81
Math Concepts	1306	734.24	46.48	949	727.36	43.19
Total Reading	1302	736.66	39.74	948	732.77	37.98
Total Language	1306	725.73	45.06	949	720.36	41.55
Total Math	1306	755.59	43.50	949	747.38	38.15
Total Battery	1302	739.28	40.10	948	733.46	36.27

Frequency analyses (Table 4) show the sample distributions to be similar to those of the population. Table 4 presents the sample statistics for the MAC and Non-MAC students, as well as for the sample as a whole. The sample (N=420) is 46% female and 54% male. The composition of the experimental and control groups with respect to gender is almost identical in number with respect to a female/male ratio of 96/114:97/113, respectively.

Table 4
Gaston County Schools Sixth Grade Sample 1988-89
Distribution by Gender, Race, Parental Education Level, Years of MAC Participation After Adjustments

	N	%
Subpopulation		
Non-MAC Students	210	50.0%
MAC Students	210	50.0%
Gender		
Female	193	46.0%
Male	227	54.0%
Race		
Non-caucasian	84	20.0%
Caucasian	336	80.0%
Parental Education Level		
Less Than High School	106	25.6%
High School	135	32.6%
More Than High School	173	41.8%
Years of MAC Participation		
3 Yrs	107	25.5%
2 Yrs	103	24.5%
0 Yrs	210	50.0%

Racial balance in the sample is similar to that in the population with the number of non-Caucasians in the experimental group (46) being higher than the number of non-Caucasians in the control group (38). The sample percentage of non-Caucasians (20.0%) is 3.3% higher than the population percentage of 16.7%.

Parental education level data are from information supplied by students on the CAT answer sheet. The category of Less Than High School is a combination of the original data supplied by the students and combines the Less Than Eighth Grade group with the More Than Eighth Grade - Less Than High School groups. The sample reflects the population with similar percentages of parents in each of the categories. Appendix E presents the analyses of the independent variables prior to combinations to accommodate adequate N values.

Fifty percent of the sample (210) are in the control group or Non-MAC Students. Of the experimental group (210), 51% (107) have been in the MAC Program for 3 years, and 49% (103) have been in the MAC Program for 2 years.

Findings for Hypothesis One

Hypothesis One ($H_0 1$) is: There is no difference between the experimental and control groups on California Achievement Test (CAT) scores.

The findings for hypothesis one are presented in five segments. Three of these segments correspond to the subtests of the CAT: Reading, Language, and Math. The Spelling subtest is not a part of the battery scores and is treated separately in section four. The fifth segment reports the data for the Total Reading, Total Language, Total Math, and Total Battery scores. All scores in this study related to hypotheses tests are scale scores on the CAT.

Group mean scores on all subtests of the CAT for the control group are higher than corresponding scores for the experimental group. Median scale scores for the control group, a second measure of central tendency, are greater than or equal to median scores for the experimental group. With the exception of Spelling, all group median scores for the control group are higher than the median scores for the experimental group. In the case of Spelling, the two scores are equal. In general, the distributions of the scores are slightly negatively skewed. The only exceptions to this tendency are in Spelling scores for the control group and

Total Language scores for the experimental group. Measures of central tendency are found in Appendix F.

Measures of variability show a general trend of smaller standard deviations, variances, and ranges in the experimental group. On nine of eleven subtests, the variances and standard deviations are lower for the experimental group. In six of eleven cases, the ranges for the scores of the subtests are lower for the experimental group. Exceptions to this generalization related to standard deviation are Comprehension and Language Expression subtests where the standard deviations of the mean scores for the control group are higher. Appendix G provides the measures of variabilities for the control and experimental groups. The smaller standard deviations for the experimental group indicate a tighter cluster of scores around the mean for the experimental group than for the control group.

Group means and standard deviations for each of the subtests are reported in more detail as a part of the hypotheses tests discussions. In addition, results of t-tests are included in the discussion for each dependent variable.

Reading

The Total Reading Battery score is the average score of the Vocabulary and Comprehension subtest scale scores. The mean score is the measure of central tendency used in the hypothesis tests (Table 5). The mean score on Vocabulary for the control group is 2.86 points higher than the mean for the experimental group. The control-group mean is 2.92 points higher than the experimental group mean on Comprehension. Total Reading Battery scores are derived from Vocabulary and Comprehension scores. Students in the control group have a 2.90 point higher mean score than students in the experimental group on Total Reading.

Table 5
Gaston County School Sixth Grade 1988-89
CAT Reading Scale Scores by Subpopulation

	Subpopulation					
	Non-MAC Students (Control)			MAC Students (Experimental)		
CAT Subtest	N	Mean	Std. Dev.	N	Mean	Std. Dev.
Vocabulary	210	730.71	47.98	210	727.85	44.58
Comprehension	210	736.90	30.65	210	733.98	32.71
Total Reading	210	734.07	37.51	210	731.17	37.00

The t-test results provide data to test the hypothesis on the subtests. The α =.05 level of significance was selected arbitrarily . The results of the hypothesis tests for the variables in the Total Reading Battery are provided in Table 6.

Table 6
t-Tests on CAT Reading Subtests
Gaston County School Sixth Grade 1988-89

CAT Subtest	t-Value	D.F.[107]	p
Vocabulary	-0.63	418	0.527
Comprehension	-0.94	418	0.347
Total Reading	-0.80	418	0.426

In no instance does the t-value reported exceed the critical t-value of 1.96 for $p \leq .05$. All t-values (Table 6) related to the Reading subtests are negative in sign indicating a reverse trend; the control-group mean is consistently higher than the MAC or experimental-group mean.

Language

The CAT Total Language Battery score is the average of the Language Mechanics and Language Expression subtests. Data for these subtests are presented in Table 7. For Language Mechanics, the mean score for the control group is 4.79 points higher than the mean for the experimental group. For Language Expression, there is an even higher difference (8.61 points) between the two groups with the control group having the higher score. On Total Language Battery scores, students in the control group score 6.72 points higher on average than students in the experimental group. The

[107]The researcher recognizes that degrees of freedom in these analyses are based on numbers of participants rather than nested classes within each group.

control group's mean score is 723.88 ± 44.92; the experimental group's mean score is 717.16 ± 42.73.

Table 7
Gaston County Schools Sixth Grade 1988-89
CAT Language Scale Scores by Subpopulation

CAT Subtest	Subpopulation					
	Non-MAC Students (Control)			MAC Students (Experimental)		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.
Language Mechanics	210	724.90	39.13	210	720.11	33.56
Language Expression	210	722.32	56.21	210	713.71	57.84
Total Language	210	723.88	44.92	210	717.16	42.73

The t-tests results for Total Language Battery are presented in Table 8. In no case does a t-value exceed the critical value of 1.96. There are no significant differences between the mean scores of the control and experimental groups on any CAT Language subtest. The t-values for this section of the CAT are larger than the Reading subtest t-values with the sign of the tests in the negative direction.

Math

The CAT Total Math Battery scores include Math Computation and Math Concepts subtests, (Table 9). The mean score for control-group students on Math Computation is

20.10 points higher than for the experimental group. Similar results are reported for Math Concepts, where the mean score for the control group is 12.56 points higher than for the experimental group. Total Math Battery mean scores are 16.35 points higher for the control than for the experimental group.

Table 8
t-Tests on CAT Language Subtests
Gaston County School Sixth Grade 1988-89

CAT Subtest	t-Value	D.F.	p
Language Mechanics	-1.34	418	0.180
Language Expression	-1.55	418	0.122
Total Language	-1.57	418	0.117

Table 9
Gaston County Schools Sixth Grade 1988-89
CAT Math Scale Scores by Subpopulation

	Subpopulation					
	Non-MAC Students (Control)			MAC Students (Experimental)		
CAT Subtest	N	Mean	Std. Dev.	N	Mean	Std. Dev.
Math Computation	210	780.54	47.42	210	760.44	38.32
Math Concepts	210	735.77	45.64	210	723.21	42.72
Total Math	210	758.42	44.22	210	742.07	37.65

T-Tests results on the subtests mean scores that comprise the Total Math Battery are in Table 10.

Table 10
t-Tests on CAT Math Subtests
Gaston County School Sixth Grade 1988-89

CAT Subtest	t-Value	D.F.	p
Math Computation	-4.78	418	0.000
Math Concepts	-2.91	418	0.004
Total Math	-4.08	418	0.000

For each subtest, the t-value exceeds the critical t-value of 1.96, and in each case the sign of the t-value is negative. The control group's mean scores are significantly higher than the experimental group's on all Math subtests.

Spelling

Spelling is not a part of the derived scores on the CAT; therefore, it is treated separately. The control-group mean score (732.32 ± 32.67) is only slightly higher than the experimental-group mean (730.56 ± 29.99); the t-value of -0.58 ($p \leq .57$) shows that there is no significant difference between the two groups.

Total Battery

The Total Battery is determined by combining Total Reading, Total Language, and Total Math scores and dividing by 3. The scores in Table 11 are those reported by

CTB/McGraw-Hill. Total Battery mean score for the control group is 8.63 points higher than for the experimental group.

Table 11
Gaston County Schools Sixth Grade 1988-89
CAT Battery Scale Scores by Subpopulation

CAT Subtest	Subpopulation					
	Non-MAC Students (Control)			MAC Students (Experimental)		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.
Total Reading	210	734.07	37.51	210	731.17	37.00
Total Language	210	723.88	44.92	210	717.16	42.73
Total Math	210	758.42	44.22	210	742.07	37.65
Total Battery	210	738.64	39.91	210	730.01	36.21

A summary table (Table 12) compiles the t-test results for Reading, Language, Math, and Total Battery scores. T-test results show the control group's mean score is significantly higher than the experimental-group mean score on Total Battery ($\alpha = .05$).

Summary

Results of the hypothesis test include analysis of the mean scale scores of the control and experimental groups on seven individual subtests, three derived scores, and one composite score. On all tests, the signs of the resulting t-tests are negative, a significant finding within itself. The significance of this finding is that in no case did the experimental group outperform the control group. Eight of the eleven tests result in findings that show no significant differences between the control and experimental groups. The three significant findings show the control group's scores to be significantly higher than the experimental group's scores.

Table 12
t-Tests on CAT Battery Scores
Gaston County School Sixth Grade 1988-89

CAT Subtest	t-Value	D.F.	*p*
Total Reading	-0.80	418	0.426
Total Language	-1.57	418	0.117
Total Math	-4.08	418	0.000
Total Battery	-2.32	418	0.021

Findings For Hypothesis Two

Hypothesis Two ($H_0 2$): There is no difference between the experimental and control groups on CAT scores as a function of gender, race, or parental education level. Data are presented to test the hypothesis on each dependent variable for each category associated with the three independent variables: gender, race, and parental education level.

Gender

There are 97 females and 113 males in the control group and 96 females and 114 males in the experimental group. Comparisons of these two subgroups are presented in the following sections: Reading, Language, Math, Spelling, Battery summary.

Reading

Data in Table 13 provide descriptive statistics for the CAT Reading subtests by gender and by subpopulation. Mean scores for females in the experimental group are higher than for females in the control group on both the Comprehension and Total Reading subtests. Females in the control group score higher on Vocabulary than females in the experimental group. In the control group, the mean scores for females are higher than for males on Comprehension and Total Reading subtests. Males have a mean score slightly higher than females on Vocabulary.

In the experimental group, the mean scores for females are higher than for males on all three subtests. On Vocabulary, females outscored males by 3.05 points. Females outscored males by almost 10 points on Comprehension, and on Total Reading by 6.26 points. Variabilities of scores in the female subgroup are higher in the experimental group than in the control group on CAT Reading subtests.

Table 13
Gaston County Schools Sixth Grade 1988-89
CAT Reading Scale Scores by Gender by Subpopulation

CAT Subtest	Subpopulation					
	Non-MAC Students (Control)			MAC Students (Experimental)		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.
Vocabulary						
Female	97	730.09	43.74	96	729.51	43.54
Male	113	731.25	51.53	114	726.46	45.58
Comprehension						
Female	97	737.65	26.19	96	739.10	33.42
Male	113	736.25	34.12	114	729.67	31.61
Total Reading						
Female	97	734.12	33.40	96	734.57	37.02
Male	113	734.02	40.87	114	728.31	36.89

Results of the t-tests on the CAT Reading subtests for females are presented in Table 14. No t-test produces t-values that equal or exceed the critical t-value of 1.96.

Table 14
t-Tests On CAT Reading Subtests
Gaston County School Sixth Grade 1988-89
Females

CAT Subtest	t-Value	D.F.	p
Vocabulary	-0.09	191	0.926
Comprehension	0.34	191	0.737
Total Reading	0.09	191	0.930

Results of t-tests between the control and experimental groups on the CAT Reading subtests for male sixth grade students (Table 15) show that no t-value indicates significant differences between group means.

Table 15
t-Tests On CAT Reading Subtests
Gaston County School Sixth Grade 1988-89
Males

CAT Subtest	t-Value	D.F.	p
Vocabulary	-0.74	225	0.459
Comprehension	-1.51	225	0.133
Total Reading	-1.11	225	0.270

Language

Table 16 includes mean scores for the CAT Language subtests by gender and by subpopulation. Experimental-group females outscored their counterparts in the control group, on average, by less than one point. Males in the control group outscored their counterparts in the experimental group, on average, by a range of from 8.95 points (Language Mechanics) to 16.27 points (Language Expression).

Results of the hypothesis test for females by subtest are presented in Table 17. For females, t-values are positive indicating higher Language scores for the experimental group, but the t-values clearly show that no significant differences exist between the control and experimental-group scores. For males, t-test results (Table 18) on CAT Language subtests are all negative in sign and show that for Language Expression and Total Language the control group scored significantly higher than the experimental group.

Table 16
Gaston County Schools Sixth Grade 1988-89
CAT Language Scale Scores by Gender by Subpopulation

	Subpopulation					
	Non-MAC Students (Control)			MAC Students (Experimental)		
CAT Subtest	**N**	**Mean**	**Std. Dev.**	**N**	**Mean**	**Std. Dev.**
Language Mechanics						
Female	97	728.47	31.47	96	728.72	35.02
Male	113	721.82	44.58	114	712.87	30.60
Language Expression						
Female	97	727.01	46.18	96	727.58	50.73
Male	113	718.30	63.50	114	702.03	61.02
Total Language						
Female	97	728.02	36.68	96	728.38	40.67
Male	113	720.33	50.84	114	707.72	42.30

Math

CAT Math subtest scores by gender and by subpopulation are in Table 19. Regardless of gender, Math scores are higher in the control group. Control-group females outscored experimental-group females on Math Computations by 14.58 points, and on Math Concepts by 8.51 points. On Total

Math, the mean score for control-group females is 11.60 points higher than for experimental-group females.

Table 17
t-Tests On CAT Language Subtests
Gaston County School Sixth Grade 1988-89
Females

CAT Subtest	t-Value	D.F.	p
Language Mechanics	0.05	191	0.959
Language Expression	0.08	191	0.935
Total Language	0.06	191	0.949

Table 18
t-Tests On CAT Language Subtests
Gaston County School Sixth Grade 1988-89
Males

CAT Subtest	t-Value	D.F.	p
Language Mechanics	-1.77	225	0.079
Language Expression	-1.97	225	0.050
Total Language	-2.03	225	0.043

In general, male students in the control group scored higher on the Math subtests than male students in the experimental group. On Math Computations, control-group males outscored experimental-group males by 24.09 points. The Math Concepts mean scores show similar results, where control-group males outscored experimental-group males by 16.00 points. On Total Math, males in the control group outscored experimental-group males by 20.34 points.

Table 19
Gaston County Schools Sixth Grade 1988-89
CAT Math Scale Scores by Gender by Subpopulation

CAT Subtest	Subpopulation					
	Non-MAC Students (Control)			MAC Students (Experimental)		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.
Math Computation						
Female	97	783.88	42.84	96	769.30	36.02
Male	113	777.67	51.03	114	752.98	38.75
Math Concepts						
Female	97	733.84	42.03	96	725.33	39.95
Male	113	737.43	48.64	114	721.43	45.02
Total Math						
Female	97	759.13	40.56	96	747.53	35.52
Male	113	757.81	47.31	114	737.47	38.92

CAT Math t-test results for females (Table 20) show that the control group scored higher than the experimental group on all Math subtests and significantly higher on Math Computation and Total Math subtests.

Table 20
t-Tests On CAT Math Subtests
Gaston County School Sixth Grade 1988-89
Females

CAT Subtest	t-Value	D.F.	p
Math Computations	-2.56	191	0.011
Math Concepts	-1.44	191	0.151
Total Math	-2.11	191	0.036

For males, t-test results for Math (Table 21) show significantly higher scores by the control group for all CAT Math subtests than for the experimental group.

Table 21
t-Tests On CAT Math Subtests
Gaston County School Sixth Grade 1988-89
Males

CAT Subtest	t-Value	D.F.	*p*
Math Computations	-4.11	225	0.000
Math Concepts	-2.57	225	0.011
Total Math	-3.54	225	0.000

Spelling

Table 22 summarizes the data for the Spelling subtest. Experimental-group females outscored their counterparts in the control group on Spelling. For males, the reverse is true -- the control group outscored the experimental group.

Table 22
Gaston County Schools Sixth Grade 1988-89
CAT Spelling Scale Scores by Gender by Subpopulation

CAT Subtest	Subpopulation					
	Non-MAC Students (Control)			MAC Students (Experimental)		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.
Spelling						
Female	97	736.77	25.24	96	739.75	28.86
Male	113	728.50	37.59	114	722.82	28.83

For females the t-value for Spelling is 0.76 ($p \leq .45$) and for males the t-value is -1.28 ($p \leq .21$).

Battery Scores

Table 23 summarizes the results of the battery scores. Regardless of gender, the control group has the higher Total Battery mean scores. Control-group females have the highest mean (740.28 ± 34.47) of either the control or experimental groups.

Table 23
Gaston County Schools Sixth Grade 1988-89
CAT Battery Scale Scores by Gender by Subpopulation

CAT Subtest	Subpopulation					
	Non-MAC Students (Control)			MAC Students (Experimental)		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.
Total Reading						
Female	97	734.12	33.40	96	734.57	37.02
Male	113	734.02	40.87	114	728.31	36.89
Total Language						
Female	97	728.02	36.68	96	728.38	40.67
Male	113	720.33	50.84	114	707.72	42.30
Total Math						
Female	97	759.13	40.56	96	747.53	35.52
Male	113	757.81	47.31	114	737.47	38.92
Total Battery						
Female	97	740.28	34.47	96	736.73	34.84
Male	113	737.24	44.15	114	724.35	36.52

T-test results for Battery scores are summarized in Tables 24 and 25. Results in these tables show that for females (Table 24) no significant difference exists, but for males (Table 25), the control group scored significantly higher than the experimental group on Total Battery.

Table 24
t-Tests On CAT Battery Scores
Gaston County School Sixth Grade 1988-89
Females

CAT Subtest	t-Value	D.F.	p
Total Reading	0.09	191	0.930
Total Language	0.06	191	0.949
Total Math	-2.11	191	0.036
Total Battery	-0.71	191	0.478

Table 25
t-Tests On CAT Battery Scores
Gaston County School Sixth Grade 1988-89
Males

CAT Subtest	t-Value	D.F.	p
Total Reading	-1.11	225	0.270
Total Language	-2.03	225	0.043
Total Math	-3.54	225	0.000
Total Battery	-2.40	225	0.017

Analysis of the data reveals an interesting trend. On every CAT subtest, the subgroup with the lowest score is the control-group males. Further analyses show that large differences in scores exist between females and males in the experimental group. This trend is not as apparent in the control group. Further investigation prompted t-tests to determine if significant differences between males and females within the control and experimental groups exist. Results of these tests are in Appendix H.

Control-group results show that there are no significant differences between male and female scores on any of the CAT subtests. Experimental-group results show that significant differences between males and females are evident on seven of the eleven tests.

Summary

The following paragraphs summarize the findings for H_02 with respect to gender. For female students, positive t-values too small to establish significance occur on six of the eleven tests. Two of the remaining five negative t-values establish significance ($\alpha = .05$).

For male students, eleven of eleven t-values are negative in sign. Six of the eleven test results show that the control group has significantly higher mean scores than the experimental group ($\alpha = .05$).

Race

Analyses of the data for $H_0 2$ are based on the mean scale scores for non-Caucasians and for Caucasians in the control and experimental groups.

Reading

CAT Reading scores by race and by subpopulation are in Table 26. Control-group non-Caucasians have higher scores on all Reading subtests than do their counterparts in the experimental group. The differences in means range from 2.31 points on Vocabulary to 9.31 points on Comprehension. Control-group Caucasians have higher mean Reading scores than experimental-group Caucasians on all subtests. The differences between the control and experimental-group means are less than two points.

T-tests are used to test $H_0 2$ for the non-Caucasian and Caucasian groups. Results for non-Caucasians are presented in Table 27 and for Caucasians in Table 28. The results for both non-Caucasians and Caucasians are similar, showing that, in all cases, for both ethnic groups, the control group outperformed the experimental group. Yet no significant differences are indicated.

Table 26
Gaston County Schools Sixth Grade 1988-89
CAT Reading Scale Scores by Race by Subpopulation

CAT Subtest	Subpopulation					
	Non-MAC Students (Control)			MAC Students (Experimental)		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.
Vocabulary						
Non-caucasian	38	707.29	57.34	46	704.98	42.28
Caucasian	172	735.89	44.19	164	734.27	43.19
Comprehension						
Non-caucasian	38	729.74	24.88	46	720.43	35.98
Caucasian	172	738.48	31.63	164	737.78	30.80
Total Reading						
Non-caucasian	38	718.82	39.99	46	712.96	37.54
Caucasian	172	737.44	36.20	164	736.28	35.30

Table 27
t-Tests On CAT Reading Subtests
Gaston County Schools Sixth Grade 1988-89
Non-Caucasians

CAT Subtest	t-Value	D.F.	*p*
Vocabulary	-0.21	82	0.832
Comprehension	-1.35	82	0.181
Total Reading	-0.69	82	0.491

Table 28
t-Tests On CAT Reading Subtests
Gaston County Schools Sixth Grade 1988-89
Caucasians

CAT Subtest	t-Value	D.F.	p
Vocabulary	-0.34	334	0.734
Comprehension	-0.20	334	0.838
Total Reading	-0.30	334	0.767

Language

The mean scores for the CAT Language subtests by race and by subpopulation are in Table 29.

Table 29
Gaston County Schools Sixth Grade 1988-89
CAT Language Scale Scores by Race by Subpopulation

CAT Subtest	Subpopulation					
	Non-MAC Students (Control)			MAC Students (Experimental)		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.
Language Mechanics						
Non-Caucasian	38	709.58	44.67	46	715.33	26.72
Caucasian	172	728.28	37.09	164	721.46	35.20
Language Expression						
Non-Caucasian	38	702.55	67.99	46	692.96	60.00
Caucasian	172	726.69	52.49	164	719.53	56.04
Total Language						
Non-Caucasian	38	706.37	53.00	46	704.33	40.02
Caucasian	172	727.75	42.13	164	720.76	42.89

Control-group non-Caucasians have mean scores 9.59 points higher on Language Expression and 2.04 points higher on Total Language scores than non-Caucasians in the experimental group. Experimental-group non-Caucasians have a mean 5.75 points higher than control-group non-Caucasians on Language Mechanics. Caucasians in the control group have mean scores higher than experimental-group Caucasians on all Language subtests.

Tables 30 and 31 present t-tests results on CAT Language subtests by race.

Table 30
t-Tests On CAT Language Subtests
Gaston County School Sixth Grade 1988-89
Non-Caucasians

CAT Subtest	t-Value	D.F.	*p*
Language Mechanics	0.73	82	0.468
Language Expression	-0.69	82	0.494
Total Language	-0.20	82	0.841

Table 31
t-Tests On CAT Language Subtests
Gaston County School Sixth Grade 1988-89
Caucasians

CAT Subtest	t-Value	D.F.	*p*
Language Mechanics	-1.73	334	0.085
Language Expression	-1.21	334	0.227
Total Language	-1.51	334	0.133

Regardless of race, there are no significant differences between the control and experimental groups on Language subtests.

Math

Mean CAT Math scores by race and by subpopulation are in Table 32. On all three Math subtests, control-group non-Caucasians have higher mean scores than experimental-group non-Caucasians. The non-Caucasian control group's Math Computation score is 14.74 points higher, Math Concepts 9.75 points higher, and Total Math 12.20 points higher than the experimental group's scores.

Control-group Caucasians have higher mean scores than experimental-group Caucasians on all CAT Math subtests. The Caucasian control group's Math Computation scores are 20.79 points higher, Math Concepts 12.07 points higher, and Total Math scores 16.46 points higher than the experimental group's scores.

Math CAT t-test results for non-Caucasians (Table 33) show that the control group scored higher than the experimental group, but no significant differences between the control and experimental-group means exist.

T-test results on Math subtests for Caucasians (Table 34) show that significantly higher means are observed for the control group on all subtests.

Table 32
Gaston County Schools Sixth Grade 1988-89
CAT Math Scale Scores by Race by Subpopulation

CAT Subtest	Subpopulation					
	Non-MAC Students (Control)			MAC Students (Experimental)		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.
Math Computation						
Non-Caucasian	38	766.87	49.74	46	752.13	40.91
Caucasian	172	783.56	46.50	164	762.77	37.36
Math Concepts						
Non-Caucasian	38	714.29	41.23	46	704.54	39.77
Caucasian	172	740.52	45.30	164	728.45	42.16
Total Math						
Non-Caucasian	38	740.79	43.36	46	728.59	38.72
Caucasian	172	762.31	43.58	164	745.85	36.58

Table 33
t-Tests On CAT Math Subtests
Gaston County Schools Sixth Grade 1988-89
Non-Caucasians

CAT Subtest	t-Value	D.F.	p
Math Computations	-1.49	82	0.140
Math Concepts	-1.10	82	0.275
Total Math	-1.36	82	0.177

Table 34
t-Tests On CAT Math Subtests
Gaston County Schools Sixth Grade 1988-89
Caucasians

CAT Subtest	t-Value	D.F.	p
Math Computations	-4.50	334	0.000
Math Concepts	-2.52	334	0.012
Total Math	-3.74	334	0.000

Spelling

Mean scores for Spelling by race and by subpopulation are in Table 35. For non-Caucasians, the experimental group has a 3.27 point higher mean score than the control group. For Caucasians, the control group has a 2.88 point higher mean score than the experimental group.

Table 35
Gaston County Schools Sixth Grade 1988-89
CAT Spelling Scale Scores by Race by Subpopulation

CAT Subtest	**Non-MAC Students (Control)**			**MAC Students (Experimental)**		
	N	**Mean**	**Std. Dev.**	**N**	**Mean**	**Std. Dev.**
Spelling						
Non-Caucasian	38	727.32	41.67	46	730.59	25.87
Caucasian	172	733.43	30.36	164	730.55	31.12

T-test results on Spelling scores for both non-Caucasians and Caucasians are the same. No significant differences between the control and experimental-group scores exist. The t-value for non-Caucasians on Spelling is 0.44 ($p \leq 0.67$) ; for Caucasians the t-value is -0.86 ($p \leq 0.40$).

Total Battery

Control-group Total Battery scores are higher for both non-Caucasians and Caucasians (Table 36). For non-

Caucasians the difference between the control and experimental-group Total Battery score is 6.69 points; for Caucasians the difference is 8.18 points.

Table 36
Gaston County Schools Sixth Grade 1988-89
CAT Battery Scale Scores by Race by Subpopulation

CAT Subtest	Non-MAC Students (Control) N	Mean	Std. Dev.	MAC Students (Experimental) N	Mean	Std. Dev.
Total Reading						
Non-Caucasian	38	718.82	39.99	46	712.96	37.54
Caucasian	172	737.44	36.20	164	736.28	35.30
Total Language						
Non-Caucasian	38	706.37	53.00	46	704.33	40.02
Caucasian	172	727.75	42.13	164	720.76	42.89
Total Math						
Non-Caucasian	38	740.79	43.36	46	728.59	38.72
Caucasian	172	762.31	43.58	164	745.85	36.58
Total Battery						
Non-Caucasian	38	721.82	42.34	46	715.13	35.05
Caucasian	172	742.36	38.50	164	734.18	35.53

Tables 37 and 38 summarize t-test results for both non-Caucasians and Caucasians on Total Battery scores. Although t-test results for both non-Caucasians (Table 37) and Caucasians (Table 38) show higher scores for the control group, only results for Caucasians show a significantly higher score for the control group on Total Battery.

Table 37
t-Tests On CAT Battery Scores
Gaston County School Sixth Grade 1988-89
Non-Caucasians

CAT Subtest	t-Value	D.F.	p
Total Reading	-0.69	82	0.491
Total Language	-0.20	82	0.841
Total Math	-1.36	82	0.177
Total Battery	-0.79	82	0.431

Table 38
t-Tests On CAT Battery Scores
Gaston County School Sixth Grade 1988-89
Caucasians

CAT Subtest	t-Value	D.F.	p
Total Reading	-0.30	334	0.767
Total Language	-1.51	334	0.133
Total Math	-3.74	334	0.000
Total Battery	-2.02	334	0.044

Summary

In summary, results for non-Caucasian students show that no significant differences exist between the means of the control and experimental groups on any of the eleven subtests. In nine of eleven instances, the resulting t-values are negative in sign confirming higher mean scores for the control group. Only on the Language Mechanics and Spelling subtests do experimental-group means exceed those of the control group.

Caucasian students in the control group have higher mean scores on eleven of eleven subtests than Caucasians in the experimental group. On five of the eleven tests, resulting t-values confirm significantly higher scores for the control-group Caucasians ($\alpha = .05$).

Parental Education Level

Parental education level for the students in the sample is defined by three categories: Less Than High School Education (<), High School Education, More Than High School Education (>). The hypothesis (H_02) tested the means of the control and experimental groups on each of the subtests for each category of parental education level.

Reading

Table 39 summarizes mean scores for CAT Reading subtests by parental education level and by subpopulation. On Vocabulary, for the less than high school category, the experimental group's score is 6.24 points higher than the control group's score. Vocabulary scores for the high school category show that the control group's score is 6.62 points higher than the experimental group's score. On Vocabulary, mean scores for the more than high school category are virtually the same for the control and experimental groups.

On Comprehension, control-group students with parents in the less than high school category outscore the experimental-group students by an average of 2.17 points. For students whose parents have only a high school education, the control group outscored the experimental group by 5.99 points on Comprehension. For students whose parents have more than a high school education, the experimental group outperformed the control group by less than two points.

Table 39
Gaston County Schools Sixth Grade 1988-89
CAT Reading Scale Scores by Parental Education Level by Subpopulation

CAT Subtest	Subpopulation					
	Non-MAC Students (Control)			MAC Students (Experimental)		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.
Vocabulary						
< High School	51	708.53	53.63	55	714.87	47.79
High School	66	722.61	41.60	69	715.99	44.64
> High School	91	749.13	42.51	82	749.09	31.92
Comprehension						
< High School	51	721.92	34.52	55	719.75	36.65
High School	66	734.02	26.04	69	728.03	32.07
> High School	91	747.62	27.70	82	749.30	23.81
Total Reading						
< High School	51	715.53	41.79	55	717.58	40.58
High School	66	728.53	31.70	69	722.28	36.99
> High School	91	748.64	33.53	82	749.41	25.71

Total Reading mean scores for students whose parents are in the category of less than high school education have a higher mean score for the experimental group by 2.05 points. In the high school graduate category, control group students have a 6.25 point higher mean than experimental group students, and in the more than high school education category, less than one point separates the control group and experimental group means.

CAT Reading t-test results for each category of parental education level are in Tables 40 through 42. Regardless of parental education level, t-test results show no significant differences exist between the control and experimental group scores on any Reading subtest.

Table 40
t-Tests On CAT Reading Subtests
Gaston County Schools Sixth Grade 1988-89
Less Than High School Education

CAT Subtest	t-Value	D.F.	p
Vocabulary	0.64	104	0.521
Comprehension	-0.31	104	0.754
Total Reading	0.26	104	0.798

Language

Mean scores by parental education level and by subpopulation for CAT Language subtests are in Table 43. In category one, students whose parents have less than a high school education, the experimental group scored 1.43 points higher than the control group on Language Mechanics. In category two, parents with a high school education, the control group's mean score is 14.79 points higher than the experimental group's mean on Language Mechanics. Students whose parents have more than a high school education scored 2.28 points higher, on average, for the experimental group than for the control group on Language Mechanics.

Table 41
t-Tests On CAT Reading Subtests
Gaston County Schools Sixth Grade 1988-89
High School Education

CAT Subtest	t-Value	D.F.	p
Vocabulary	-0.89	133	0.375
Comprehension	-1.19	133	0.237
Total Reading	-1.05	133	0.294

Table 42
t-Tests On CAT Reading Subtests
Gaston County Schools Sixth Grade 1988-89
More Than High School Education

CAT Subtest	t-Value	D.F.	p
Vocabulary	-0.01	171	0.994
Comprehension	0.43	171	0.669
Total Reading	0.17	171	0.865

Table 43
Gaston County Schools Sixth Grade 1988-89
CAT Language Scale Scores by Parental Education Level by Subpopulation

CAT Subtest	Non-MAC Students (Control) N	Mean	Std. Dev.	MAC Students (Experimental) N	Mean	Std. Dev.
Language Mechanics						
< High School	51	705.86	41.69	55	707.29	31.74
High School	66	724.17	35.68	69	709.38	32.62
> High School	91	736.74	35.90	82	739.02	27.05
Language Expression						
< High School	51	697.45	59.20	55	692.80	60.20
High School	66	719.03	39.48	69	697.51	58.87
> High School	92	739.34	59.81	82	742.74	43.23
Total Language						
< High School	51	701.96	47.08	55	700.31	43.09
High School	66	721.86	35.26	69	703.70	41.37
> High School	91	738.30	45.14	82	741.13	32.63

On Language Expression, students in category one, parents with less than a high school education, control-group students have a 4.65 point higher mean score than students in the experimental group. In category two students, parents with a high school education, the control group mean score is 21.52 points higher than the experimental group mean. In category three students, parents with more than a high school education, the experimental group outscored the control group by 3.40 points.

Total Language control and experimental group means are separated by less than two points for students whose parents have less than a high school education. Category two students, parents with a high school education, exhibit the largest difference between the control and experimental group means; 18.16 points. In category three, students whose parents have more than a high school education, experimental group Total Language scores exceed the control group scores by less than three points.

For students whose parents have less than a high school education (Table 44) and for students whose parents have more than a high school education (Table 46), t-test results on Language scores show no significant differences between the control and experimental group scores.

Table 44
t-Tests On CAT Language Subtests
Gaston County School Sixth Grade 1988-89
Less Than High School Education

CAT Subtest	t-Value	D.F.	*p*
Language Mechanics	0.20	104	0.842
Language Expression	-0.40	104	0.690
Total Language	-0.19	104	0.851

For students whose parents have a high school education (Table 45), t-test results show that the control group scored significantly higher than the experimental group on all three Language subtests.

Table 45
t-Tests On CAT Language Subtests
Gaston County School Sixth Grade 1988-89
High School Education

CAT Subtest	t-Value	D.F.	p
Language Mechanics	-2.52	133	0.013
Language Expression	-2.48	133	0.014
Total Language	-2.74	133	0.007

Table 46
t-Tests On CAT Language Subtests
Gaston County School Sixth Grade 1988-89
More Than High School Education

CAT Subtest	t-Value	D.F.	p
Language Mechanics	0.47	171	0.639
Language Expression	0.42	171	0.671
Total Language	0.47	171	0.639

Math

Table 47 presents mean scores for CAT Math subtests by parental education level and by subpopulation. For all three parental education categories, the control group means on Math Computation are higher than the experimental group means. The greatest difference in the means of the control and experimental groups on Math Computation is in the high school group (26.75 points), followed by the less-than-high school group (16.96 points), and the more-than-high school group (14.71).

Table 47
Gaston County Schools Sixth Grade 1988-89
CAT Math Scale Scores by Parental Education Level
by Subpopulation

CAT Subtest	Non-MAC Students (Control) N	Non-MAC Students (Control) Mean	Non-MAC Students (Control) Std. Dev.	MAC Students (Experimental) N	MAC Students (Experimental) Mean	MAC Students (Experimental) Std. Dev.
Math Computation						
< High School	51	762.51	44.55	55	745.55	40.79
High School	66	781.21	38.94	69	754.46	36.51
> High School	91	791.93	50.59	82	777.22	31.98
Math Concepts						
< High School	51	715.98	46.82	55	705.89	51.16
High School	66	732.70	47.31	69	716.52	36.63
> High School	91	749.49	39.43	82	743.34	30.78
Total Math						
< High School	51	739.47	42.16	55	725.95	43.37
High School	66	757.20	41.68	69	735.72	33.06
> High School	91	771.01	43.33	82	760.55	28.13

Scores on the Math Concepts subtest follow the same pattern as the Math Computation subtest. Category one students, parents with less than a high school education, have a 10.09 point higher mean score for the control group than for the experimental group. Category two, students whose parents have a high school education, have an even larger difference (16.18 points) between the control and experimental group means. Of the three categories, students whose parents have more than a high school education have the smallest difference in means (6.15 points) between the control and experimental groups.

Total Math mean scores continue the trend of higher mean scores for the control group. For students in category one, parents with less than a high school education, the control group outscored the experimental group by 13.52 points on Total Math. For students in category two, parents with a high school education, the control group outscored the experimental group by 21.78 points, and for students in category three, parents with more than a high school education, the control group outscored the experimental group by 10.46 points.

Results of t-tests on the Math subtest scores are presented in Tables 48 through 50. Results show that some significant differences exist between the control and experimental group means.

Table 48
t-Tests On CAT Math Subtests
Gaston County Schools Sixth Grade 1988-89
Less Than High School Education

CAT Subtest	t-Value	D.F.	p
Math Computations	-2.05	104	0.043
Math Concepts	-1.06	104	0.293
Total Math	-1.63	104	0.107

For students in category one, parents with less than a high school education, (Table 48) and in category three, parents with more than a high school education, (Table 50) t-test results show that the control group outscored the experimental group on all Math subtests, but the control group scored significantly higher than the experimental group on Math Computations.

T-test results for category two, students with parents having a high school education (Table 49), show that the control group scored significantly higher than the experimental group on all three Math subtests.

Table 49
t-Tests On CAT Math Subtests
Gaston County Schools Sixth Grade 1988-89
High School Education

CAT Subtest	t-Value	D.F.	p
Math Computations	-4.12	133	0.000
Math Concepts	-2.23	133	0.028
Total Math	-3.32	133	0.001

Table 50
t-Tests On CAT Math Subtests
Gaston County Schools Sixth Grade 1988-89
More Than High School Education

CAT Subtest	t-Value	D.F.	p
Math Computations	-2.26	171	0.025
Math Concepts	-1.14	171	0.258
Total Math	-1.86	171	0.064

Spelling

Table 51 presents CAT Spelling scores by parental education level and by subpopulation. On Spelling, the experimental group outscored the control group by 1.87 points for the parents with less than high school education category, and by 3.31 points for the parents with more than high school education category. Control group students whose parents have a high school education outscored their counterparts in the experimental group by 7.52 points.

Table 51
Gaston County Schools Sixth Grade 1988-89
CAT Spelling Scale Scores by Parental Education Level by Subpopulation

CAT Subtest	Subpopulation					
	Non-MAC Students (Control)			MAC Students (Experimental)		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.
Spelling						
< High School	51	720.06	33.86	55	721.93	31.32
High School	66	730.00	29.69	69	722.48	28.69
> High School	91	740.54	32.25	82	743.85	25.59

T-values for students whose parents have less than, equal to, and more than a high school education are 0.30, -1.50, and 0.74, respectively. These differences are not significant at the $\alpha = .05$ level.

Total Battery

Table 52 presents Total Battery mean scores as well as means for Total Reading, Total Language, and Total Math by parental education level and by subpopulation.

Table 52
Gaston County Schools Sixth Grade 1988-89
CAT Battery Scale Scores by Parental Education Level by Subpopulation

CAT Subtest	Subpopulation: Non-MAC Students (Control)			Subpopulation: MAC Students (Experimental)		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.
Total Reading						
< High School	51	715.53	41.79	55	717.58	40.58
High School	66	728.53	31.70	69	722.28	36.99
> High School	91	748.64	33.53	82	749.41	25.71
Total Language						
< High School	51	701.96	47.08	55	700.31	43.09
High School	66	721.86	35.26	69	703.70	41.37
> High School	91	738.30	45.14	82	741.13	32.63
Total Math						
< High School	51	739.47	42.16	55	725.95	43.37
High School	66	757.20	41.68	69	735.72	33.06
> High School	91	771.01	43.33	82	760.55	28.13
Total Battery						
< High School	51	718.80	40.67	55	714.49	39.03
High School	66	735.74	33.87	69	720.46	34.24
> High School	91	752.52	38.72	82	750.22	25.36

Control-group students whose parents' education level place them in category one, (<HS), have a 4.31 point higher Total Battery score than the experimental group. Control-

group students in category two, parents with a high school education, have a Total Battery score 15.28 points higher than the experimental group. Students in category three, (>HS), have a Total Battery score 2.30 points higher for the control group than for the experimental group.

T-test results on CAT Battery scores are in Tables 53 through 55. For students whose parents are < HS educated (Table 53), and for students whose parents have > HS education (Table 55), no significant differences exist between the control and experimental groups on Total Battery scores.

Table 53
t-Tests On CAT Battery Scores
Gaston County School Sixth Grade 1988-89
Less Than High School Education (<HS)

CAT Subtest	t-Value	D.F.	p
Total Reading	0.26	104	0.798
Total Language	-0.19	104	0.851
Total Math	-1.63	104	0.107
Total Battery	-0.56	104	0.579

T-test results for students in category two, parents with a high school education (Table 54), show that the control group scored significantly higher than the experimental group on Total Battery.

Table 54
t-Tests On CAT Battery Scores
Gaston County School Sixth Grade 1988-89
High School Education

CAT Subtest	t-Value	D.F.	p
Total Reading	-1.05	133	0.294
Total Language	-2.74	133	0.007
Total Math	-3.32	133	0.001
Total Battery	-2.61	133	0.010

Table 55
t-Tests On CAT Battery Scores
Gaston County School Sixth Grade 1988-89
More Than High School Education (>HS)

CAT Subtest	t-Value	D.F.	p
Total Reading	0.17	171	0.865
Total Language	0.47	171	0.639
Total Math	-1.86	171	0.064
Total Battery	-0.46	171	0.649

Summary

For students whose parents have less than a high school education, the control group means are higher for seven of eleven means analyzed. Math Computation is the only score that shows a significant difference between the control and experimental group means at the $\alpha = .05$ level in favor of the control group.

For students whose parents have a high school education, the control group has higher mean scores than the experimental group on eleven of eleven scores analyzed, and significantly higher scores on seven of eleven subtests (α = .05).

Students whose parents have more than a high school education have higher control-group mean scores than the experimental group scores on seven of eleven subtests. Only on Math Computations is there a significant difference between the control and experimental group means.

Findings For Hypothesis Three

Hypothesis Three ($H_0 3$) states: There is no difference between the experimental and control groups on CAT scores as a function of years of participation in the MAC Program. For analysis, the sample is collapsed into three groups. Group one students, the control group, have zero years of participation in the MAC Program. Group two students are those from the experimental group who entered the MAC Program in 1987 and have two years of participation in the MAC Program. Finally, group three is those students in the experimental group who entered the MAC Program in 1986 and have three years of participation in the MAC Program. Oneway ANOVA is the procedure of choice to determine whether significant differences exist among the three group means. The Scheffé method is used to identify which groups, if any, are significantly different.

Reading

Mean scores for the Vocabulary, Comprehension, and Total Reading subtests by years of participation in the MAC Program are in Table 57. On Vocabulary, students in the MAC Program for three years have the highest mean score, zero years of participation students have the second highest mean, and two years of participation students have the lowest mean score.

Table 56
Gaston County Schools Sixth Grade 1988-89
CAT Reading Scale Scores by Years of MAC Participation

Cat Subtest	Years in MAC		
	3	2	0
Vocabulary			
N	107	103	210
Mean	732.27	723.26	730.71
Std. Dev.	37.28	50.85	47.98
Comprehension			
N	107	103	210
Mean	736.27	731.60	736.90
Std. Dev.	33.01	32.40	30.65
Total Reading			
N	107	103	210
Mean	734.54	727.67	734.07
Std. Dev.	33.34	40.31	37.51

Oneway ANOVA results (Table 57) with vocabulary scores as the dependent variable and years of MAC participation as the independent variable show no significant differences among the three group means ($\alpha = .05$).

Table 57
Analysis of Variance
Vocabulary Scores by Years of MAC Participation
Gaston County Schools Sixth Grade 1988-89

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Probability
Between Groups	2	5119.36	2559.68	1.196	0.303
Within Groups	417	892133.92	2139.41		
Total	419	897253.28			

Mean scores for Comprehension subtests (Table 56) show that the zero years of participation group has the highest mean score, followed by the three years of participation group, followed by the two years of participation group. Oneway ANOVA results (Table 58) show no significant differences among the mean scores of the three groups on the Comprehension subtest (α = .05).

For Total Reading, students participating in the MAC Program for three years have the highest mean score, followed by the zero years of participation group, and finally, the two years of participation group. No significant differences among the group means exist (α = .05) on Total Reading scores (Table 59).

Table 58
Analysis of Variance
Comprehension Scores by Years of MAC Participation
Gaston County Schools Sixth Grade 1988-89

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Probability
Between Groups	2	2035.88	1017.94	1.013	0.364
Within Groups	417	418851.52	1004.44		
Total	419	420887.40			

Table 59
Analysis of Variance
Total Reading Scores by Years of MAC Participation
Gaston County Schools Sixth Grade 1988-89

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Probability
Between Groups	2	3358.64	1679.32	1.212	0.299
Within Groups	417	577674.40	1385.31		
Total	419	581033.04			

Language

Language mean scores are in Table 60. On Language Mechanics, students with zero years of participation have the highest mean score. The three years of participation group has the second highest mean, followed by the two years of participation group.

Results of the oneway ANOVA (Table 61) on Language Mechanics scores show no significant differences among three means ($\alpha = .05$).

Table 60
Gaston County Schools Sixth Grade 1988-89
CAT Language Scale Scores by Years of MAC Participation

Cat Subtest	Years In MAC		
	3	2	0
Language Mechanics			
N	107	103	210
Mean	723.50	716.60	724.90
Std. Dev.	29.69	36.98	39.13
Language Expression			
N	107	103	210
Mean	723.18	703.87	722.32
Std. Dev.	55.49	58.85	56.21
Total Language			
N	107	103	210
Mean	723.59	710.49	723.88
Std. Dev.	39.86	44.74	44.92

Table 61
Analysis of Variance
Language Mechanics Scores by Years of MAC Participation
Gaston County Schools Sixth Grade 1988-89

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Probability
Between Groups	2	4893.87	2446.93	1.846	0.159
Within Groups	417	552879.12	1325.85		
Total	419	557772.99			

Language Expression mean scores (Table 60) show that the group with three years of MAC has the highest mean, followed in order by the zero years and the two years of participation groups. Oneway ANOVA results (Table 62) show that significant differences exist among the three group means ($\alpha = .05$). Scheffé Test results (Table 63) show that these differences are between the two and zero year groups, and between the two and three year groups.

Table 62
Analysis of Variance
Language Expression Scores by Years of MAC Participation
Gaston County Schools Sixth Grade 1988-89

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Probability
Between Groups	2	27347.92	13673.96	4.256	0.015
Within Groups	417	1339916.97	3213.23		
Total	419	1367264.89			

Table 63
Scheffé Test
Language Expression Scores by Years of MAC Participation
Gaston County School Sixth Grade 1988-89

Mean	Participation Group	0 Yrs.	2 Yrs.	3 Yrs.
722.32	0 Years		X	
703.87	2 Years	X		X
723.17	3 Years		X	

Students in the zero years of participation group have the highest Total Language mean score (Table 60). Students in the three years and zero years of participation groups have virtually the same mean score, but the two-year group mean is over 13 points lower. Table 64 presents the ANOVA results which show that significant differences exist among the three groups. Scheffé Test results (Table 65) show that a significant difference exists between the mean scores for the two year and zero year groups.

Table 64
Analysis of Variance
Total Language Scores by Years of MAC Participation
Gaston County Schools Sixth Grade 1988-89

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Probability
Between Groups	2	13751.15	6875.57	3.610	0.028
Within Groups	417	794309.66	1904.82		
Total	419	808060.81			

Table 65
Scheffé Test
Total Language Scores by Years of MAC Participation
Gaston County Schools Sixth Grade 1988-89

Mean	Participation Group	0 Yrs.	2 Yrs.	3 Yrs.
723.88	0 Years		X	
710.49	2 Years	X		
723.58	3 Years			

Math

Math scores for the categories of participation are in Table 66.

Table 66
Gaston County Schools Sixth Grade 1988-89
CAT Math Scale Scores by Years of MAC Participation

Cat Subtest	Years In MAC		
	3	2	0
Math Computation			
N	107	103	210
Mean	765.47	755.22	780.54
Std. Dev.	35.31	40.72	47.42
Math Concepts			
N	107	103	210
Mean	725.44	720.90	735.77
Std. Dev.	42.42	43.11	45.64
Total Math			
N	107	103	210
Mean	745.70	738.30	758.42
Std. Dev.	36.09	39.02	44.22

On Math Computations, students with zero years of participation in the MAC Program on average outscored their counterparts in the other two groups by a minimum 15 points. Oneway ANOVA results on Math Computation data (Table 67) show that significant differences exist among the three groups ($\alpha = .05$). The Scheffé Test results (Table 68) verify these findings and identify that differences are between the zero years group and both the two and three years groups.

Table 67
Analysis of Variance
Math Computation Scores by Years of MAC Participation
Gaston County Schools Sixth Grade 1988-89

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Probability
Between Groups	2	47908.27	23954.13	12.952	0.000
Within Groups	417	771226.69	1849.46		
Total	419	819134.96			

Table 68
Scheffé Test
Math Computation Scores by Years of MAC Participation
Gaston County Schools Sixth Grade 1988-89

Mean	Participation Group	0 Yrs.	2 Yrs.	3 Yrs.
780.54	0 Years		X	X
755.22	2 Years	X		
765.47	3 Years	X		

Math Concepts scores (Table 66) are the highest in the zero years group followed by the three years and two years groups. Oneway ANOVA results for the Math Concepts Scores (Table 69) show significant differences among the three groups. Scheffé Test results show that these significant differences are between the zero and the two years groups (Table 70).

Table 69
Analysis of Variance
Math Concepts Scores by Years of MAC Participation
Gaston County Schools Sixth Grade 1988-89

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Probability
Between Groups	2	17636.57	8818.28	4.508	0.012
Within Groups	417	815656.41	1956.01		
Total	419	833292.98			

Table 70
Scheffé Test
Math Concepts Scores by Years of MAC Participation
Gaston County Schools Sixth Grade 1988-89

Mean	Participation Group	0 Yrs.	2 Yrs.	3 Yrs.
735.77	0 Years		X	
720.90	2 Years	X		
725.44	3 Years			

Total Math scores (Table 66) show that students in the zero years group have the highest mean and, that the second highest mean is for the three-year group. The lowest mean is for the two-year group. Oneway ANOVA results for Total Math indicate that significant differences exist among the three groups (Table 71). The Scheffé Test results (Table 72) show that the differences are between the zero and two years and the zero and three years group means.

Table 71
Analysis of Variance
Total Math Scores by Years of MAC Participation
Gaston County Schools Sixth Grade 1988-89

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Probability
Between Groups	2	30934.52	15467.26	9.186	0.000
Within Groups	417	702119.22	1683.74		
Total	419	733053.74			

Table 72
Scheffé Test
Total Math Scores by Years of MAC Participation
Gaston County Schools Sixth Grade 1988-89

Mean	Participation Group	0 Yrs.	2 Yrs.	3 Yrs.
758.42	0 Years		X	X
738.30	2 Years	X		
745.70	3 Years	X		

Spelling

Spelling mean scores are in Table 73. The mean scores for the three groups are within two points of each other. Oneway ANOVA produces no results that indicate significantly different group means on Spelling (Table 74).

Table 73
Gaston County Schools Sixth Grade 1988-89
CAT Spelling Scale Scores by Years of MAC Participation

Cat Subtest	Years In MAC		
	3	2	0
Spelling			
N	107	103	210
Mean	730.69	730.43	732.32
Std. Dev.	30.52	29.58	32.67

Table 74
Analysis of Variance
Spelling Scores by Years of MAC Participation
Gaston County Schools Sixth Grade 1988-89

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Probability
Between Groups	2	329.62	164.81	0.167	0.846
Within Groups	417	411036.01	985.70		
Total	419	411365.63			

<u>Total Battery</u>

The mean Total Battery scores along with the Reading, Language, and Math Battery scores are presented in Table 75. The highest Total Battery mean score is for the zero years of participation group and the lowest is for the two years of participation group.

ANOVA results for Total Battery (Table 76) show that significant differences exist among the three group means.

The Scheffé Test (Table 77) identifies that the difference is between the means of the two years and zero years groups.

Table 75
Gaston County Schools Sixth Grade 1988-89
CAT Battery Scale Scores by Years of MAC Participation

CAT Subtest	Years In MAC 3	2	0
Total Reading			
N	107	103	210
Mean	734.54	727.67	734.07
Std. Dev.	33.34	40.31	37.51
Total Language			
N	107	103	210
Mean	723.59	710.49	723.88
Std. Dev.	39.86	44.74	44.92
Total Math			
N	107	103	210
Mean	745.70	738.30	758.42
Std. Dev.	36.09	39.02	44.22
Total Battery			
N	107	103	210
Mean	734.47	725.38	738.64
Std. Dev.	33.77	38.20	39.91

Table 76
Analysis of Variance
Total Battery Scores by Years of MAC Participation
Gaston County Schools Sixth Grade 1988-89

Source	D.F.	Sum of Squares	Mean Squares	F Ratio	F Probability
Between Groups	2	12161.23	6080.61	4.208	0.016
Within Groups	417	602563.08	1445.00		
Total	419	614724.31			

Table 77
Scheffé Test
Total Battery Scores by Years of MAC Participation
Gaston County Schools Sixth Grade 1988-89

Mean	Participation Group	0 Yrs.	2 Yrs.	3 Yrs.
738.64	0 Years		X	
725.38	2 Years	X		
734.47	3 Years			

Summary

To analyze data for Hypothesis Three (H_03) the researcher examined the longitudinal effects of the MAC Program on CAT scores. Results of the Scheffé Tests show that significant differences between the mean scores of the zero years group (control) and the two years group exist for six of eleven subtests favoring the control group. The Scheffé Test results also show significant differences in the mean scores between the zero years group (control) and the three years group for two of eleven subtests favoring the control group. For the Language Expression subtest, in addition to the significant difference between the zero years group and the two years group there is a significant difference between the means of the two years group and the three years group.

Sign Test Results

Upon completion of the analyses for the three hypotheses, it was evident from inspection that an overwhelming number of tests results favored the control group. The Sign Test was applied for each of the hypotheses to determine if the direction of the results were of significance. Results of these tests are in Appendix K.

The Sign Test results show that for Hypothesis One ($H_0 1$) the z-value (-3.32) exceeds the critical z-value of ± 1.96 favoring the control group.

Hypothesis Two ($H_0 2$) used gender, race, and parental education level as independent variables to determine if MAC students (experimental group) outperformed their counterparts in the non-MAC group (control group). For gender, Sign Test results favor control-group males significantly ($z = -3.32$) and favor experimental group females but not significantly ($z = 0.30$). Overall for gender, Sign Test results favor the control group with a significant z-value of -2.13.

For race as the independent variable, Sign Test results favor both the control Caucasians ($z = -3.32$) and non-Caucasians ($z = -2.11$). Overall for race, Sign Test results show that the control group does significantly better than the experimental group ($z = -3.83$).

For parental education level as the independent variable, Sign Test results favor the control group's < high school group slightly (z = -.90); the control group's high school group significantly (z = -3.32); and the experimental group's > high school group slightly (z = 0.30). Overall for parental education level, Sign Test results favor the control group (z = -2.26).

A total of seventy-seven tests were performed for $H_0 2$. Sign Test results for the combined test favor the control group significantly (z = - 4.67).

For Hypothesis Three ($H_0 3$), years of participation in the MAC Program was the independent variable. Sign Test results favor the control group (z = -1.51), but not significantly.

Ninety-nine tests were performed testing the three hypotheses in this study. Sign Test results for the combination of all tests favors the control group significantly (z = -5.73).

Reliability Study

In order to establish credibility to test results, reliability coefficients must be calculated to determine if the instrument measures the entity of knowledge consistently. The MAC Program has two tests that measure student progress and determine levels of mastery for the objectives tested. No previous empirical data are available to support the reliability of the MAC Program tests. As a part of this study, the reliability of the sixth grade MAC Program Communication Skills and Math tests are determined. The KR20 Method is the mean of all possible split-half reliability estimates.

The sample consists of randomly selected classrooms of students from randomly selected schools in the Gaston County feeder system during the 1990-91 school year. One randomly selected school with a sixth-grade population from each feeder group, seven in all, contributed one randomly selected classroom of student data to the reliability study sample.

MAC Program Communication Skills Test

One hundred sixty-two respondents participated in the study to estimate the reliability coefficient for the MAC Program Communication Skills Test. The test consists of 173 multiple choice questions measuring mastery on 78 objectives. For Communication Skills, the mean raw score is 83.7 ± 39.49 and the median raw score is 85. The raw scores range from a low of 21 to a high of 155.

An item analysis of the Communication Skills Test is included in Appendix I. The item analysis shows that the percentage of students responding correctly to individual questions ranges from a low of 10% on question 173 to a high of (82%) on question 5. On 23.70% of the Communication

Skills Test questions, more than 60% of the responses were correct. On 26.59% of the Communication Skills Test questions, fewer than 40% of the 162 respondents answered the question correctly. On 47.40% of the Communication Skills questions, respondents failed to provide an answer. The estimate of internal consistency for the Communication Skills test is $r_{KR20} = 0.98$.

MAC Program Math Test

One Hundred sixty students participated in the study to estimate the reliability coefficient for the MAC Program Math Test. The MAC Math Test consists of 194 multiple choice questions measuring mastery on 77 objectives. For the Math Test, the mean raw score is 70.8 ± 24.09 and the median is 72. The raw scores range from a low of 26 to a high of 134.

An item analysis of the MAC Program Math Test is included in Appendix J. The item analysis shows that the percentage of students responding correctly ranges from a low of 3% on question 63 to a high of 85% on question 144. On 15.47% of the Math questions, more than 60% of the students responded correctly . On a high percentage of the Math questions (58.77%), students' responses were correct less than 40% of the time. On 85.57% of the Math questions, more than 10% of the students failed to respond. The estimate of the internal consistency for the Math Test is

$r_{KR20} = 0.94$. Like the Communication Skills Test, the MAC Program Math Test has an extremely high reliability estimate. Reliability is, however, a function of test length and both tests exceed 170 questions.

CHAPTER V

SUMMARY, CONCLUSIONS, DISCUSSION, AND RECOMMENDATIONS

Summary

This study examined California Achievement Test scores of 420 students selected from 1988-89 sixth grade population of 2241. The control group or non-MAC (Math and Communication Skills Program) students (N = 210) had zero years of participation in the MAC Program. The experimental group or MAC students (N = 210) consisted of students that had participated in the MAC Program for either two or three years. These two groups were used to test the following hypotheses:

$H_0 1$: There is no difference between the experimental and control groups on California Achievement Test (CAT) scores.

$H_0 2$: There is no difference between the experimental and control groups on CAT scores as a function of gender, race, or parental education level.

$H_0 3$: There is no difference between the experimental and control groups on CAT scores as a function of years of participation in the MAC Program.

This chapter is divided into four sections. The first section addresses the three hypotheses and their findings, the second section discusses conclusions, the third section presents recommendations to Gaston County, and the fourth section suggests areas for future study.

Hypothesis One

The test statistic used for $H_0 1$ was the t-test for independent means with an α level of .05 as the criterion for retention or rejection of the null hypothesis. Rejection of the null hypothesis would favor an alternate hypothesis that states there is a difference between the experimental and control groups on CAT scores. The Total Battery is the overall student score on the CAT. Examination of the Total Battery score alone would not give a complete picture of differences that may exist between the control and experimental groups. This study applied the hypotheses tests to all CAT subtests. Table 78 summarizes the hypothesis decision for each CAT subtest.

In Reading, Language, and Spelling, there is no difference between the control and experimental group means. In these areas students in the MAC Program do not outperform students not in the MAC Program. Assuming proper implementation of the MAC Program, one could further conclude that the MAC Program offers no beneficial feedback to teachers that improves instruction and thus improves CAT Reading, Language, and Spelling scores.

For Math, a different condition exists. In all areas of Math, one rejects the null hypothesis in favor the alternate hypothesis. In all cases, mean scores for control-group students are significantly higher than means for the experimental group. MAC Program students score significantly lower on Math than non-MAC students. One may conclude that the MAC Program, as it exists, does not offer the feedback necessary to improve Math scores on the CAT.

Table 78
Hypothesis Decision
Gaston County Schools Sixth Grade 1988-89
Hypothesis One

CAT Subtest	Group With Higher Score	Hypothesis Decision
Vocabulary	Non-MAC	Retain
Comprehension	Non-MAC	Retain
Total Reading	Non-MAC	Retain
Language Mechanics	Non-MAC	Retain
Language Expression	Non-MAC	Retain
Total Language	Non-MAC	Retain
Math Computation	Non-MAC	Reject
Math Concepts	Non-MAC	Reject
Total Math	Non-MAC	Reject
Spelling	Non-MAC	Retain
Total Battery	Non-MAC	Reject

In all cases, the control group mean exceeded the experimental group mean; but, only Math scores were significantly different between the two groups. The Total Battery score is a composite score for the Total Reading, Language, and Math scores. Neither the Total Reading score nor the Total Language score approaches significance. However, the magnitude of difference in the Math scores is large. One may conclude that the Math scores force the Total Battery score to be significant.

Hypothesis Two

For Hypothesis two (H_02) the researcher tested the mean CAT scores of the control and experimental groups for three independent variables: gender, race, parental education level.

Gender

Tables 79 through 81 summarize the hypothesis decisions for each independent variable. For female students (Table 79), there is no difference between the control and experimental group mean scores on Reading, Language, and Spelling. On Math Computation and Total Math, control group students outperformed the experimental (MAC) students. Finally, for the Total Battery score one would retain the null hypothesis.

Gaston County female sixth graders in the MAC Program do not outperform non-MAC female sixth graders on CAT scores. On Math Computation and Total Math subtests, Gaston County female sixth graders not in the MAC Program outperform their counterparts in the MAC Program.

For male students, one retains the null hypothesis on all Reading, Language Mechanics, and Spelling subtests (Table 80). On Language Expression and Total Language, and all Math subtests one rejects the null hypothesis in favor of the control group. Finally, for males, one rejects the null hypothesis for the alternate hypothesis favoring the control group for the Total Battery score.

Table 79
Hypothesis Decision by Gender by CAT Subtest
Gaston County Schools Sixth Grade 1988-89
Hypothesis Two

	Hypothesis Decision			
CAT Subtest	Higher Score	Females	Higher Score	Males
Vocabulary	Non-MAC	Retain	Non-MAC	Retain
Comprehension	MAC	Retain	Non-MAC	Retain
Total Reading	MAC	Retain	Non-MAC	Retain
Language Mechanics	MAC	Retain	Non-MAC	Retain
Language Expression	MAC	Retain	Non-MAC	Reject
Total Language	MAC	Retain	Non-MAC	Reject
Math Computation	Non-MAC	Reject	Non-MAC	Reject
Math Concepts	Non-MAC	Retain	Non-MAC	Reject
Total Math	Non-MAC	Reject	Non-MAC	Reject
Spelling	MAC	Retain	Non-MAC	Retain
Total Battery	Non-MAC	Retain	Non-MAC	Reject

Male sixth grade students not in the MAC Program either do as well as MAC students or significantly better than MAC students. On Reading, Spelling, and Language Mechanics non-MAC sixth grade males score equally as well as MAC sixth grade males. On Language Expression, Total Language, and all Math scores, non-MAC sixth graders significantly outperform MAC sixth graders.

Race

Table 80 presents data for the hypothesis decisions associated with the independent variable race. For each CAT subtest the hypothesis decision for both non-Caucasians and Caucasians are presented.

On every CAT subtest, one retains the null hypothesis for non-Caucasian students. For Caucasian students, one retains the null hypothesis on all Reading, Language, and Spelling subtests. On every Math subtest and on Total Battery, one rejects the null hypothesis for the alternative hypothesis favoring the control group.

Non-Caucasian sixth grade students in the MAC Program do not outperform their counterparts not in the MAC Program on any phase of the California Achievement Test. Caucasian sixth graders not in the MAC Program outperform Caucasian sixth graders in the MAC Program on all Math subtest and on Total Battery scores.

Table 80
Hypothesis Decision By Race By CAT Subtest
Gaston County School Sixth Grade 1988-89
Hypothesis Two

	Hypothesis Decision			
CAT Subtest	**Higher Score**	**Non-Caucasians**	**Higher Score**	**Caucasians**
Vocabulary	Non-MAC	Retain	Non-MAC	Retain
Comprehension	Non-MAC	Retain	Non-MAC	Retain
Total Reading	Non-MAC	Retain	Non-MAC	Retain
Language Mechanics	MAC	Retain	Non-MAC	Retain
Language Expression	Non-MAC	Retain	Non-MAC	Retain
Total Language	Non-MAC	Retain	Non-MAC	Retain
Math Computation	Non-MAC	Retain	Non-MAC	Reject
Math Concepts	Non-MAC	Retain	Non-MAC	Reject
Total Math	Non-MAC	Retain	Non-MAC	Reject
Spelling	MAC	Retain	Non-MAC	Retain
Total Battery	Non-MAC	Retain	Non-MAC	Reject

Parental Education Level

Table 81 summarizes the hypothesis decisions by parental education level and by CAT subtest. For students whose parents have less than a high school education one retains the null hypothesis for every CAT subtest except Math Computation. In the case of Math Computation, one rejects the null hypothesis in favor of the control group.

Table 81
Hypothesis Decision By Parental Education Level By CAT Subtest
Gaston County Schools Sixth Grade 1988-89
Hypothesis Two

CAT Subtest	Hypothesis Decision					
	Higher Score	< HS	Higher Score	HS	Higher Score	> HS
Vocabulary	MAC	Retain	Non-MAC	Retain	Non-MAC	Retain
Comprehension	Non-MAC	Retain	Non-MAC	Retain	MAC	Retain
Total Reading	MAC	Retain	Non-MAC	Retain	MAC	Retain
Language Mechanics	MAC	Retain	Non-MAC	Reject	MAC	Retain
Language Expression	Non-MAC	Retain	Non-MAC	Reject	MAC	Retain
Total Language	Non-MAC	Retain	Non-MAC	Reject	MAC	Retain
Math Computation	Non-MAC	Reject	Non-MAC	Reject	Non-MAC	Reject
Math Concepts	Non-MAC	Retain	Non-MAC	Reject	Non-MAC	Retain
Total Math	Non-MAC	Retain	Non-MAC	Reject	Non-MAC	Retain
Spelling	MAC	Retain	Non-MAC	Retain	MAC	Retain
Total Battery	Non-MAC	Retain	Non-MAC	Reject	Non-MAC	Retain

For students whose parents have a high school education, one retains the null hypothesis for Reading and Spelling, and rejects the null hypothesis for Language, Math, and Total Battery in favor of the control group. Non-MAC sixth grade students in this category perform at least as well as MAC students in the same category. Empirical data show that on Language, Reading, and Total Battery, non-MAC students score significantly higher than MAC students.

Students whose parents have more than a high school education have a decision pattern similar to the one for students with less than a high school education. Except for Math Computation, where one rejects the null hypothesis in favor of the control group, one retains the null hypothesis for all other CAT subtests. Sixth grade students not in the MAC Program, whose parents have either less than a high school education or more than a high school education, score as well as non-MAC sixth graders on the CAT. The only exception to this trend is on Math Computation where non-MAC students outperform MAC students significantly. Students whose parents have a high school education show significant differences in scores on most CAT subtests. Non-MAC sixth graders, whose parents have only a high school education, outperform MAC sixth graders on all Language and Math subtests of the CAT as well as the Total Battery.

Hypothesis Three

The test statistic used for hypothesis three (H_03) was the oneway analysis of variance and the Scheffé Method. Analysis for hypothesis three examined the longitudinal effect of participation in the MAC Program and scores on the CAT. The control group had zero years of participation; the experimental group is subdivided into the two years and the three years of participation groups.

Table 82 presents the hypothesis decision by CAT subtest. Rejection or retention of the null hypothesis reported in Table 82 is based on significant differences between the control (zero years of participation group) and the experimental (either the two or three years of participation groups).

In Reading, Language Mechanics, and Spelling one retains the null hypothesis because there is no difference between the performance of the control and experimental groups. For Language Expression, all Math subtests, and Total Battery, one rejects the null hypothesis for the alternate hypothesis favoring the control group.

Years of participation is not a positive factor on CAT scores. On eleven of eleven subtest scores, there is no difference between the three years group means and the zero years group means. In every case, the rejection of the null hypothesis results from differences between the two years and zero years of participation groups.

Table 82
Hypothesis Decision By CAT Subtest
Hypothesis Three

CAT Subtest	Higher Score	Hypothesis Decision
Vocabulary	MAC (3yr)	Retain
Comprehension	Non-MAC	Retain
Total Reading	MAC (3yr)	Retain
Language Mechanics	Non-MAC	Retain
Language Expression	MAC (3yr)	Reject
Total Language	Non-MAC	Reject
Math Computation	Non-MAC	Reject
Math Concepts	Non-MAC	Reject
Total Math	Non-MAC	Reject
Spelling	Non-MAC	Retain
Total Battery	Non-MAC	Reject

Summary

No empirical data support the claim that students in the experimental group (MAC Program) outperform students in the control group. At best, students in the experimental group score about as well on the CAT as students in the control group. The control group actually outperforms the experimental group (but not always significantly) on 78 of 99 CAT subtests.

On the CAT Reading and Spelling tests, the control and experimental groups score equally. Regardless of the independent variable tested (e.g., control group, experimental group, gender, race, parental education level, years of participation in the MAC Program) there is no evidence that one group outperforms the other.

On Language subtests, gender, race, parental education level, and years of participation in the MAC Program are all factors in student outcomes. Females in the control group do equally as well as females in the experimental group. Males, however, present different results. Control group males outperform experimental group males.

Race also is a factor in student outcomes. Non-Caucasian students show no difference in performance on Language subtests, while Caucasian students in the control group outperform the experimental group. Students whose parents either have less than a high school education or more than a high school education show no difference between the scores of the control and experimental groups. Control group students whose parents have only a high school education outperform their counterparts in the experimental group. Years of participation in the MAC Program also proved to be a factor in student outcomes on Language subtests. Control group students outperform students who were in the MAC Program for two years on Language subtests.

Math scores show the greatest differences. On every hypothesis test except for non-Caucasians, the control group outperforms the experimental group on Math Computation. For Total Math, control group students outperform experimental group students for all independent variables except non-Caucasians, students whose parents have less than a high school education, and students whose parents have more than a high school education.

For Total Battery scores, the control group outperforms the experimental group for every independent variable except non-Caucasians, parents with less than a high school education, and parents with more than a high school education.

Finally, results of the Sign Tests for each of the three hypotheses indicates that the control group outperformed the experimental group. Sign Test results are further evidence that the results obtained in the t-tests are not due to chance alone.

Conclusions

Several conclusions can be drawn from this study. These conclusions are discussed below.

1. The MAC Program does not help Gaston County students to score higher on the California Achievement Test in the sixth grade. On no test did the findings show that the students whose teachers use the MAC Program outperform

students whose teachers did not use the MAC Program. No factor investigated (e.g., gender, race, parental education level, and longevity) provided higher test results for MAC students. Although the literature supports measurement-driven instruction as a measure of student achievement, this study's findings are in contrast to the literature. One can conclude the MAC Program is not a positive factor on student scores on the CAT. The findings support this conclusion. In cases where significant differences were found, the differences were in favor of students who were not in the MAC Program.

2. This study indicates that a differential impact on sixth grade male students exits. This conclusion, based on empirical data, showed that control-group male students had the lowest score of either males or females in either the control or experimental groups on all CAT subtests. Experimental- group males scored significantly lower than control- group males and experimental group females on CAT subtests. One expects that an instrument used to measure student progress to be free of bias against any particular group. Male students in the MAC Program consistently scored lower than male students not in the MAC Program and significantly lower than female students in the MAC Program. No significant differences between males and

females in the control group were detected on any CAT subtests.

3. The MAC Program in its present state does not satisfy the effective school research concept of frequent monitoring nor does it satisfy the need for timely data for accountability purposes. Effective schools research calls for frequent monitoring of student progress, and superintendents need frequent data to answer accountability issues, but the MAC Program only employs a pretest-posttest format with no intermediate testing.
4. The MAC Program with its measurement-driven instruction concept takes too many decisions from the classroom teacher in a site-based management environment. The new reform in education calls for more decision making at the classroom level that affects student outcomes. Measurement-driven instruction is far too structured for site-based management because it makes most of the instructional decisions from the teacher through its prescriptive, diagnostic testing.
5. The MAC Communication Skills and MAC Math Tests are not educationally sound instruments to measure student progress. Although both MAC tests have an extremely high reliability estimate, both tests violate the concepts of good criterion-referenced tests. These violations include number of items for determination of

mastery, number of objectives tested at one time, and validity.

6. The attempt to improve tests scores through the MAC Program is a failure for Gaston County Schools. Gaston County has invested almost a million dollars and seven years in the MAC Program with very few positive results. Each year teachers take between two and two and one-half weeks of instructional time to administer the MAC pre- and posttests.

Discussion

Gaston County has invested approximately one million dollars and countless hours in the development, implementation, and maintenance of the MAC Program. For a commitment of this proportion in an educationally sound program, one would expect that Gaston County students should benefit from this project and show improvement in test scores. This clearly is not the case in this study. Results of this study show that, at best, students in the MAC Program do equally as well on the CAT as students not in the MAC Program. The cornerstones of the MAC program are two criterion referenced tests that are supposed to measure the mastery level of students. Computerized analysis of student responses on these tests provides reports for teachers that identify students' strengths and weaknesses and provides the list of the appropriate resources available to assist the teacher in preparation for instruction. This process is a diagnostic-prescriptive approach to lesson preparation with computer as the "workhouse" for locating the appropriate materials.

Neither criterion-referenced tests nor prescriptive-diagnostic approach to learning are without support in the literature. Popham and others expound the virtues of CRTs as a sound educational assessment tool. The testing trend in North Carolina is one that moves from NRTs to CRTs as the assessment tool for student performance and accountability. If the MAC program is built on sound educational principles then what explanation can one offer for the results of this study?

The researcher believes and the study supports three critical factors that may explain this paradox. These factors include: curriculum alignment, test construction, and teachers.

During the development of the MAC Program, the tests were constructed so that they addressed the objectives of the North Carolina Course of Study and, the objectives tested on the California Achievement Test. In addition, the textbooks used in Gaston County were referenced in the resource library of the MAC Program so that reports listing resources available could guide teachers to appropriate sections of textbooks for individualized or group instruction.

A phone conversation with Rod Moore, SDPI, produced evidence that no alignment between the CAT and the North Carolina Course of Study has been done since 1985. One questions whether or not the CAT is a good instrument to measure achievement toward mastery of the course of study objectives in light of the lack of alignment. With respect to textbooks, North Carolina adopts textbooks every five years and there have been two adoptions that affect the MAC Program since it was implemented with no alignment to compensate for these adoptions. In Gaston County, no scientific procedures are used to validate the textbooks against the North Carolina Course of Study other than teacher appraisal. Since the development of the MAC Program, no scientific validation studies have been conducted with the CAT, or the North Carolina textbook adoptions, or the North Carolina Course of Study. There is no empirical evidence that shows that these three educational tools are aligned. Congruence of these three entities would provide the optimum situation for effective assessment of student performance.

The second factor which affects this study is the construction of the criterion-referenced tests used in the MAC Program. Results of t-tests show that males in the control group and control group students whose parents have a high school education scored significantly higher on all CAT subtests. Some subtest results show significantly higher scores for the control group than for their counterparts in the experimental group.

These groups of students in the MAC Program are not receiving or benefiting from the kind of instruction MAC offers. No scientific study has been done on the test items on the MAC Program Math and Communication skills tests to determine the discrimination index of these items or to determine if these items may be biased in some way against a group of students. Although not tested as an hypothesis, evidence shows that male students in the MAC Program score significantly lower than female students in the MAC Program. This is not the case in the non-MAC student group. This finding raises the question of MAC tests bias. Well constructed tests should be as free as possible from any kind of bias. Empirical evidence should be available to support the test as being biased free. This evidence is not available for the MAC Tests.

Mastery levels for the MAC Program tests are set for 100% correct responses for the questions pertaining to a specific objective. Research shows that ten to thirty questions are appropriate to measure mastery for an objective. Research also shows that a good criterion referenced test should assess no more than one to two objectives at a time. The MAC tests attempts to assess over seventy objectives in one test, far exceeding the number recommended in the research and literature.

Two major factors that all tests should have empirical data to support are validity and reliability estimates. Reliability, the measure of consistency, is critical to assessment. This study established the reliability estimates of the MAC Program Communication Skills and Math Tests at r = 0.98 and 0.94, respectively. Both of these estimates are extremely high estimates of reliability. One must consider that reliability estimates are a function of test length. In that regard, both MAC Program tests exceed 170 questions and take three to four days each to administer.

Good reliability is an essential characteristic for tests. Equally important in assessment of student progress is validity which estimates how well a test measure what it is intended to measure. There is no evidence that students who take the MAC Tests, are receiving instruction based on the report provided to the teacher concerning students strengths and weaknesses that results in higher CAT scores. The reason is no validation studies have been done to validate the MAC Program with the CAT or the resources in the MAC Program library.

Finally, clearly stated in the limitations of this study are the MAC Tests. Due to the weaknesses of these tests one cannot expect them to be sound assessment instruments for student achievement.

Teachers as the third factor that affect student achievement are a key element in the success of any instructional program. Teachers influence on student outcomes is difficult to address and was not attempted in this study. An assumption of this paper was that teachers assigned to the MAC Program were using test results as tools for planning instruction. Students in the MAC Program did not out perform students not in the program. One could conclude that MAC is a deterrent to the education process, but to be sure, the researcher would need to add a study component to assess how and to what degree the teachers actually use the MAC Program.

Another factor not controlled by this study was the historical path of teachers a student had prior to the sixth grade. Although t-test on IQ scores established the groups to be of similar aptitude no attempt to control teachers or quality of instruction was made. Finally there was a group of teachers in Gaston County that had no access to an instructional management system (MAC) yet the students they taught outperformed students who had the benefit of MAC.

Recommendations For Action

This study investigates three pertinent hypotheses related to the Gaston County Instructional Management System known as the MAC Program and results of the California Achievement Test. No attempt has been made to explain why the results obtained in this study present such a paradoxical result as they do. At this point in time, a recommendation to abolish the MAC Program is not in order. The investment is simply too large to abandon the program. In light of the enormous investment by Gaston County Schools of both its fiscal and personnel resources one would expect the experimental group to outperform the control group. This clearly is not happening. At this point the researcher recommends the following to Gaston County:

1. A complete formative and summative program evaluation of the MAC Program should be conducted by an independent consultant to answer such questions as cost-benefit, teacher use of MAC, teacher satisfaction, strengths and weaknesses of the program, test/retest reliability, and then to recommend continuation or termination of the MAC Program.
2. Policy should be developed and enacted by the Board of Education that outlines procedures for developing, field testing, piloting, implementing, and evaluating new instructional programs in Gaston County thus, hopefully, preventing problems such as the MAC to be inflicted on the students of Gaston County.
3. Based only on the results of this study, which does have some weaknesses, the researcher

recommends that Gaston County discontinue use of the MAC Program if no further study shows evidence for continuing MAC.

Recommendations For Further Study

The data presented in this study brought to light some biases that may exist in the tests used in the MAC Program. Serious attempts to determine if, in fact, the tests are biased against any group of students need to be conducted before the test is administered again.

Further study on test theory should be done. The MAC Communication Skills Test and MAC Math Tests should be examined carefully with respect to modern testing theory. Objectives should be tested with at least five questions and preferably more to determine mastery rather than the one to three questions currently used. This study only examines one grade level; all grade levels need to be evaluated to determine if the findings in other grade levels are consistent with the findings of this study. Results of a summative evaluation may present additional empirical evidence that corroborates the findings of this study and recommend the final disposition of the MAC Program. Finally, the scope and sequence of the MAC objectives should be aligned with the North Carolina Course of Study and the CAT to ensure that students are being tested and instructed at the appropriate level.

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APPENDICES

APPENDIX A

GRADE 6 - COMMUNICATIONS TEST

Choose the best answer to complete the sentence.

1. Demonstrate means to show. Demonstrable means:

   a. showing itself
   b. to show a demonstration
   c. capable of being shown
   d. helping to show

2. Suppose means to guess. Presuppose means:

   a. to guess ahead of time
   b. to guess afterwards
   c. capable of being guessed
   d. a guessing game

3. Living means to be alive. Nonliving means:

   a. capable of living
   b. to be born
   c. living alone
   d. not alive

For each item below, match the underlined word to its meaning.

4. The invalid lived a tranquil life.

   a. exciting
   b. quiet
   c. active
   d. happy

5. Not having eaten breakfast, Carol was famished by lunchtime.

   a. tired
   b. happy
   c. hungry
   d. energetic

6. The sound of a whistle is shrill.

   a. soft
   b. sharp
   c. roaring
   d. subdued

Choose the correct homonym for each meaning below.

7. a brief stop

   a. paws
   b. pause

8. an officer in the army

   a. kernel
   b. colonel

APPENDIX A

9. a time of day

a. mourning b. morning

Find the synonym for the underlined word.

10. precise directions

a. lost
b. exact
c. confusing
d. written

11. correct answer

a. wrong
b. right
c. acceptable
d. ridiculous

12. demolish

a. distinguish
b. descend
c. demean
d. destroy

Find the antonym of the underlined word.

13. fragile vase

a. orderly
b. beautiful
c. brittle
d. tough

14. maximum penalty

a. most severe
b. minimum
c. shortest
d. hard

15. ridiculous

a. funny
b. scary
c. serious
d. reckless

For each item below, choose the sentence in which the underlined word has the meaning given.

16. contract: to shrink into a smaller space

a. Cold weather causes pavement to contract.
b. We signed a contract at the bank.
c. We will contract with him to build a swimming pool.

APPENDIX A

17. permit: a license

   a. Will you permit me to park here?
   b. I got my driver's permit yesterday.
   c. Mother does not permit the dog in her house.
   d. The club will permit members only.

18. wound: an injury

   a. A digital watch does not have to be wound.
   b. The ball team was wound up over the victory.
   c. The road wound around the mountain.
   d. The soldier wrapped his wound with a hankerchief.

For each item below, choose the word which contains a silent consonant.

19. a. ocean b. measure c. doubt d. believe

20. a. seventy b. alphabet c. choir d. often

21. a. tension b. column c. leopard d. garage

For each item below, choose the word which contains the schwa (ə) sound.

22. a. already b. orphan c. prefix d. aircraft

23. a. scarecrow b. drench c. laundry d. celebrate

24. a. pinto b. cafeteria c. cashier d. library

How many syllables are in each of the following words?

25. creation

   a. 3 syllables b. 6 syllables c. 2 syllables d. 4 syllables

APPENDIX A

26. inhabitants

    a. 3 syllables
    b. 4 syllables
    c. 5 syllables
    -d. 6 syllables

27. encyclopedia

    a. 3 syllables
    b. 4 syllables
    c. 5 syllables
    d. 6 syllables

In each group of words, find the word that is correctly divided into syllables.

28. a. narr ow
    b. skil let
    c. utt er
    d. kenn el

29. a. penc il
    b. bask et
    c. pic ture
    d. should er

30. a. si ren
    b. sol ar
    c. pap er
    d. hum or

Choose the root of each word below.

31. unpredictable

    a. un
    b. predict
    c. able
    d. pre

32. reusable

    a. re
    b. us
    c. use
    d. able

33. hydroelectricity

    a. hydro
    b. elect
    c. city
    d. electric

Choose the part of each word that is a prefix.

34. endanger

    a. en
    b. dan
    c. ger
    d. er

APPENDIX A

35. discontentment

a. ment
b. dis
c. con
d. content

36. ungrateful

a. grate
b. ful
c. grateful
d. un

Choose the part of each word that is a suffix.

37. returnable

a. re
b. turn
c. able
d. turnable

38. merciful

a. merci
b. merce
c. ciful
d. ful

39. enjoyment

a. en
b. joy
c. ment
d. enjoy

****

STOP

APPENDIX A

Read the paragraph below and answer the questions following it.

Many snakes have a special sense. This sense helps them find food. Mice, rabbits, and many other animals give off heat. Some snakes can feel that heat even when an animal is 5 or 10 feet away. Their special sense even picks up the heat of an animal that is hiding. The snake "knows" where the animal is even though the snake can't see it.

40. Snakes are able to use their special sense to:

    a. tell when an animal is afraid
    b. move without making any noise
    c. find animals for food

41. What is the topic sentence of the paragraph?

    a. Many snakes have a special sense.
    b. This sense helps them find food.
    c. Their special sense even picks up the heat of an animal that is hiding.

42. The special sense would not be very useful to a snake when:

    a. it is very hot
    b. it is very cold
    c. other animals are far away

43. The author's purpose for writing the paragraph is:

    a. to entertain
    b. to inform
    c. to persuade

44. The paragraph suggests that:

    a. Most snakes give off heat.
    b. Some snakes do not have the special sense.
    c. All snakes have the special sense.

APPENDIX A

Read the poem below and answer the questions following it.

Spaghetti

Spaghetti, spaghetti, all over the place,
Up to my elbows--up to my face,
Over the carpet and under the chairs,
Into the hammock and wound round the stairs,
Filling the bathtub and covering the desk,
Making the sofa a mad, mushy mess.

The party is ruined, I'm terribly worried.
The guests have all left (unless they're all buried).
I told them, "Bring presents." I said, "Throw confetti."
I guess they heard wrong
'Cause they all threw spaghetti.

Shel Silverstein

45. The main idea of the poem is:

    a. Spaghetti is good with tomato sauce.
    b. Spaghetti can be really messy.
    c. Spaghetti should be served at parties.

46. The poet wrote this poem in order to _____.

    a. make you hungry
    b. make you laugh
    c. make you want to have a party.

47. The party was ruined because _____.

    a. the poet was sick.
    b. it rained.
    c. the guests misunderstood.

48. How long do you think it took to clean up after the party?

    a. a whole day
    b. five minutes
    c. two hours

APPENDIX A

49. After the party the poet felt _____.

    a. confused
    b. upset
    c. pleased

Read the passage below and answer the questions following it.

People wear hats for many reasons. The most important reasons are for decoration, for communication, and for protection.

Hats were first worn to protect people from the weather. We still use them for that reason. In the summer, hats keep the sun's rays from peoples' eyes. In the winter, they provide warmth from the cold.

Hats protect people from getting hurt. The construction worker's "hard hat" is a good example. In some sports, such as baseball and football, players wear hats to protect themselves.

Hats can communicate things about the people who wear them. Sometimes, as in the case of a crown, they tell the rank of the person wearing the hat. We can often tell what some people do for a living by the kinds of hats they wear.

Finally, hats are worn for decoration. People choose a certain hat because they like the way it looks on them. Or they choose a particular hat because it is a fad, like the "pillbox" hats worn by women in the 1960's. And what party would be complete without party hats?

50. What is the best title for an outline of this article?
    a. "Why People Wear Hats"
    b. "Summer Hats and Winter Hats"
    c. "Communicating with Hats"
51. What is the topic sentence of the third paragraph?

    a. The construction worker's "hard hat" is a good example.
    b. Hats protect people from getting hurt.
    c. In some sports, such as baseball and football, players wear hats to protect themselves.

52. Choose the statement below that is a fact, not an opinion.

    a. All hats are beautiful.
    b. Construction workers wear "hard hats" for protection.
    c. I do not think hats keep my head warm.

APPENDIX A

53. Why did the author write this article?

    a. to inform the reader why the author wears a hat
    b. to convince the reader to wear a hat
    c. to show why different types of hats are worn

54. What is the main idea of this article?

    a. Hats provide warmth from the cold.
    b. Hats are worn for many reasons.
    c. Hats are worn for decoration.

55. Football players wear hats because _____.

    a. They might prevent injury.
    b. They look nice.
    c. They are comfortable.

Read the passage below, and answer the questions following it.

In 1483 King Edward IV of England died. He left his two sons under the protection of his younger brother Richard. Richard, a physically ugly person, immediately had the two boys locked up in the Tower of London. They were never seen again. Richard also said the boy's mother was a witch. Richard packed England's governing body, Parliament, with his friends. Then this awful tyrant got Parliament to crown him king. During his reign, he had hundreds of people murdered. Richard was killed in 1485 during the war of the Roses. Many years later, William Shakespeare wrote a play about him. Richard III was remembered by Shakespeare as the most unfair and murderous of all kings.

Questions for this passage are on the following page.

56. Name England's governing body.

    a. Congress
    b. Legislature
    c. Parliament

57. Name the king that Shakespeare wrote about as the most unfair?

    a. King Edward IV
    b. William Shakespeare
    c. Richard III

APPENDIX A

58. What is the main idea of this passage?

    a. The boys' mother wanted to be Queen.
    b. Richard got rid of the children so he could be king.
    c. Richard wanted a book written about him.

59. How soon did Richard lock the boys in the Tower after their father died?

    a. 1 year later
    b. 6 months later
    c. very soon

60. How did Richard get to be King?

    a. He was chosen by the people.
    b. He put his friends in Parliament so they could vote for him.
    c. His mother died and he inherited the throne.

61. Which of the following is an opinion?

    a. Richard was killed during the war of the Roses.
    b. Edward's wife was a witch.
    c. Parliament is England's governing body.

62. How did Shakespeare feel about Richard III?

    a. Shakespeare liked him.
    b. Shakespeare thought he was an awful tyrant.
    c. Shakespeare thought he was a fair man.

****

STOP

APPENDIX A

Read the passage below and answer the questions following it.

My teen-age sister and I wanted to drive the family car to the parade downtown, but Mom said, "No." We begged, but she would not yield, so we had to take the bus. We thought we would have a short wait. Instead, we stood for an unbelievably long time at the bus stop. When the bus finally came, the driver apologized to the dissatisfied people. "I'm sorry this bus is late," he said. "Traffic was all tied up because of an accident."

As we got off the bus, a man ran past yelling, "Jake! Stop! Please, someone grab my monkey! His collar broke!" We tried to catch the little monkey, but he soon disappeared, swallowed up in the crowd.

We were on time for the parade despite all the confusion. The parade was really exciting! The governor led the parade. Next came the mayor. The fire chief drove an antique fire engine. School bands, led by girls twirling batons, marched snappily down the street. Clowns laughed, performed tricks and tossed candy to the children. We watched in fascination as the riders performed acrobatic stunts on their horses. One of them even rode the horse while standing on his head.

After the parade we stopped to eat. We had hamburgers, french fries, and apple pie. All of a sudden, we spotted Jake, the runaway monkey. He was sitting on a trash can begging french fries from some boys. I ran to get the owner while my sister played with the monkey.

Lucky for us, the owner of the monkey was so relieved that he gave us a reward. We were twenty-five dollars richer! We were very happy!

63. Choose the best title for the story above.

    a. "Laughing Clowns"
    b. "The Bus Stop"
    c. "Our Lucky Day"

64. What is the topic sentence of the third paragraph?

    a. The fire chief drove an antique fire engine.
    b. The parade was really exciting.
    c. The governor led the parade.

65. What happened last in the story?

    a. The teenagers received a reward.
    b. The runaway monkey was caught.
    c. The horseback riders performed acrobatic stunts.

APPENDIX A

66. Which of the following best describes how the owner felt when his monkey was returned to him?

    a. disgusted
    b. angry
    c. overjoyed

67. About how much time passed during this story?

    a. one hour
    b. one afternoon
    c. one week

68. Who came in second in the parade?

    a. the governor b. the mayor c. the fire chief

69. Why did the sister play with the monkey while the storyteller went to get the owner?

    a. So the monkey wouldn't run away again
    b. So she could give him a banana
    c. So she could fix his collar

70. Which of the following is an opinion?

    a. All the school bands were very good.
    b. The governor led the parade.
    c. The teenagers received a reward.

Analogy: An analogy is a way of comparing things. Long way: Bird is to sky as fish is to water. Short way: bird:sky/fish:water. Complete the analogies below.

71. taste:tongue/hear: _____

    a. listen c. music
    b. noise d. ear

APPENDIX A

72. clock:time/thermometer: ______

    a. date
    b. temperature
    c. glass
    d. sickness

73. scales:fish/fur: ______

    a. feathers
    b. coat
    c. bird
    d. cat

Read each sentence and select the best answer to each question.

74. Johnny sat in the corner looking like a rain cloud. Johnny was _____

    a. happy
    b. sad
    c. wet
    d. dark

75. Nancy is as prickly as a porcupine if you try to be friends with her. Nancy makes people feel _____.

    a. comfortable
    b. sticky
    c. friendly
    d. uneasy

76. Tom's school work was a breeze. Tom finds his work _____.

    a. difficult
    b. good
    c. easy
    d. interesting

77. John is a bear when he gets angry. John is _____.

    a. fancy
    b. fierce
    c. fuzzy
    d. funny

Choose the word which is out of alphabetical order.

78. a. innate
    b. innards
    c. inner city
    d. inner ear

79. a. primarily
    b. primary
    c. primacy
    d. prime

APPENDIX A

80. a. South Islands
    b. Southern Yemen
    c. South Korea
    d. South Pole

Choose the word which would be found on a dictionary page on which the underlined words are the guide words.

81. <u>imperil</u> <u>important</u>

    a. importer
    b. impatient
    c. improve
    d. impolite

82. <u>brocade</u> <u>brook</u>

    a. brown
    b. bronze
    c. broad
    d. broth

83. <u>choose</u> <u>compare</u>

    a. cherry
    b. citizen
    c. court
    d. creep

Choose the respelling for the word that would best complete each sentence.

84. There was not ________ food to eat.

    a. skar′e
    b. i nuf′
    c. pə zes′ iv
    d. sum

85. She is _______ that she won the prize.

    a. hwich
    b. or′ fen
    c. kə rekt′
    d. ha′ pe

86. Did you _______ the ingredients for the recipe?

    a. men′ shən
    b. mois′ cher
    c. mezh′ ər
    d. mes′ ij

APPENDIX A

Which definition best fits the word used in the sentence?

Sad-dle (sad' l) n. 1. A padded seat. 2. A cut of meat. 3. To load down or burden.

87. My grandmother bought a <u>saddle</u> of lamb for dinner.

a. definition 1　　b. definition 2　　c. definition 3

run (run) v. 1. To move quickly. 2. To enter into an election. 3. To score in baseball. 4. To ravel hosiery.

88. He will <u>run</u> for mayor.

a. definition 1　　c. definition 3
b. definition 2　　d. definition 4

mess (mes) n. 1. An unsightly object. 2. A lack of order. 3. A group of things gathered haphazardly. 4. A ruinous state of disorder.

89. That old abandoned house is a <u>mess.</u>

a. definition 1　　c. definition 3
b. definition 2　　d. definition 4

Answer questions 90-92 by using the following index.

birds, 150, 165, 299ff, 396; doves, 299;
finches, 396; magpies, 300; penguins, 165
cedar, See trees
climate, 83
doves, See birds
fawns, 151
finches, See birds
giraffe, 79
hemlock, See trees
igloos, 139
insects, 22
irrigation, 53-63; in California, 56-60; in
Colorado, 63

90. Which page tells something about finches?

a. page 63　　c. page 396
b. page 151　　d. the index does not give the information

APPENDIX A

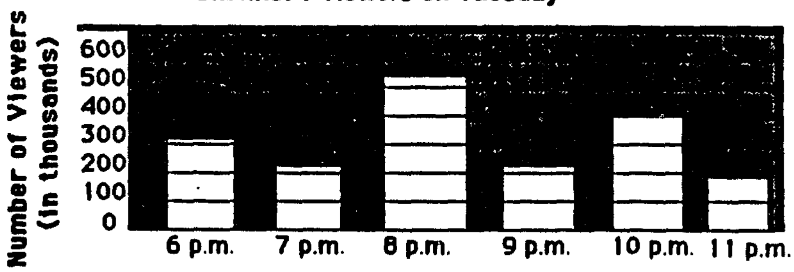
91. Which page tells something about fawns?

a. page 63
b. page 151
c. page 396
d. the index does not give the information

92. Which page tells about irrigation in Colorado?

a. page 63
b. page 151
c. page 396
d. the index does not give the information

Channel 1 Viewers on Tuesday



Answer the questions below by using the above graph.

93. At what time on Tuesdays do more people watch Channel 1?

a. 7 p.m.
b. 8 p.m.
c. 10 p.m.
d. 11 p.m.

94. How does the number of viewers compare in watching the 7 p.m. show and the 9 p.m. show on Tuesdays?

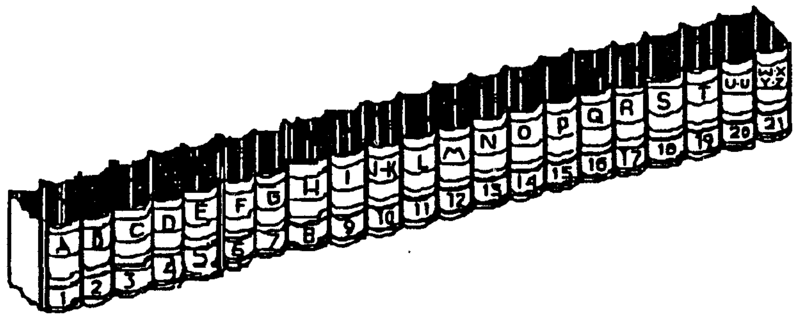
a. About the same number watch
b. There is a great difference in the two viewing times.
c. The 9 p.m. show has fewer viewers than the 7 p.m. show.
d. The 9 p.m. show has more viewers than the 7 p.m. show.

95. Which statement cannot be decided from the graph?

a. Channel 1 has fewest Tuesday night viewers at 11 p.m.
b. Approximately 325,000 viewers watch channel 1 on Tuesday at 6 p.m.
c. Most people watch Channel 1 for at least an hour on Tuesday.
d. More people watch Channel 1 at 8 p.m. on Tuesdays than watch at 9 p.m. on Tuesdays.

STOP

APPENDIX A



IN WHICH NUMBERED VOLUME COULD YOU FIND THE ANSWER TO THE FOLLOWING?

96. Who discovered penicillin?

a. 4	c. 21
b. 12	d. 15

97. Who are the winners of the Nobel Peace Prize?

a. 13	c. 21
b. 15	d. 17

98. When was Martin Luther King born?

a. 11	c. 12
b. 2	d. 10

Use the page from the telephone book to help choose the correct answers to the questions on the following page.

SOUTHERN BELL TEL & CO 515 Main

To report difficulty with a local or long distance call --Dial 0
To report a telephone out of service------------------Dial 611
Buried cable locating service------------------------Dial 611
Yellow Pages advertising service --------------------976-4011

STEPHENS See also Stevens
Stephens C M 219 Concord Road----------------------976-9556
Stephens Forrest 207 Wendover Rd-------------------976-8491
Stephens J T Sr Mrs. Hwy 29 ------------------------980-2909
Stephens Thomas F 211 Edgewood Av-----------------976-8735

STEVENS See also Stephens
Stevens Arthur H 811 Lyndale-----------------------976-0286
Stevens Elizabeth Mrs 91 Prince Dr------------------976-7866
Stevens John F 308 Hillside Dr----------------------976-1597

APPENDIX A

99. You're not sure how to spell Liz's last name. She lives on Prince Drive. Which is correct?

    a. Stephens   b. Stevens

100. If you have trouble making a long distance call, you would dial

    a. 611   c. 976-4011
    b. 0   d. 911

101. You wish to place an ad in the Yellow Pages. Which Southern Bell division would be of help?

    a. Buried cable locating service
    b. Service calls
    c. Advertising Services

CAPITALIZATION
For each item below, decide which part of the sentence, if any, needs a capital letter.

102. A famous battle | was fought | at the alamo. | None
a b c d

103. Last spring | our french class | visited the Eiffel Tower. | None
a b c d

104. Neil Armstrong flew | seventy-eight missions for the U.S. Navy |
a b
during the Korean war. | None
c d

105. Grandfather was helped | in his work | by uncle Jim. | None
a b c d

106. The largest | of the Great Lakes | is lake Superior. | None
a b c d

107. My favorite movie | of all time | is Old Yeller. | None
a b c d

108. I just finished reading | the book | A Wrinkle in Time. | None
a b c d

APPENDIX A

109. "Tim," | my mother said, | " you should clean your room." | None
a b c d

110. Mary said, | "you mustn't | do that." | None
a b c d

PUNCTUATION
Choose the item which is punctuated correctly.

111. a. San, Francisco California
b. San Francisco, California
c. San Francisco California

112. a. Saturday, February 26, 1983
b. Saturday, February, 26 1983
c. Saturday, February 26 1983

113. a. Dear Anne;
b. Dear Anne
c. Dear Anne,
d. Dear, Anne

114. a. Sincerely yours,
b. Sincerely yours;
c. Sincerely yours
d. Sincerely, yours

115. a. The basketball, team ran fast, shot well, and stayed calm.
b. The basketball team ran, fast shot, well and stayed calm.
c. The basketball team ran fast, shot well, and stayed calm.
d. The basketball team ran fast, shot well, and stayed, calm.

116. a. John collected coins, stamps, and model cars.
b. John collected, coins, stamps, and model, cars.
c. John collected coins stamps, and model cars.
d. John collected, coins, stamps and model, cars.

117. a. Maria said I have already finished that book."
b. Maria said, "I have already finished that book.
c. Maria said "I have already finished that book."
d. Maria said, "I have already finished that book."

118. a. "I have lost my favorite sweater" cried Joan.
b. "I have lost my favorite sweater," cried Joan.
c. I have lost my favorite sweater," cried Joan.
d. "I have lost my favorite sweater, cried Joan.

APPENDIX A

119. a. Okay let's go, out on the beach now.
 b. Okay, let's go, out on the beach now.
 c. Okay let's go out on the beach now.
 d. Okay, let's go out on the beach now.

120. a. If you want to go along, let me know.
 b. If you want to go along let me know.
 c. If you want, to go along, let me know.
 d. If you want, to go, along, let me know.

121. a. Mary bring, the cake with you.
 b. Mary, bring, the cake with you.
 c. Mary, bring the cake with you.
 d. Mary bring the cake with you.

122. a. The game is at the ballpark, John.
 b. The game is, at the ballpark John.
 c. The game is at the ballpark John.
 d. The, game, is at the ballpark, John.

123. a. You can buy, a flute or you, can rent one.
 b. You can buy a flute or you can rent one.
 c. You can buy a flute, or you can rent one.
 d. You, can buy a flute, or you , can rent one.

124. a. I fell asleep during the program but, I enjoyed the part I heard.
 b. I fell asleep during the program but I enjoyed, the part I heard.
 c. I fell asleep during the program, but I enjoyed the part I heard.
 d. I fell asleep, during the program but I enjoyed the part I heard.

125. a. Wilbur and Orville Wright two brothers made the first successful airplane flight.
 b. Wilbur and Orville Wright, two brothers, made the first successful airplane flight.
 c. Wilbur and Orville Wright, two brothers made the first successful, airplane flight.
 d. Wilbur, and Orville Wright, two brothers, made the first, successful, airplane flight.

126. a. Mr. Jones our teacher, gave us, an assignment.
 b. Mr. Jones our teacher gave us, an assignment.
 c. Mr. Jones, our teacher, gave us, an assignment.
 d. Mr. Jones, our teacher, gave us an assignment.

APPENDIX A

127. a. Johnson, Susan B.
     b. Johnson Susan, B.
     c. Johnson; Susan B.
     d. Johnson: Susan B.

128. a. Book: "Chocolate Fever"
     b. Play: "A Midsummer Night's Dream"
     c. Poem: "My Thumbprints"
     d. Television Program: "Webster"

129. a. Movie: "Red Dawn"
     b. Story: "Dooly and the Snortsoot"
     c. Article: <u>A European Vacation</u>
     d. Chapter: Chapter 38: <u>Library Skills</u>

130. a. 2 30: p.m.
     b. 2:30 p.m.
     c. :2 30 p.m.
     d. 2.30 p.m.

131. a. Dear Sir
     b. Dear Sir,
     c. Dear, Sir
     d. Dear Sir:

Choose the correct possessive form for each sentence.

132. ________ neighbor is very generous.

     a. Georges
     b. George's
     c. Georges'
     d. George'

133. The ________ food was put in the little dish.

     a. canary
     b. canarys
     c. canary's
     d. canarie's

Choose the word that is correctly written.

134. a. three-fourths b. three:fourths c. three/fourths

135. a. thirty/three b. ex;husband c. vice-president

Choose the underlined word which is a noun.

136. <u>Harry</u> (a) was <u>happy</u> (b) <u>when</u> (c) he met the <u>new</u> (d) girl, Sue.

137. America is <u>known</u> (a) the world <u>over</u> (b) as <u>the</u> (c) land of <u>freedom</u> (d).

****

STOP

APPENDIX A

Choose the underlined word which is a pronoun.

138. John hurt <u>himself</u> <u>when</u> <u>the</u> branch fell <u>on</u> him.
a b c d

139. <u>Sue</u> left <u>her</u> book at <u>the</u> library <u>yesterday</u>.
a b c d

Choose the complete verb that is underlined in each sentence.

140. <u>The</u> riders <u>urged</u> the <u>horse</u> <u>forward</u>.
a b c d

141. <u>This</u> <u>contest</u> <u>has attracted</u> <u>many talented</u> people.
a b c d

142. The <u>kitchen</u> <u>looked</u> <u>messy</u> <u>after</u> supper.
a b c d

Choose the underlined word which is an adjective in each sentence.

143. Shirley <u>looked</u> <u>longingly</u> at the <u>beautiful</u> <u>jacket</u>.
a b c d

144. The <u>old</u> <u>house</u> <u>looked</u> frightening in the <u>twilight.</u>
a b c d

Choose the underlined word which is an adverb in each sentence.

145. The children <u>screamed</u> <u>loudly</u> as the roller coaster <u>gathered</u> <u>speed</u>.
a b c d

146. The <u>tiny</u> mouse <u>ran</u> <u>quickly</u> back <u>into</u> its hole.
a b c d

Choose the correct plural form to complete each sentence.

147. I attended a powwow of Indian ________.

a. chief
b. chiefs
c. chieves
d. chief's

148. There were three ________ in the car.

APPENDIX A

148. There were three ________ in the car.

a. woman's
b. womans
c. women
d. womens

Choose the correct possessive form to complete each sentence.

149. Both ________ players were covered with mud.

a. teams
b. team'es
c. teams'
d. team's

150. The ________ doors opened at 12:00.

a. churches
b. churchs
c. church'es
d. church's

Choose the correct pronoun to replace the underlined word or words in each sentence.

151. <u>John</u> and his friends played a great game of baseball at the park yesterday.

a. he
b. him
c. they
d. them

152. <u>John and Jim</u> played basketball a long time.

a. he
b. him
c. they
d. them

Choose the correct form of the pronoun in each sentence.

153. ________ and Jackie read a story.

a. her
b. me
c. she
d. herself

154. Teresa and ________ are playing a game of chess.

a. I
b. me
c. us
d. them

APPENDIX A

Choose the correct verbs for the following sentences.

155. I ________ my homeword already.

a. have did
b. have done
c. done done
d. done did

156. I have already _______ to her about her work.

a. spoke
b. did speak
c. spoken
d. speaked

Choose the correct verbs for the following sentences.

157. He is a _______ student than I am.

a. best
b. more better
c. better
d. gooder

158. Sam is the _______ of the two boys.

a. taller
b. tallest
c. more taller
d. more tall

Choose the correct article in each sentence.

159. It is ______ honor to serve as your guide.

a. an
b. a

160. He has _____ pair of glases.

a. an
b. a

Choose the subject of each of the following sentences.

161. Is Mary going to join the Girl Scouts tonight?

a. Girl Scouts
b. is
c. Mary
d. tonight

162. Buy two quarts of milk at the store.

a. quarts
b. (you)
c. milk
d. store

APPENDIX A

163. Vitamins and minerals are important nutrients found in foods

a. nutrients
b. vitamins and nutrients
c. minerals
d. vitamins and minerals

Choose the sentence that is correctly stated.

164.
a. He writes with a pen.
b. Boys walks to the store.
c. Mary bake the cake.
d. My feet is cold.

165.
a. Mr. Brown, along with his students, read after lunch each day.
b. The girl in the bleachers sing in the choir.
c. The boys in the band goes on field trips.
d. Sam and Dave are friends of mine.

Choose the complete sentence.

166.
a. Built a nest
b. The squirrel built a nest for its babies.
c. The large gray squirrel.
d. Because the squirrel built a nest.

167.
a. Rotates around the sun every 365 days.
b. Since the earth is a planet.
c. Nine planets.
d. Science is the study of many things.

Choose the correctly written sentence in each group.

168.
a. New York is a large city it has many skyscrapers.
b. He is my best friend, I like him.
c. The girl running down the street is my sister.
d. Europe is a continent so is Africa.

169.
a. The Great Lakes are very large many ships enter the Great Lakes through canals.
b. Wheat is a valuable crop in the United States much wheat is sent to other countries.
c. North Carolina, our state, is located in the southern United States.
d. Geography includes studying maps, I made a map of France.

APPENDIX A

Choose the correct sentence type for each item below.

170. The old house on the corner was torn down

a. declarative
b. imperative
c. interrogative
d. exclamatory

171. How many hours a week do you practice the piano

a. declarative
b. imperative
c. interrogative
d. exclamatory

Choose the correctly written sentence in each group.

172.
a. I didn't see no birds in the sky.
b. There wasn't nothing to do on Saturday.
c. It wasn't any trouble to make plans.
d. John never does nothing right.

173.
a. The principal doesn't know all the students' names.
b. Thomas hasn't got none of that money.
c. We aren't doing nothing wrong.
d. He didn't never go to church.

****

STOP

APPENDIX B

Class Profile - Communication Skills - Grade 6

Learns Words in Basal Text (M)*
Learns Functional and Transitional Vocabulary (M)*
Learns and Applies Dolch List (M)*
Recognizes and Applies Words From a Survival Word List (Wilson's Essential Vocabulary) (M)*
Identifies Affixed Word
Chooses Match to Definition
Applies Concept of Homonym/Homophones
Applies Concept of Synonym
Applies Concept of Antonym
Applies Concept of Heteronym/Homograph
Applies the Concept of Multiple Meaning (M)*Associates Words With Feelings (M)*
Uses Picture Clues to Identify New Words or the Meanings of Sentences (M)*
Finds the Meaning of an Unfamiliar Word in Context (M)*
Knows Variant Consonant Sounds of C, S, G, & Z (M)*
Recognizes Silent Consonants
Recognizes Schwa Sound
Knows the Short Vowel Sound - A (M)*
Knows the Short Vowel Sound - E (M)*
Knows the Short Vowel Sound - I (M)*
Knows the Short Vowel Sound - O (M)*
Knows the Short Vowel Sound - U (M)*
Knows the Long Vowel Sound - A (M)*
Knows the Long Vowel Sound - E (M)*
Knows the Long Vowel Sound - I (M)*
Knows the Long Vowel Sound - O (M)*
Knows the Long Vowel Sound - U (M)*
Recognizes Consonant Digraphs in the Initial Position (M)*
Recognizes consonant digraphs in the final position (M)*
Recognizes Vowel Digraphs (M)*
Recognizes Syllables in Words
Applies Syllabication Rules
Recognizes Root Words
Recognizes Prefixes
Recognizes Suffixes
Forms Contractions Correctly
Recognizes Compound Words
Recalls Details in a Passage (M)*
Locates Facts/Details in Passage
Chooses the Sentence That Does Not Belong in a Passage (Relevant-Irrelevant) (M)*

APPENDIX B

Class Profile - Communication Skills - Grade 6 (Cont.)

Sequencing/Arranging Events
Recognizes Topic Sentence
Answers Questions About Who, What, Where, When (M)*
Answers Questions About Why, How, and Which When Stated in a Phrase or a Passage (M)*
Recognizes Descriptive Words & Phrases (M)*
Setting (M)*
Finding Main Idea
Chooses Best Title
Finds the Unstated Reason for a Character's Action (M)*
Recognizes Character's Response to an Event in a Passage (M)*
Character Analysis
Identifies Character's Point of View (I)*
Answers Question About Time
Cause and Effect (M)*
Categorizes; Classification (M)*
Determines Analogous Relationships
Draws Conclusions
Classifies a Passage as Descriptive, Narrative, Expository (I)*
Identifies Mood (M)*
Makes Inferences
Figurative Language-Simile
Figurative Language-Metaphor
Idioms (M)*
Predicting Outcomes (M)*
Recognizes Author's Purpose
Reality or Fantasy (M)*
Fact or Opinion
Making Judgements (I)*
Point of View
Alphabetizes
Uses Phonetic Key
Apply Use of Guide Words
Identify Definition in Sentence
Uses Table of Contents (M)*
Use Title Page and/or Copyright Page (M)*
Book Parts-Uses an Index
Uses a Glossary (M)*
Legend/Key (M)*
Scale of Miles (M)*
Compass Rose (Cardinal/Intermediate Directions) (M)*
Determine Parts of Speech of Entry Words (I)*
Uses Charts, Tables, Graphs
Uses and Interprets Diagrams (I)*
Interprets and Uses Time Schedules (M)*

APPENDIX B

Class Profile - Communication Skills - Grade 6 (Cont.)

Uses an Encyclopedia
Uses a Telephone Book
Uses an Almanac (I)*
Identifies and Uses Parts of a Newspaper (I)*
Uses Card Catalog (I)*
Names of Sites, Ships, Monuments, Statues, Aircraft, Brand Names, Etc. (M)*
Abbreviations/Acronyms (M)*
Organizations (M)*
Proper Nouns-Historical Events
Proper Nouns-Relatives
Proper Nouns-School Subjects
Proper Nouns-Geography
Letter Parts (M)*
Pronoun "I" (M)*
Proper Adjectives (M)*
Titles of Books, Poems
Direct Quotations
Exclamation Marks (M)*
Question Marks (M)*
End Sentences (M)*
Abbreviations (M)*
Commas-In Letter
Commas-Series
Commas-Between City/State
Commas-Direct Quotations

APPENDIX C

NUMERATION

1. Find the number word for the numeral: 760,802

   a. seven million six hundred eight thousand two
   b. seven hundred sixty thousand eight hundred two
   c. seventy-six thousand eight eight hundred two
   d. seven hundred sixty eight thousand two

2. Find the number word for the numeral: 3,858,186

   a. three million eight hundred fifty-eight thousand one hundred eighty-six
   b. thirty-eight million five hundred eighty-one thousand eighty-six
   c. three hundred fifty-eight thousand one hundred eighty-six
   d. thirty-eight million five hundred eighty-one thousand eighty-six

3. Which of the following is the same as: three hundred sixteen million one hundred one?

   a. 316,101
   b. 3,016,101
   c. 316,000,101
   d. 30,016,101

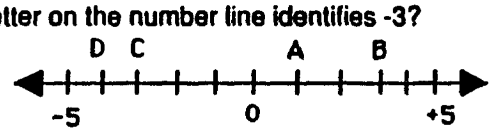
4. In which numeral is the 4 in the ten-thousands place?

   a. 29,973,461
   b. 93,946
   c. 87,640,057
   d. 34,996

5. What is the value of the underlined digit in $4{,}1\underline{6}3{,}005$?

   a. 600
   b. 6,000
   c. 60,000
   d. 600,000

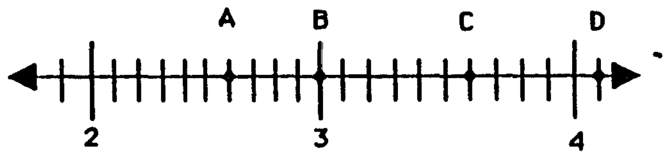
6. Which letter on the number line identifies -3?



   a. A
   b. B
   c. C
   d. D

APPENDIX C

7. Which letter on the number line identifies 3.6?



a. A   c. C
b. B   d. D

8. Which number is missing in the following pattern?

1, 4, 9, $\square$, 25

a. 15   c. 20
b. 12   d. 16

9. What number comes next in this series?

409, 405, 401, $\square$

a. 402   c. 397
b. 398   d. 400

10. Which of the following show the commutative property of addition?

a. 3 + 5 = 3 + 5   c. (3 + 4) + 5 = 3 + (5 + 4)
b. 2 + 4 = 6   d. 4 + 3 = 3 + 4

11. What number goes in the box to make the number sentence true?

5 X $\square$ = 6 X 5

a. 5   c. 1
b. 4   d. 6

12. What number goes in the box to make this number sentence true?

(10 + 15) + $\square$ =10 + (15 + 3)

a. 10   c. 3
b. 15   d. 5

APPENDIX C

13. Which of the following shows the associative property of multiplication?

    a. (5 X 10) = 5 X 10
    b. (5 X 4) X 2 = 5 X (4 X 2)
    c. (4 X 3) + 2 = 24
    d. 5 X 0 = 0

14. Which of the following shows the distributive property?

    a. (4 + 5) +3 = 4 + (5 + 3)
    b. 2 + 4 + 6 = 6 + 4 + 2
    c. 2(3 + 4) = (2 X 3) + (2 X 4)
    d. 2 X 0 = 0

15. What number goes in the box to make this number sentence true?

    4(3 + 2) = (4 X $\square$) + (4 X 2)

    a. 3
    b. 4
    c. 2
    d. 8

16. Which number will make the number sentence true?

    $\square \times \frac{3}{4} = \frac{3}{4}$

    a. 0
    b. 1
    c. $\frac{4}{3}$
    d. 4

17. Which of the following shows the identity property of addition?

    a. 4 + 0 = 0
    b. 4 + 0 = 4
    c. 0 + 3 = 0
    d. 4 + 3 = 7

Round the number to the place value named.

18. 87,643 rounded to the nearest hundred is:

    a. 87,600
    b. 90, 000
    c. 87,645
    d. 88,000

19. 3,676,499 rounded to the nearest million is:

    a. 3,700,000
    b. 4,000,000
    c. 3,680,000
    d. 3,000,000

APPENDIX C

20. Which of the following is a prime number?

a. 12 c. 6
b. 9 d. 5

21. Which of the following is a composite number?

a. 7 c. 11
b. 15 d. 13

22. What number is NOT prime in the following series?

2, 3, 5, 7, 8

a. 2 c. 7
b. 5 d. 8

23. Select the expanded form that is equivalent to the number given.

6103

a. (6 X 1000) + (1 X 10) + (3 X1) c. (6 X 1000)+ (1 X 100) + (3 X 10)
b. (6 X 1000) + (1 X 100) + (0 X 10) + (3 X 1) d. 6 X 103

24. Select the number that is equivalent to the expanded form given.

(2 X 100) + (1 X 10) + (1 X 1)

a. 211 c. 2001
b. 210 d. 222

Select the prime factorization for the following composite numbers.

25. 27

a. 3 X 9 c. 3 X 3 X 3
b. 3 X 2 X 3 d. 9 X 1 X 3

26. 40

a. 5 X 4 X 2 c. 2 X 2 X 2 X 5
b. 2 X 20 d. 5 X 8

APPENDIX C

Determine the GCF (Greatest Common Factor) of the following sets of numbers.

27. 27 and 36

a. 3
b. 6
c. 8
d. 9

28. 12 and 20

a. 6
b. 12
c. 5
d. 4

Determine the LCM (Least Common Multiple) of the following sets of numbers.

29. 2 and 5

a. 5
b. 6
c. 10
d. 2

30. 12 and 16

a. 16
b. 48
c. 36
d. 28

31. Which of the following is arranged in order, from the smallest to the largest?

a. 3014, 3004, 3041, 3124
b. 4015, 4105, 4125, 4215
c. 3401, 3140, 3160, 3010
d. 3004, 3041, 3124, 3014

32. Which of the following is arranged in order from the smallest to the largest?

a. $\frac{1}{4}, \frac{1}{2}, \frac{1}{3}, \frac{1}{5}$
b. $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}$
c. $\frac{1}{5}, \frac{1}{4}, \frac{1}{3}, \frac{1}{2}$
d. $\frac{1}{10}, \frac{1}{2}, \frac{1}{3}, \frac{1}{6}$

APPENDIX C

WHOLE NUMBERS

Add.

33. 473
759
+ 321

a. 1253
b. 1603
c. 1553
d. 1463

34. 24 + 461 + 1345 + 6 =

a. 2146
b. 1836
c. 4136
d. 3621

Subtract.

35. 9703
- 6835

a. 2968
b. 2868
c. 3968
d. 3979

36. 1425 - 1251 =

a. 2676
b. 244
c. 164
d. 174

Multiply.

37. 92 X 75 =

a. 3162
b. 6900
c. 2668
d. 6750

38. 472
X 218

a. 102,896
b. 167,661
c. 111,584
d. 98,176

Divide.

39. $32\overline{)7136}$

a. 216
b. 225
c. 223
d. 232

APPENDIX C

40. $7833 \div 20 =$

a. 391 R 13
b. 250 R 13
c. 392 R 5
d. 291

FRACTIONS

41. Which fraction is equivalent to $\frac{2}{3}$?

a. $\frac{12}{15}$
b. $\frac{5}{6}$
c. $\frac{3}{4}$
d. $\frac{10}{15}$

42. $\frac{7}{8}$ can be renamed as which fraction?

a. $\frac{21}{24}$
b. $\frac{12}{16}$
c. $\frac{2}{3}$
d. $\frac{3}{4}$

Reduce to lowest terms.

43. $\frac{6}{9}$

a. $\frac{3}{9}$
b. $\frac{2}{3}$
c. $\frac{8}{16}$
d. $\frac{3}{2}$

44. $\frac{60}{100}$

a. $\frac{6}{10}$
b. $\frac{3}{4}$
c. $\frac{3}{5}$
d. $\frac{12}{18}$

45. Change $2\frac{2}{3}$ to an improper fraction.

a. $\frac{9}{3}$
b. $\frac{7}{3}$
c. $\frac{8}{3}$
d. $\frac{6}{3}$

APPENDIX C

46. Change $5\frac{2}{3}$ to an improper fraction.

a. $\frac{16}{3}$ c. $\frac{11}{3}$

b. $\frac{18}{3}$ d. $\frac{17}{3}$

Add.

47. $\frac{2}{15} + \frac{8}{15}$

a. $\frac{2}{3}$ c. $\frac{20}{30}$

b. $\frac{10}{30}$ d. $\frac{1}{3}$

Subtract.

48. $\frac{9}{12} - \frac{2}{12}$

a. $\frac{7}{12}$ c. $\frac{11}{12}$

b. $\frac{7}{0}$ d. $\frac{9}{12}$

Add.

49. $\frac{1}{2} + \frac{3}{5} =$

a. $\frac{4}{10}$ c. $1\frac{1}{10}$

b. $2\frac{1}{10}$ d. $3\frac{1}{10}$

Subtract.

50. $\frac{3}{4} - \frac{1}{3}$

a. $\frac{5}{12}$ c. $\frac{7}{12}$

b. $\frac{2}{7}$ d. $\frac{2}{12}$

APPENDIX C

Add.

51.
$$\begin{array}{r} 4\frac{1}{3} \\ +\ 6\frac{2}{3} \\ \hline \end{array}$$

a. $6\frac{3}{3}$ c. 10

b. $10\frac{2}{3}$ d. 11

52.
$$\begin{array}{r} 4\frac{1}{2} \\ +\ 2\frac{1}{3} \\ \hline \end{array}$$

a. $6\frac{2}{5}$ c. $6\frac{1}{3}$

b. $6\frac{5}{6}$ d. $6\frac{4}{5}$

Subtract.

53.
$$\begin{array}{r} 4\frac{3}{4} \\ -\ 2\frac{1}{2} \\ \hline \end{array}$$

a. $2\frac{2}{6}$ c. $2\frac{1}{8}$

b. $2\frac{1}{6}$ d. $2\frac{1}{4}$

Subtract.

54. $7\frac{3}{5} - 3\frac{2}{10} =$

a. $4\frac{2}{5}$ c. $4\frac{1}{10}$

b. $3\frac{3}{10}$ d. $4\frac{3}{10}$

Add.

55.
$$\begin{array}{r} 6 \\ +\ 9\frac{3}{5} \\ \hline \end{array}$$

a. $15\frac{2}{5}$ c. $15\frac{7}{15}$

b. $15\frac{3}{5}$ d. $15\frac{8}{15}$

APPENDIX C

56 $9 + 3\frac{2}{3} =$

a. $11\frac{2}{3}$ c. $13\frac{1}{3}$

b. $12\frac{2}{3}$ d. $6\frac{1}{3}$

Subtract.

57.

$$\begin{array}{r} 7\frac{1}{4} \\ -\ 3\frac{3}{8} \\ \hline \end{array}$$

a. $3\frac{5}{8}$ c. $4\frac{1}{8}$

b. $3\frac{7}{8}$ d. $4\frac{1}{4}$

Subtract.

58.

$$\begin{array}{r} 6 \\ -\ 1\frac{2}{3} \\ \hline \end{array}$$

a. $5\frac{1}{3}$ c. $4\frac{1}{3}$

b. $5\frac{2}{3}$ d. $7\frac{2}{3}$

Multiply.

59. $\frac{4}{5}$ X $\frac{2}{3}$ =

a. $\frac{8}{15}$ c. $\frac{6}{15}$

b. $\frac{6}{8}$ d. $\frac{2}{5}$

60. $\frac{3}{5}$ X $\frac{1}{3}$ =

a. $\frac{3}{8}$ c. $\frac{4}{15}$

b. $\frac{1}{5}$ d. $\frac{4}{8}$

Multiply.

61.

$$\begin{array}{r} 10 \\ \times\ 3\frac{1}{5} \\ \hline \end{array}$$

a. 35 c. 32

b. $30\frac{1}{5}$ d. $31\frac{1}{5}$

APPENDIX C

Multiply.

62. $\frac{3}{4}$ of 8 =

a. 6
b. $\frac{1}{12}$
c. $\frac{1}{6}$
d. $\frac{3}{32}$

Multiply.

63. $4\frac{1}{2} \times 1\frac{1}{3} =$

a. $4\frac{1}{6}$
b. 4
c. $5\frac{1}{6}$
d. 6

64. $3\frac{3}{4} \times 2\frac{2}{3} =$

a. $6\frac{1}{2}$
b. 10
c. $6\frac{3}{4}$
d. $10\frac{3}{4}$

65. The reciprocal of $\frac{3}{2}$ is:

a. $1\frac{1}{2}$
b. $\frac{2}{3}$
c. $\frac{1}{5}$
d. $\frac{6}{3}$

66. The reciprocal of 3 is:

a. $1\frac{1}{2}$
b. $\frac{2}{3}$
c. $\frac{1}{3}$
d. $\frac{3}{3}$

Divide.

67. $\frac{5}{6} \div \frac{1}{6} =$

a. 5
b. $\frac{5}{6}$
c. 1
d. $\frac{5}{36}$

68. $\frac{3}{8} \div \frac{2}{5} =$

a. $\frac{1}{8}$
b. $\frac{3}{20}$
c. $\frac{3}{40}$
d. $\frac{15}{16}$

APPENDIX C

Divide.

69. $\frac{3}{4} + 3 =$

a. $\frac{1}{3}$ c. $\frac{1}{4}$

b. $2\frac{1}{3}$ d. $\frac{9}{13}$

Divide.

70. $4\frac{1}{2} + 2 =$

a. $8\frac{1}{2}$ c. $2\frac{1}{2}$

b. $2\frac{1}{4}$ d. $2\frac{3}{4}$

71. $3\frac{1}{3} + 1\frac{1}{5} =$

a. $1\frac{1}{5}$ c. $2\frac{7}{9}$

b. $2\frac{1}{2}$ d. $1\frac{3}{7}$

72. $7\frac{1}{2} + 2\frac{1}{3} =$

a. $3\frac{1}{3}$ c. $3\frac{3}{14}$

b. $2\frac{1}{4}$ d. $3\frac{1}{6}$

STOP

APPENDIX C

DECIMALS

73. Which digit is in the tenths place in the number **0.621?**

a. 2 c. 1
b. 8 d. 6

74. In the numeral **287.134,** which digit is in the hundredths place?

a. 1 c. 3
b. 2 d. 4

75. **4.003** is read as:

a. four and three thousandths c. forty-three tenths
b. four and three tenths d. forty-three hundredths

76. Which of the following is the same as **200.06**:

a. two hundred six c. two hundred sixty thousandths
b. two and six hundredths d. two hundred and six hundredths

77. Round **1.06** to the nearest tenth.

a. 1.6 c. 1.01
b. 1.1 d. 1.06

78. Round **1.053** to the nearest hundredth.

a. 1.06 c. 1.05
b. 1.6 d. 1.03

Add.

79.
$$\begin{array}{r} 0.847 \\ \underline{+\,0.36} \end{array}$$

a. 0.120 c. 1.207
b. 120 d. 0.48

APPENDIX C

Subtract.

80. $25.00
  -4.97

a. $21.13
b. $20.03
c. $20.13
d. $21.03

Subtract.

81. 4.9 - 3.21 =

a. 1.69
b. 1.71
c. 1.61
d. 0.79

Multiply.

82. 3.45
  X 7

a. 2.415
b. 24.25
c. 24.15
d. 2.451

83. 6.25 X 0.05 =

a. 3.125
b. 31.25
c. 0.3125
d. 32.125

84. 0.28 X 3.8 =

a. 1.064
b. 1.264
c. 1.604
d. 1.640

Divide.

85. .620 ÷ 5 =

a. 0.104
b. 14
c. .124
d. 12

86. $0.6\overline{)0.24}$

a. 0.4
b. 0.04
c. 4
d. 40

APPENDIX C

87. $0.5\overline{)25}$

a. 5
b. 50
c. 0.05
d. 0.55

88. Which of the following is equal to 0.5 ?

a. $\frac{1}{5}$
b. $\frac{3}{5}$
c. $\frac{1}{2}$
d. $\frac{2}{5}$

89. Which of the following is equal to $\frac{1}{4}$?

a. 0.40
b. 0.04
c. 0.25
d. 0.025

MEASUREMENT

90. Select the best unit to measure the distance from New York to North Carolina.

a. millimeter
b. kiloliter
c. kilometer
d. kilogram

91. Select the best unit to measure the weight of a man.

a. gram
b. liter
c. kilometer
d. kilogram

92. Select the best unit to measure the capacity of a large water tank.

a. pounds
b. feet
c. gallons
d. yards

What number goes in each box to make the sentence true?

93. 1 meter = $\square$ centimeters

a. 10
b. 100
c. 0.01
d. 1,000

APPENDIX C

What number goes in each box to make the sentence true?

94. 36 inches = □

a. 2 feet
b. 1 yard
c. 4 feet
d. 2 feet 6 inches

95. 64 ounces = □ pounds

a. 1
b. 3
c. 4
d. 5

Add or subtract (Regroup if necessary).

96. Add.

24 minutes 53 seconds
+ 19 minutes 20 seconds

a. 5 minutes 33 seconds
b. 43 minutes 13 seconds
c. 44 minutes 13 seconds
d. 50 minutes 7 seconds

97. Add.

4 yards 1 foot 5 inches
+ 1 yard 1 foot 9 inches

a. 6 yards 2 inches
b. 6 yards 4 inches
c. 5 yards 16 feet
d. 21 yards

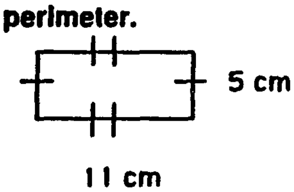
98. Subtract.

34 minutes 26 seconds
- 15 minutes 36 seconds

a. 21 minutes 26 seconds
b. 18 minutes 50 seconds
c. 19 minutes 74 seconds
d. 18 minutes 74 seconds

Find the perimeter.

99.

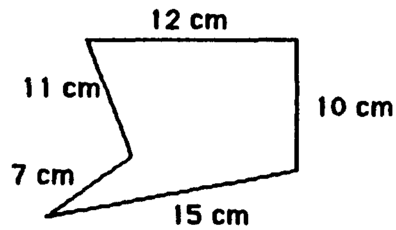


a. 32 centimeters
b. 55 centimeters
c. 16 centimeters
d. 27 centimeters

APPENDIX C

Find the perimeter.

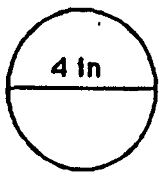
100.



a. 48 centimeters
b. 55 centimeters
c. 45 centimeters
d. 120 centimeters

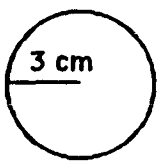
Using the formula to find the circumference. C = π d, (π = 3.14)

101.



a. 16.5 inches
b. 12.56 inches
c. 13.24 inches
d. 6.28 inches

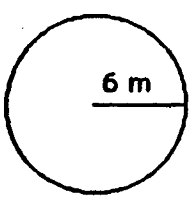
102.



a. 3.45 centimeters
b. 12.64 centimeters
c. 18.84 centimeters
d. 16.24 centimeters

Using A = π x r x r, find the area of the following circles. Use 3.14 for π.

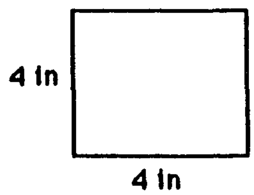
103.



a. 12.04 square meters
b. 113.04 square meters
c. 106.24 square meters
d. 112.36 square meters

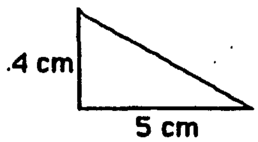
APPENDIX C

104. Using A = l X w, find the area of this square.



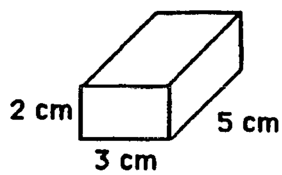
a. 8 square inches
b. 4 square inches
c. 16 square inches
d. 12 square inches

105. Using the $A = \frac{1}{2} \times b \times h$, find the area of the triangle.



a. 20 square centimeters
b. 9 square centimeters
c. 30 square centimeters
d. 10 square centimeters

106. Using the formula V = l X w X h, find the volume of the rectangular solid



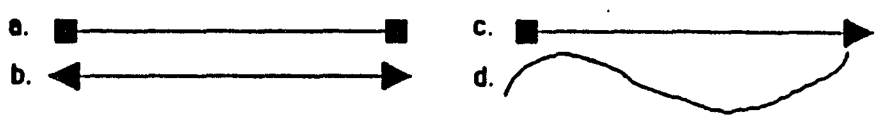
a. 10 cubic centimeters
b. 20 cubic centimeters
c. 30 cubic centimeters
d. 18 cubic centimeters

GEOMETRY

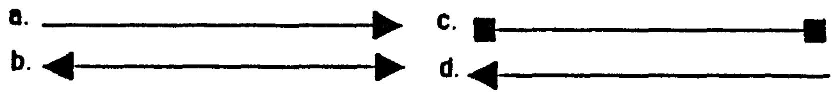
107. Which of the following is a line segment?

APPENDIX C

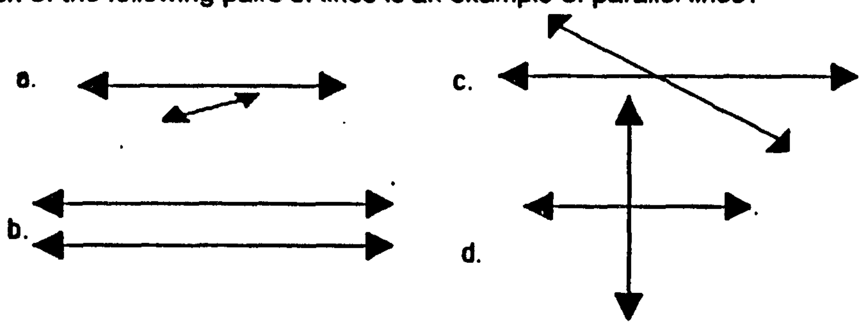
108. Which of the following is a ray?



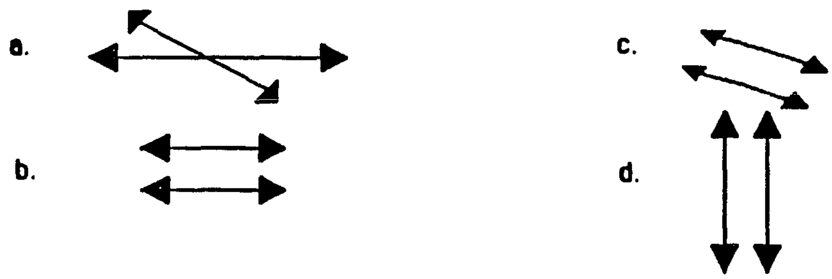
109. Which of the following is a line?



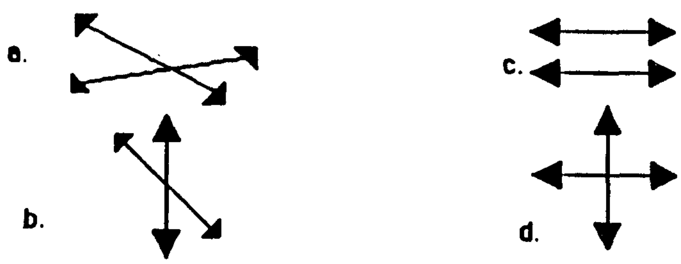
110. Which of the following pairs of lines is an example of parallel lines?



111. Which of the following pairs of lines is an example of intersecting lines?



112. Which of the following pairs of lines is an example of perpendicular lines?

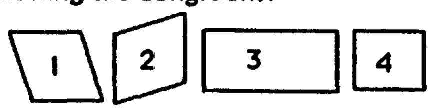


APPENDIX C

113. Which of the figures are congruent?

a. 1 and 2
b. 2 and 3
c. 1 and 3
d. 1 and

114. Which of the following are congruent?

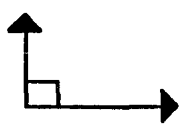


a. 1 and 3
b. 1 and 2
c. 2 and 3
d. 3 and 4

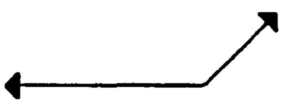
115. The angle pictured below is an example of:

a. acute angle
b. obtuse angle
c. straight angle
d. right angle

116. Choose the angle pictured below which is an example of a right angle.

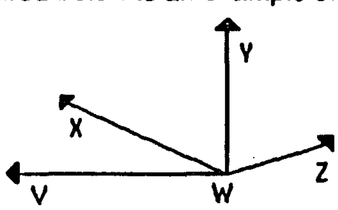
a. 

c. 

b. 

d. 

117. Which angle pictured below is an example of an obtuse angle?



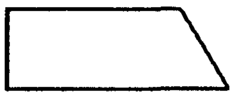
a. $\angle$ VWX
b. $\angle$ XWY
c. $\angle$ VWZ
d. $\angle$ YWZ

APPENDIX C

118. Identify the polygon.

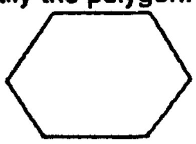
a. square
b. rectangle
c. parallelogram
d. trapezoid

119. Identify the polygon.



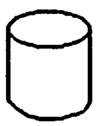
a. parallelogram
b. trapezoid
c. rectangle
d. square

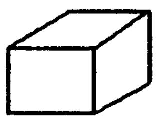
120. Identify the polygon.



a. octagon
b. rectangle
c. trapezoid
d. hexagon

121. Identify the picture of the cone.

a. 

b. 

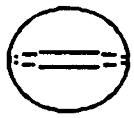
c. 

d. 

122. The solid pictured is an example of :

a. sphere
b. cylinder
c. cone
d. cube

123. The solid pictured below is an example of:



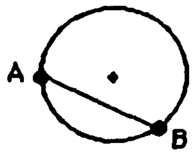
a. rectangular prism
b. cylinder
c. cone
d. sphere

STOP

APPENDIX C

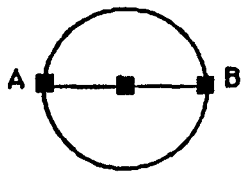
Choose the correct name for the illustrated AB.

124.



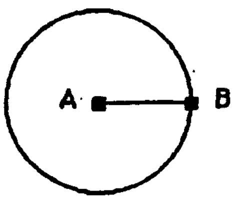
a. center
b. radius
c. diameter
d. chord

125.



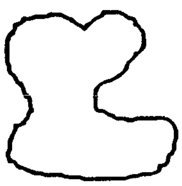
a. center
b. radius
c. diameter
d. chord

126.



a. center
b. radius
c. diameter
d. chord

127. **Identify the closed curve from the given pictures.**

a. 

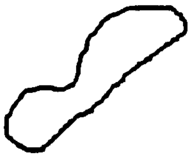
b. 

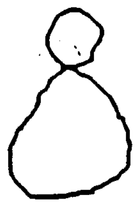
c. 

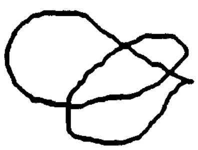
d. 

APPENDIX C

128. Which curve is not closed?

a. 

c. 

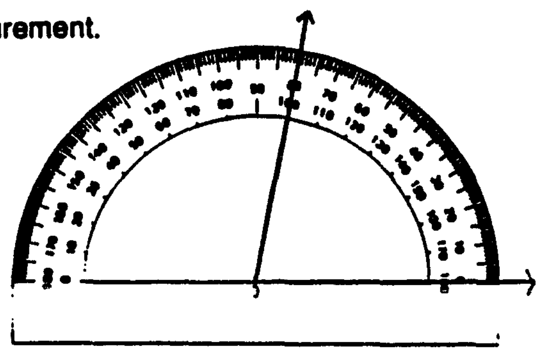
b. 

d. 

129. Which letter of the alphabet given below is a closed curve?

a. B
b. C
c. S
d. V

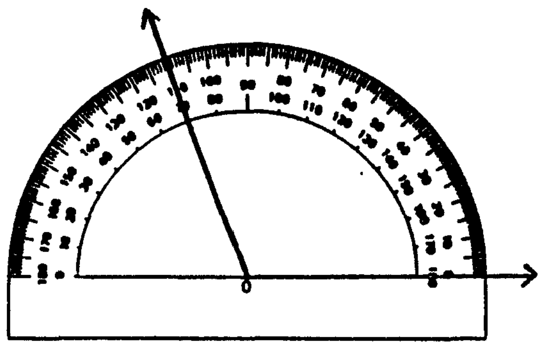
130. Choose the correct angle measurement.



a. 80°
b. 100°
c. 60°
d. 120°

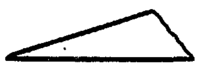
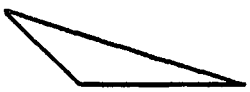
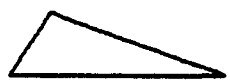
APPENDIX C

131. Choose the correct angle measurement.

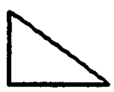
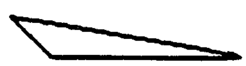


a. 110°
b. 70°
c. 125°
d. 65°

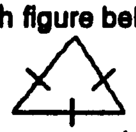
132. Which drawing shows a right triangle?

a. 
b. 
c. 
d. 

133. Which of the following geometric figures is an isosceles triangle?

a. 
b. 
c. 
d. 

134. Which figure below is an equilateral triangle?

a. 
b. 
c. 
d. 

ESTIMATION

Estimate the sums by rounding.

135. 242
+ 81

a. 400
b. 320
c. 220
d. 500

APPENDIX C

136. Estimate the difference by rounding.

700 - 496 =

a. 1200   c. 200
b. 300   d. 100

137. Estimate the sum by rounding.

$$\begin{array}{r} 8.379 \\ \underline{+\ .784} \end{array}$$

a. 8.7   c. 10.5
b. 9.2   d. 7

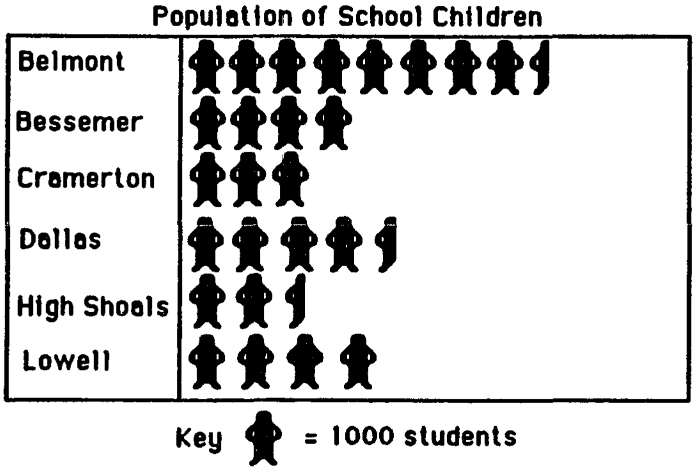
138. Estimate the difference by rounding.

$$\begin{array}{r} 36.52 \\ \underline{-15.93} \end{array}$$

a. 15   c. 20
b. 10   d. 30

GRAPHS

Population of School Children



139. Which city has the smallest number of students?

a. Lowell   c. Belmont
b. Cramerton   d. High Shoals

140. How many more students are there in Bessemer than Cramerton?

a. 1000   c. 500
b. 7000   d. 450

APPENDIX C

Candy Sale

Class	Mon.	Tues.	Wed.	Thur.	Fri.	Class Totals
A	$12	$10	$11	$34	$18	$85
B	$17	$13	$14	$15	$17	$76
C	$16	$20	$22	$20	$15	$93
Daily Totals	$45	$43	$47	$69	$50	

141. On which day was the most money raised?

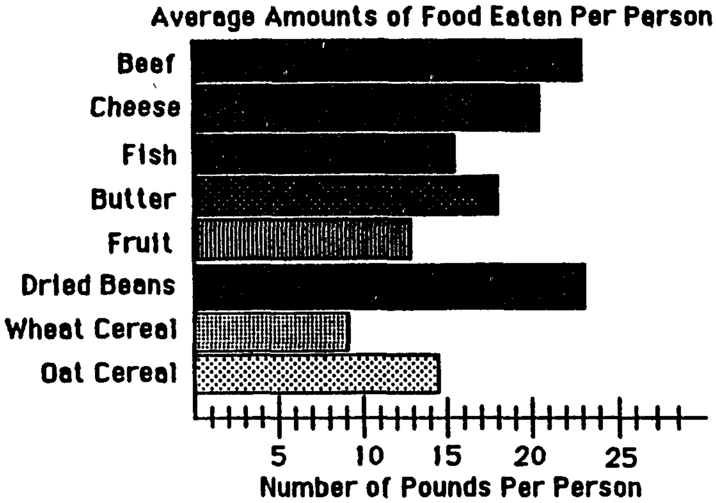
a. Monday
b. Friday
c. Thursday
d. Wednesday

142. How much money was raised in all?

a. $198
b. $239
c. $254
d. $508

APPENDIX C

Study the graph to answer questions 143-144.



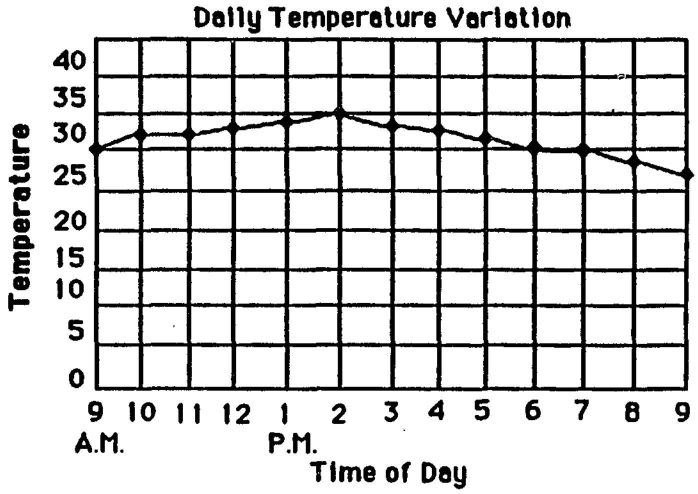
143. How many pounds of beef were eaten per person?

a. 15 pounds
b. 25 pounds
c. 23 pounds
d. 18 pounds

144. Which food was eaten least?

a. Fruit
b. Wheat cereals
c. Fish
d. Beef

APPENDIX C



145. What time of day was the temperature highest?

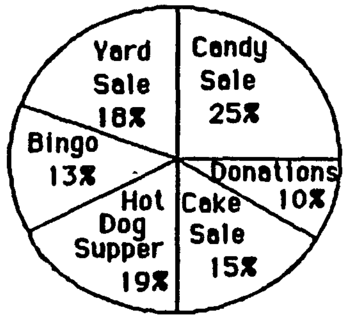
a. 3 p.m.
b. 1 p.m.
c. 2 p.m.
d. 9 a.m.

146. What is the difference in temperature from 10 A.M. to 11 A.M.?

a. 0
b. 5
c. 10
d. 15

APPENDIX C

Fund raising Activities of Boy Scouts



147. What is the sum of percents shown on the circle graph?

a. 98% c. 110%
b. 100% d. 300%

148. Which fund-raising activity raised the most money?

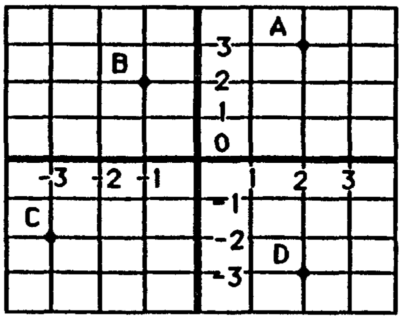
a. Cake sale c. Candy Sale
b. Hot dog supper d. Yard Sale

149. What percent of the money was from donations and the yard sale?

a. 28% c. 15%
b. 10% d. 18%

APPENDIX C

Study the grid to answer questions 16-18.



150. What are the coordinates for point B on the graph?

a. (+1, -2)
b. (-1, +2)
c. (+2, -1)
d. (+2, -2)

151. What are the coordinates for point D on the graph?

a. (-3, +2)
b. (+3, -2)
c. (-2, +3)
d. (+2, -3)

152. Find the mean of the following set of numbers:

20, 25, 40, 15

a. 40
b. 50
c. 25
d. 30

153. Find the range of the following set of numbers:

21, 28, 29, 48, 62, 75

a. 36
b. 54
c. 64
d. 48

APPENDIX C

154. Find the median of the following set of numbers:

3, 6, 9, 12, 12, 18, 21

a. 9
b. 18
c. 15
d. 12

PERCENT

155. 20% is the same as:

a. 2 out of 100
b. 20 out of 100
c. 20 out of 1000
d. 10 out of 200

156. 1% is the same as:

a. $\frac{1}{100}$
b. $\frac{10}{100}$
c. $\frac{10}{1000}$
d. $\frac{10}{200}$

157. 5% is the same as:

a. 0.5
b. 0.50
c. 0.05
d. 0.005

158. Change 20% to a fraction.

a. $\frac{1}{20}$
b. $\frac{1}{5}$
c. $\frac{2}{20}$
d. $\frac{2}{5}$

159. Change $\frac{1}{2}$ to a percent.

a. 5%
b. .5%
c. 50%
d. 2%

160. Change 30 % to a decimal.

a. 0.03
b. 0.3
c. 0.003
d. 0.030

APPENDIX C

161. Change 0.1 to a percent.

a. 1%
b. 0.01%
c. 10%
d. 0.1%

Give each ratio as a fraction in lowest terms.

162. 10 to 12

a. $\frac{5}{8}$
b. $\frac{8}{10}$
c. $\frac{5}{6}$
d. $\frac{1}{2}$

163. 8 out of 24

a. $\frac{1}{4}$
b. $\frac{1}{3}$
c. $\frac{4}{9}$
d. $\frac{1}{6}$

164. 6 : 30

a. $\frac{2}{3}$
b. $\frac{4}{5}$
c. $\frac{1}{5}$
d. $\frac{3}{5}$

Find the correct number to fill in the box.

165. $\frac{2}{3} = \frac{\square}{6}$

a. 2
b. 4
c. 1
d. 3

Find the correct number to fill in the box.

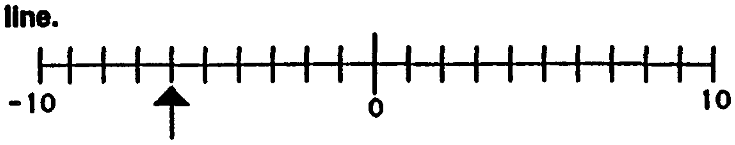
166. $\frac{\square}{4} = \frac{8}{16}$

a. 1
b. 2
c. 3
d. 4

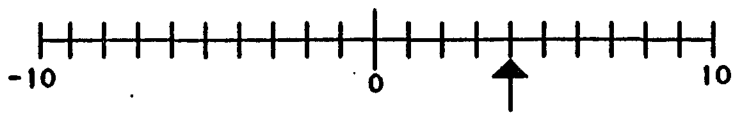
APPENDIX C

INTEGERS

Find the value of the point indicated by the arrow on each number line.

167. 

a. -2
b. 5
c. -6
d. +15

168. 

a. -6
b. +4
c. -5
d. +6

SPECIAL TOPICS

What number will make the number sentence true?

169. $2^4 = \square$

a. 8
b. 2
c. 16
d. 32

170. $10{,}000 = \square$

a. 10^3
b. 10^4
c. 10^5
d. 10^6

STOP

APPENDIX C

PROBLEM SOLVING

Read each problem carefully. Decide what information is missing. There may be no information missing.

171. Paul bought a bag of apples for $5.40. How much did each apple cost?

    a. The size of the bag
    b. How large the apples were
    c. The number of apples in the bag
    d. No information is missing

172. Jim worked in a factory 5 days a week. His gross was $200.00 a week. How much did he make each day?

    a. The name of the factory
    b. The number of days he worked
    c. The number of hours he worked
    d. No information is missing

173. Kim rode the school bus each day. The trip to school took 30 minute How far did she travel?

    a. The speed of the bus
    b. The type of school bus
    c. The number of pupils on the bus
    d. No information is missing

Read each problem carefully. Decide what information is NOT needed to work the problem. All information may be needed.

174. John weighed 90 pounds. Kathy weighed 70 pounds. Jill weighed 80 pounds. Tim weighed 85 pounds. What was their average weight?

    a. John's weight
    b. Tim's weight
    c. Kathy's weight
    d. All information is needed

175. The class sold 200 boxes of candy. They made a profit of $100.00. There were 27 children in the class. How much profit did they make on each box?

    a. The number of boxes
    b. The number of children in the class
    c. The total profit
    d. All information is needed

176. Jim bought 4 apples for $.60. The apples weighed 2 pounds. How much did he pay for each apple?

    a. The number of apples
    b. The price of all the apples
    c. The weight of the apples
    d. All information is needed

APPENDIX C

Solve the story problems.

177. Donald left for vacation on June 1st and returned on July 5th. How many days was he gone on vacation? (June has 30 days.)

a. 35 days	c. 45 days
b. 40 days	d. 25 days

178. How many hours are between 4:00 a.m. and 3:00 p.m.?

a. 10 hours	c. 15 hours
b. 11 hours	d. 20 hours

179. Dan bought $7.65 worth of merchandise. He gave the cashier a $10 bill. How much change does he get?

a. $2.35	c. $3.35
b. $3.25	d. $4.25

Solve story problems.

180. Using the formula: Distance = Rate X Time, solve. Kelly is going to Disney World. If she travels at an average speed of 50 miles per hour, how many miles can she travel in 8 hours?

a. 58 miles	c. 400 miles
b. 42 miles	d. 500 miles

181. The Jones family averaged 40 miles per hour while driving to their vacation spot. The vacation spot was 500 miles away. How long did it take them to arrive there?

a. $12\frac{1}{2}$ hours	c. 14 hours
b. $13\frac{1}{4}$ hours	d. 16 hours

182. A plane flew 1000 miles in 2 hours. What was its average speed?

a. 200 miles per hour	c. 1000 miles per hour
b. 500 miles per hour	d. 2000 miles per hour

APPENDIX C

Choose the best operation to solve the problems.

183. Three pears cost $.66. How much does 1 pear cost?

a. Addition
b. Subtraction
c. Multiplication
d. Division

184. One package weighed 7.5 pounds. Another weighed 4.6 pounds. How much heavier was the first package?

a. Addition
b. Subtraction
c. Multiplication
d. Division

185. At a price of $1.09 per gallon, how much would 5 gallons of gasoline cost?

a. Addition
b. Subtraction
c. Multiplication
d. Division

Solve the story problems.

186. James' test scores were 84, 70, 90, and 80. What was his average grade?

a. 81
b. 83
c. 84
d. 86

187. The rainfall for April measured 2.7 inches. In May it was 1.5 inches, and in June it was1.2 inches. What was the average rainfall for those three months?

a. 2.4 inches
b. 2.5 inches
c. 3.4 inches
d. 1.8 inches

188. The club has a car wash. They washed 25 cars at $1.50 each. Their supplies cost $4.00. How much profit did they make?

a. $30.00
b. $32.00
c. $33.50
d. $37.50

APPENDIX C

189. Carol bought items costing $1.50, $2.00, $.75, and $1.25. She gave the cashier a $10 bill. How much change did she receive?

a. $4.50	c. $6.50
b. $5.50	d. $7.50

Solve the story problems.

190. A bathtub measures 6 feet by 4 feet by 3 feet. What is the volume of the tub? (V = l x w x h)

a. 13 cubic feet	c. 24 cubic feet
b. 18 cubic feet	d. 72 cubic feet

191. A box weighed 80 ounces. How many pounds do 30 boxes weigh?

a. 11 pounds	c. 110 pounds
b. 150 pounds	d. 2400 pounds

192. Mr. Smith bought a car. He was given 10% off the list price of $12,000. How much was his discount?

a. $1200	c. $120
b. $1000	d. $10

193. A pair of shoes regularly priced at $60 is on sale at 20% off. What is the sale price?

a. $30	c. $48
b. $40	d. $50

194. Mary received $20.00 for her birthday. She spent 40% on records. How much did she spend on records?

a. $4.00	c. $12.00
b. $8.00	d. $16.00

STOP

Appendix D

Class Profile - Math - Grade 6

Match Whole Numbers
Recognize Place Value
Identify Even and Odd Numbers (M)*
Identify Number Line
Recognize Math Symbols <, >, = (M)*
Identify Missing Number
Identify a Set of Multiples (M)*
Regroup Numbers (Ex. 1 Thousand = 10 Hundred) (M)*
Identify Roman Numerals (M)*
Commutative Properties +, x
Associative Properties +, x
Identify Distributive Property
Identify Properties +, x
Round Whole Number
Prime/Composite Numbers
Convert Standard Numbers
Prime Factorization
Identify the GCF
Identify the LCM
Order of Whole Number
Add Using all Regrouping
Subtract Using all Regrouping
Multiply Whole Numbers
Determine Divisibility by 2, 3, 5, 9, 10 (M)*
Divide 4 Digits by 2 Digits
Identify Equivalent Fractions
Reduce Fractions to Lowest Terms
Change Improper Fraction
Add/Subtract Like Denominators
Add/Subtract Unlike Denominators
Add Mixed Numbers
Subtract Mixed Numbers
Add Mixed Number/Whole Number
Subtract Fractions
Multiply Fraction by Fraction
Multiply Fraction-Mixed Number
Multiply Mixed Number-Mixed Number
Identify Reciprocal
Divide Fraction by Fraction
Divide Fraction/Mixed Number
Divide 2 Mixed Numbers
Identify Fractional Numbers with Denominators of 10 or 100 as Decimals (M)*

APPENDIX D

Class Profile - Math - Grade 6 (Cont.)

Identify Decimal Notation
Identify Word Names
Round Decimals
Add/Subtract Decimals
Multiply 2 Decimals
Divide Decimal Numbers
Change Decimal Number
Measure Distance, Mass
Convert Equivalent Measure
Add/Subtract Mixed Measurements
Perimeter of a Polygon
Circumference/Area of a Circle
Area of a Polygon
Points, Line Segments, Rays
Parallel, Intersecting
Congruent Figures
Identify Right Angles, Angles
Recognize Polygons
Identify 3-Dimensional Shapes
Identify Parts of Circle
Identify Open/Closed Curve
Use Protractor
Classify Right, Isosceles
Classify Quadrilaterals by the Number of Congruent Sides and Congruent Angles (I)*
Estimate Sums/Differences
Estimate Sums/Differences
Interpret Pictograph Info
Chart/Table Info
Interpret Bar Graph Info
Interpret Broken Line Graphs
Interpret Circle Graph Data
Ordered Pairs on a Grid
Find Mean, Range, Median
Express % as a Ratio
Fractional Equivalence of %
Change % to a Decimal
Compare 2 Numbers as Ratios
Solve any of 3 Forms of Percent Problems (I)*
Find Missing Term of Proportion
Label Indicated Integers
Solve a Simple Linear Equation N + 10 = 15 (I)*
Raise Number to Given Power
Identify Facts-Word Problems
Identify Extraneous Facts
Clock, Calendar, Money Problems

APPENDIX D

Class Profile - Math - Grade 6 (Cont.)

Time, Distance Problems
Best Operation-Word Problems
Problems Dealing with Averages
1-2 Step Story Problems
Measurement Problems-Metric
Percent, Ratio, Proportion Problems
Solve Problems Using Discounts, Commission and Tax Rates (I)*
Solve Simple Interest Problems (I)*
Solve Problems Using Integers in Everyday Situations (I)*

Appendix E

Gaston County Schools 1988-89 Sixth Grade Sample
Distribution by Gender, Race, Parent Education Level,
Years of MAC Prior to Adjustments

Variable	N	%
Subpopulation		
Non-MAC Students	210	50.0%
MAC Students	210	50.0%
Gender		
Female	193	46.0%
Male	227	54.0%
Race		
Black	81	19.3%
White	336	80.0%
Other	3	.7%
Parental Education Level		
Eighth Grade or Less	18	4.3%
> Eighth Grade - < High School	88	21.3%
High School	135	32.6%
Some Education After High School	173	41.8%
Years of MAC Participation		
3 Yrs	107	25.5%
2 Yrs	103	24.5%
0 Yrs	210	50.0%

Appendix F

Measures of Central Tendency
Gaston County Schools 1988-89 Sixth Grade

	Subpopulation					
	Non-MAC Students			MAC Students		
Subtest	**Mode**	**Median**	**Mean**	**Mode**	**Median**	**Mean**
Vocabulary	752	735	730.71	752	732	727.85
Comprehension	753	739	736.90	775	737	733.98
Spelling	728	732	732.32	745	732	730.56
Language Mechanics	736	725	724.90	707	721	720.11
Language Expression	736	727	722.32	748	719	713.71
Math Computation	784	784	780.54	737	763	760.44
Math Concepts	766	740	735.77	752	729	723.21
Total Reading	746	739	734.07	727	736	731.17
Total Language	732	728	723.88	704	717	717.16
Total Math	748	764	758.42	741	743	742.07
Total Battery	757	743	738.64	712	734	730.01

N=210 Non-MAC Students N=210 MAC Students

Appendix G

Measures of Variablility
Gaston County Schools 1988-89 Sixth Grade

	Subpopulation					
	Non-MAC Students			MAC Students		
Subtest	**Range**	**Variance**	**Standard Deviation**	**Range**	**Variance**	**Standard Deviation**
Vocabulary	282	2302	47.98	282	1987	44.58
Comprehension	184	939	30.65	184	1070	32.71
Spelling	203	1067	32.67	166	900	29.99
Language Mechanics	245	1531	39.13	245	1126	33.56
Language Expression	339	3159	56.21	316	3346	57.84
Math Computation	283	2248	47.42	265	1468	38.32
Math Concepts	274	2083	45.64	254	1825	42.72
Total Reading	217	1407	37.51	233	1369	37.00
Total Language	253	2018	44.92	250	1826	42.73
Total Math	243	1956	44.22	245	1418	37.65
Total Battery	217	1593	39.91	204	1311	36.21

N=210 Non-MAC Students N=210 MAC Students

APPENDIX H

t-Test Results for CAT Subtests By Gender By Subpopulation
Experimental Group

CAT Subtest	N	Mean	S. D.	t-value	D.F.	*p*
Vocabulary						
Female	96	729.51	43.54	0.49	208	0.622
Male	114	726.46	45.58			
Comprehension						
Female	96	739.10	33.42	2.10	208	0.037
Male	114	729.67	31.61			
Lang. Mech.						
Female	96	728.72	35.02	3.50	208	0.001
Male	114	712.87	30.60			
Lang. Exp.						
Female	96	727.58	50.73	3.26	208	0.001
Male	114	702.03	61.02			
M. Computation						
Female	96	769.30	36.02	3.14	208	0.002
Male	114	752.98	38.75			
Math Concepts						
Female	96	725.33	39.95	0.66	208	0.511
Male	114	721.43	45.03			
Spelling						
Female	96	739.75	28.86	4.24	208	0.000
Male	114	722.82	28.83			
Total Reading						
Female	96	734.57	37.02	1.22	208	0.222
Male	114	728.31	36.89			
Total Language						
Female	96	728.38	40.67	3.59	208	0.000
Male	114	707.72	42.30			
Total Math						
Female	96	747.53	35.52	1.94	208	0.054
Male	114	737.47	38.92			
Total Battery						
Female	96	736.73	34.84	2.50	208	0.013
Male	114	724.35	36.52			

APPENDIX H

t-Test Results for CAT Subtests By Gender By Subpopulation
Control Group

CAT Subtest	N	Mean	S. D.	t-value	D.F.	*p*
Vocabulary						
Female	97	730.09	43.74	-0.17	208	0.862
Male	113	731.24	51.53			
Comprehension						
Female	97	737.65	26.19	0.33	208	0.742
Male	113	736.25	34.12			
Lang. Mech.						
Female	97	728.47	31.47	1.23	208	0.220
Male	113	721.82	44.58			
Lang. Exp.						
Female	97	727.01	46.18	1.12	208	0.264
Male	113	718.30	63.50			
M. Computation						
Female	97	783.88	42.84	0.95	208	0.346
Male	113	777.67	51.03			
Math Concepts						
Female	97	733.84	42.03	-0.57	208	0.570
Male	113	737.43	48.64			
Spelling						
Female	97	736.77	25.24	1.84	208	0.067
Male	113	728.50	37.60			
Total Reading						
Female	97	734.12	33.40	0.02	208	0.984
Male	113	734.02	40.87			
Total Language						
Female	97	728.02	36.68	1.24	208	0.217
Male	113	720.33	50.84			
Total Math						
Female	97	759.13	40.56	0.22	208	0.829
Male	113	757.81	47.31			
Total Battery						
Female	97	740.28	34.47	0.55	208	0.583
Male	113	737.24	44.15			

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 1
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
1	A	0	2	6	4	-0.1	0.744
	B*	35	26	119	74	0.2	
	C	5	6	28	18	-0.0	
	D	0	3	4	3	-0.1	
	E	0	0	0	0	0.0	
	OTH	0	3	3	2	-0.1	
2	A*	40	23	141	88	0.4	0.881
	B	0	6	6	4	-0.2	
	C	0	5	6	4	-0.1	
	D	0	0	1	1	0.0	
	E	0	0	0	0	0.0	
	OTH	0	6	6	4	-0.2	
3	A	1	17	34	21	-0.4	0.619
	B	0	3	15	9	-0.1	
	C*	39	13	99	62	0.6	
	D	0	4	8	5	-0.1	
	E	0	0	0	0	0.0	
	OTH	0	3	4	3	-0.1	
4	A	0	2	6	4	-0.1	0.719
	B	0	3	6	4	-0.1	
	C*	33	22	115	72	0.3	
	D	7	6	25	16	0.0	
	E	0	0	0	0	0.0	
	OTH	0	7	8	5	-0.2	
5	A	0	6	7	4	-0.2	0.831
	B	0	4	8	5	-0.1	
	C*	40	22	133	83	0.4	
	D	0	4	7	4	-0.1	
	E	0	0	0	0	0.0	
	OTH	0	4	5	3	-0.1	
6	A	2	0	6	4	0.1	0.494
	B	8	11	40	25	-0.1	
	C*	28	13	79	49	0.4	
	D	1	4	10	6	-0.1	
	E	0	0	0	0	0.0	
	OTH	1	12	25	16	-0.3	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 | National Computer Systems | Page: 2
Test Date.: 00/00/00 | MicroTEST Score II Plus

Item Analysis

Test Name: | Test ID: 1 | Sort: None
Instructor: All | Grade: All | Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
7	A	1	5	15	9	-0.1	0.519
	B	1	9	23	14	-0.2	
	C*	35	9	83	52	0.6	
	D	0	2	7	4	-0.1	
	E	0	0	0	0	0.0	
	OTH	3	15	32	20	-0.3	
8	A	13	11	43	27	0.1	0.287
	B	3	10	23	14	-0.2	
	C	1	6	18	11	-0.1	
	D*	14	2	46	29	0.3	
	E	0	0	0	0	0.0	
	OTH	9	11	30	19	-0.1	
9	A	0	5	10	6	-0.1	0.475
	B	5	13	40	25	-0.2	
	C*	32	9	76	48	0.6	
	D	2	5	20	13	-0.1	
	E	0	0	0	0	0.0	
	OTH	1	8	14	9	-0.2	
10	A	3	4	7	4	-0.0	0.087
	B	16	14	67	42	0.1	
	C	6	4	26	16	0.1	
	D*	3	4	14	9	-0.0	
	E	0	0	1	1	0.0	
	OTH	12	14	45	28	-0.1	
11	A	0	5	6	4	-0.1	0.725
	B	1	4	5	3	-0.1	
	C	0	7	19	12	-0.2	
	D*	39	14	116	73	0.6	
	E	0	0	1	1	0.0	
	OTH	0	10	13	8	-0.3	
12	A	1	6	10	6	-0.1	0.431
	B	3	8	31	19	-0.1	
	C*	25	10	69	43	0.4	
	D	4	6	19	12	-0.1	
	E	0	0	1	1	0.0	
	OTH	7	10	30	19	-0.1	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 3
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
13	A	3	1	12	8	0.1	0.162
	B*	8	4	26	16	0.1	
	C	2	4	9	6	-0.1	
	D	12	15	58	36	-0.1	
	E	0	0	0	0	0.0	
	OTH	15	16	55	34	-0.0	
14	A	6	3	18	11	0.1	0.131
	B	7	7	30	19	0.0	
	C*	5	5	21	13	0.0	
	D	5	7	27	17	-0.1	
	E	0	0	0	0	0.0	
	OTH	17	18	64	40	-0.0	
15	A*	16	11	58	36	0.1	0.363
	B	3	4	14	9	-0.0	
	C	10	5	39	24	0.1	
	D	1	4	7	4	-0.1	
	E	0	0	0	0	0.0	
	OTH	10	16	42	26	-0.2	
16	A	8	8	30	19	0.0	0.425
	B*	25	11	68	43	0.3	
	C	3	4	30	19	-0.0	
	D	2	5	9	6	-0.1	
	E	0	0	0	0	0.0	
	OTH	2	12	23	14	-0.3	
17	A	1	6	15	9	-0.1	0.250
	B*	11	10	40	25	0.0	
	C	1	3	8	5	-0.1	
	D	14	11	56	35	0.1	
	E	0	0	0	0	0.0	
	OTH	13	10	41	26	0.1	
18	A*	32	19	100	63	0.3	0.625
	B	2	5	23	14	-0.1	
	C	0	5	7	4	-0.1	
	D	6	6	24	15	0.0	
	E	0	0	0	0	0.0	
	OTH	0	5	6	4	-0.1	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 4
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
19	A	5	7	29	18	-0.1	0.556
	B*	28	13	89	56	0.4	
	C	1	9	16	10	-0.2	
	D	6	7	20	13	-0.0	
	E	0	0	0	0	0.0	
	OTH	0	4	6	4	-0.1	
20	A	15	8	33	21	0.2	0.262
	B	3	8	27	17	-0.1	
	C	3	2	18	11	0.0	
	D*	13	6	42	26	0.2	
	E	0	0	0	0	0.0	
	OTH	6	16	40	25	-0.3	
21	A	8	10	37	23	-0.1	0.188
	B*	9	5	30	19	0.1	
	C	5	5	22	14	0.0	
	D	6	2	17	11	0.1	
	E	0	0	0	0	0.0	
	OTH	12	18	54	34	-0.2	
22	A	5	10	27	17	-0.1	0.225
	B	3	12	27	17	-0.2	
	C	7	4	26	16	0.1	
	D*	16	1	36	23	0.4	
	E	0	0	0	0	0.0	
	OTH	9	13	44	28	-0.1	
23	A	9	11	36	23	-0.1	0.425
	B*	23	10	68	43	0.3	
	C	4	2	12	8	0.1	
	D	1	4	14	9	-0.1	
	E	0	0	0	0	0.0	
	OTH	3	13	30	19	-0.3	
24	A*	32	10	88	55	0.6	0.550
	B	3	4	18	11	-0.0	
	C	4	6	17	11	-0.1	
	D	0	3	6	4	-0.1	
	E	0	0	0	0	0.0	
	OTH	1	17	31	19	-0.4	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 5
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
25	A	21	13	73	46	0.2	0.100
	B	1	8	16	10	-0.2	
	C*	8	2	16	10	0.2	
	D	5	2	16	10	0.1	
	E	0	0	0	0	0.0	
	OTH	5	15	39	24	-0.3	
26	A	6	2	19	12	0.1	0.087
	B	16	12	50	31	0.1	
	C*	7	4	14	9	0.1	
	D	6	6	38	24	0.0	
	E	0	1	1	1	-0.0	
	OTH	5	15	38	24	-0.3	
27	A	4	11	34	21	-0.2	0.444
	B	6	3	21	13	0.1	
	C	0	4	13	8	-0.1	
	D*	29	10	71	44	0.5	
	E	0	0	0	0	0.0	
	OTH	1	12	21	13	-0.3	
28	A	6	2	18	11	0.1	0.431
	B	7	10	34	21	-0.1	
	C	1	6	16	10	-0.1	
	D*	24	10	69	43	0.3	
	E	0	0	0	0	0.0	
	OTH	2	12	23	14	-0.3	
29	A	2	3	14	9	-0.0	0.400
	B	1	1	6	4	0.0	
	C*	17	15	64	40	0.1	
	D	16	11	48	30	0.1	
	E	0	0	1	1	0.0	
	OTH	4	10	27	17	-0.2	
30	A	9	8	39	24	0.0	0.237
	B*	9	8	38	24	0.0	
	C	9	8	23	14	0.0	
	D	4	3	18	11	0.0	
	E	0	0	0	0	0.0	
	OTH	9	13	42	26	-0.1	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 6
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
31	A	0	8	12	8	-0.2	0.669
	B*	39	15	107	67	0.6	
	C	0	4	9	6	-0.1	
	D	1	6	19	12	-0.1	
	E	0	0	0	0	0.0	
	OTH	0	7	13	8	-0.2	
32	A	0	4	6	4	-0.1	0.256
	B	15	20	88	55	-0.1	
	C*	22	7	41	26	0.4	
	D	0	2	8	5	-0.1	
	E	0	0	0	0	0.0	
	OTH	3	7	17	11	-0.1	
33	A	0	4	4	3	-0.1	0.837
	B	0	5	7	4	-0.1	
	C*	38	24	134	84	0.3	
	D	2	4	11	7	-0.1	
	E	0	0	0	0	0.0	
	OTH	0	3	4	3	-0.1	
34	A	0	5	9	6	-0.1	0.831
	B*	40	25	133	83	0.4	
	C	0	1	4	3	-0.0	
	D	0	3	5	3	-0.1	
	E	0	1	1	1	-0.0	
	OTH	0	5	8	5	-0.1	
35	A	2	9	19	12	-0.2	0.706
	B*	36	17	113	71	0.5	
	C	1	5	11	7	-0.1	
	D	0	5	10	6	-0.1	
	E	1	1	3	2	0.0	
	OTH	0	3	4	3	-0.1	
36	A	0	7	16	10	-0.2	0.719
	B	1	7	13	8	-0.2	
	C	0	4	9	6	-0.1	
	D*	38	17	115	72	0.5	
	E	0	0	0	0	0.0	
	OTH	1	5	7	4	-0.1	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 7
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
37	A	0	4	5	3	-0.1	0.675
	B*	37	15	108	68	0.6	
	C	0	9	16	10	-0.2	
	D	2	7	16	10	-0.1	
	E	0	0	3	2	0.0	
	OTH	1	5	12	8	-0.1	
38	A*	31	13	93	58	0.4	0.581
	B	1	5	12	8	-0.1	
	C	1	4	13	8	-0.1	
	D	4	9	20	13	-0.1	
	E	0	0	0	0	0.0	
	OTH	3	9	22	14	-0.2	
39	A	5	7	25	16	-0.1	0.500
	B	1	4	10	6	-0.1	
	C*	31	12	80	50	0.5	
	D	2	5	16	10	-0.1	
	E	0	0	0	0	0.0	
	OTH	1	12	29	18	-0.3	
40	A*	36	12	86	54	0.6	0.538
	B	0	4	17	11	-0.1	
	C	3	8	24	15	-0.1	
	D	0	5	9	6	-0.1	
	E	1	1	2	1	0.0	
	OTH	0	10	22	14	-0.3	
41	A	10	10	32	20	0.0	0.181
	B	5	5	21	13	0.0	
	C	4	8	39	24	-0.1	
	D*	20	2	29	18	0.4	
	E	0	0	0	0	0.0	
	OTH	1	15	39	24	-0.3	
42	A*	29	10	65	41	0.5	0.406
	B	0	8	18	11	-0.2	
	C	2	1	8	5	0.0	
	D	6	3	28	18	0.1	
	E	0	0	0	0	0.0	
	OTH	3	18	41	26	-0.4	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 8
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
43	A	5	6	40	25	-0.0	0.500
	B*	32	11	80	50	0.5	
	C	2	6	8	5	-0.1	
	D	1	2	8	5	-0.0	
	E	0	0	0	0	0.0	
	OTH	0	15	24	15	-0.4	
44	A	15	10	61	38	0.1	0.237
	B	6	7	19	12	-0.0	
	C*	18	4	38	24	0.3	
	D	0	2	10	6	-0.1	
	E	0	0	0	0	0.0	
	OTH	1	17	32	20	-0.4	
45	A	2	5	12	8	-0.1	0.294
	B	10	10	36	23	0.0	
	C*	19	5	47	29	0.3	
	D	5	5	26	16	0.0	
	E	0	0	0	0	0.0	
	OTH	4	15	39	24	-0.3	
46	A	1	3	12	8	-0.1	0.250
	B	2	14	24	15	-0.3	
	C	10	6	35	22	0.1	
	D*	19	2	40	25	0.4	
	E	1	0	2	1	0.0	
	OTH	7	15	47	29	-0.2	
47	A*	19	9	39	24	0.3	0.244
	B	15	15	75	47	0.0	
	C	0	5	16	10	-0.1	
	D	0	1	3	2	-0.0	
	E	3	0	3	2	0.1	
	OTH	3	10	24	15	-0.2	
48	A*	34	10	78	49	0.6	0.488
	B	5	10	39	24	-0.1	
	C	0	7	16	10	-0.2	
	D	0	2	4	3	-0.1	
	E	0	0	0	0	0.0	
	OTH	1	11	23	14	-0.3	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 9
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
49	A	24	13	76	48	0.3	0.094
	B	1	7	19	12	-0.2	
	C*	6	4	15	9	0.1	
	D	2	2	11	7	0.0	
	E	0	1	2	1	-0.0	
	OTH	7	13	37	23	-0.2	
50	A*	6	4	19	12	0.1	0.119
	B	16	10	59	37	0.2	
	C	0	6	10	6	-0.2	
	D	9	4	26	16	0.1	
	E	1	2	3	2	-0.0	
	OTH	8	14	43	27	-0.2	
51	A	1	3	19	12	-0.1	0.213
	B	8	13	50	31	-0.1	
	C	5	10	27	17	-0.1	
	D*	23	0	34	21	0.6	
	E	0	2	2	1	-0.1	
	OTH	3	12	28	18	-0.2	
52	A	25	15	84	53	0.3	0.144
	B*	7	7	23	14	0.0	
	C	4	6	23	14	-0.1	
	D	2	1	6	4	0.0	
	E	0	0	0	0	0.0	
	OTH	2	11	24	15	-0.2	
53	A	14	6	43	27	0.2	0.206
	B	1	4	16	10	-0.1	
	C	1	9	18	11	-0.2	
	D*	16	3	33	21	0.3	
	E	3	0	3	2	0.1	
	OTH	5	18	47	29	-0.3	
54	A*	7	5	17	11	0.1	0.106
	B	1	5	19	12	-0.1	
	C	20	5	53	33	0.4	
	D	3	6	17	11	-0.1	
	E	0	0	0	0	0.0	
	OTH	9	19	54	34	-0.3	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 10
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
55	A	1	7	9	6	-0.2	0.550
	B*	33	9	88	55	0.6	
	C	1	4	13	8	-0.1	
	D	2	5	15	9	-0.1	
	E	0	0	0	0	0.0	
	OTH	3	15	35	22	-0.3	
56	A	1	4	9	6	-0.1	0.644
	B*	37	12	103	64	0.6	
	C	1	6	9	6	-0.1	
	D	0	1	6	4	-0.0	
	E	0	1	1	1	-0.0	
	OTH	1	16	32	20	-0.4	
57	A	0	4	10	6	-0.1	0.100
	B*	7	2	16	10	0.1	
	C	10	9	34	21	0.0	
	D	13	6	46	29	0.2	
	E	0	1	2	1	-0.0	
	OTH	10	18	52	33	-0.2	
58	A	3	5	16	10	-0.1	0.075
	B	24	12	79	49	0.3	
	C*	3	2	12	8	0.0	
	D	3	2	8	5	0.0	
	E	0	1	2	1	-0.0	
	OTH	7	18	43	27	-0.3	
59	A*	31	13	90	56	0.4	0.563
	B	0	3	9	6	-0.1	
	C	4	6	17	11	-0.1	
	D	1	3	9	6	-0.1	
	E	0	1	1	1	-0.0	
	OTH	4	14	34	21	-0.3	
60	A	8	2	21	13	0.2	0.194
	B*	14	7	31	19	0.2	
	C	7	9	42	26	-0.1	
	D	2	3	8	5	-0.0	
	E	1	1	2	1	0.0	
	OTH	8	18	56	35	-0.3	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 11
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
61	A	0	2	3	2	-0.1	0.056
	B	34	13	97	61	0.5	
	C*	0	4	9	6	-0.1	
	D	2	2	9	6	0.0	
	E	0	1	1	1	-0.0	
	OTH	4	18	41	26	-0.3	
62	A*	7	5	16	10	0.1	0.100
	B	2	7	22	14	-0.1	
	C	4	1	20	13	0.1	
	D	14	4	30	19	0.3	
	E	0	1	1	1	-0.0	
	OTH	13	22	71	44	-0.2	
63	A	27	8	78	49	0.5	0.031
	B	0	3	5	3	-0.1	
	C	6	11	27	17	-0.1	
	D*	1	1	5	3	0.0	
	E	0	1	1	1	-0.0	
	OTH	6	16	44	28	-0.3	
64	A	23	5	41	26	0.4	0.100
	B*	2	6	16	10	-0.1	
	C	3	4	32	20	-0.0	
	D	1	2	8	5	-0.0	
	E	0	2	2	1	-0.1	
	OTH	11	21	61	38	-0.3	
65	A	12	9	25	16	0.1	0.319
	B*	17	5	51	32	0.3	
	C	1	5	10	6	-0.1	
	D	1	1	9	6	0.0	
	E	0	1	2	1	-0.0	
	OTH	9	19	63	39	-0.3	
66	A	4	5	15	9	-0.0	0.162
	B	1	6	13	8	-0.1	
	C*	9	5	26	16	0.1	
	D	13	4	38	24	0.2	
	E	1	1	2	1	0.0	
	OTH	12	19	66	41	-0.2	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 12
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
67	A*	8	2	21	13	0.2	0.131
	B	12	11	42	26	0.0	
	C	7	5	22	14	0.1	
	D	4	6	24	15	-0.1	
	E	0	1	1	1	-0.0	
	OTH	9	15	50	31	-0.2	
68	A	10	5	30	19	0.1	0.069
	B	2	6	15	9	-0.1	
	C	9	4	34	21	0.1	
	D*	4	3	11	7	0.0	
	E	1	1	2	1	0.0	
	OTH	14	21	68	43	-0.2	
69	A	2	5	20	13	-0.1	0.237
	B	9	4	23	14	0.1	
	C*	11	8	38	24	0.1	
	D	5	0	12	8	0.1	
	E	0	2	2	1	-0.1	
	OTH	13	21	65	41	-0.2	
70	A	5	8	22	14	-0.1	0.087
	B*	3	3	14	9	0.0	
	C	16	5	51	32	0.3	
	D	3	3	11	7	0.0	
	E	0	1	1	1	-0.0	
	OTH	13	20	61	38	-0.2	
71	A	2	4	16	10	-0.1	0.119
	B	12	6	31	19	0.2	
	C*	4	3	19	12	0.0	
	D	1	5	17	11	-0.1	
	E	0	1	1	1	-0.0	
	OTH	21	21	76	48	0.0	
72	A	7	4	26	16	0.1	0.156
	B	4	5	17	11	-0.0	
	C*	3	7	25	16	-0.1	
	D	5	2	18	11	0.1	
	E	1	1	3	2	0.0	
	OTH	20	21	71	44	-0.0	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 13
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
73	A	22	13	87	54	0.2	0.188
	B	0	6	15	9	-0.2	
	C	7	4	19	12	0.1	
	D*	11	8	30	19	0.1	
	E	0	1	1	1	-0.0	
	OTH	0	8	8	5	-0.2	
74	A	22	22	96	60	0.0	0.194
	B	3	4	15	9	-0.0	
	C*	11	6	31	19	0.1	
	D	4	0	8	5	0.1	
	E	0	1	1	1	-0.0	
	OTH	0	7	9	6	-0.2	
75	A*	19	7	52	33	0.3	0.325
	B	16	11	59	37	0.1	
	C	1	6	15	9	-0.1	
	D	2	6	16	10	-0.1	
	E	0	1	1	1	-0.0	
	OTH	2	9	17	11	-0.2	
76	A	5	15	43	27	-0.3	0.363
	B	9	5	25	16	0.1	
	C	2	5	13	8	-0.1	
	D*	23	4	58	36	0.5	
	E	0	2	2	1	-0.1	
	OTH	1	9	19	12	-0.2	
77	A	6	8	33	21	-0.1	0.306
	B*	24	7	49	31	0.4	
	C	0	1	12	8	-0.0	
	D	4	6	24	15	-0.1	
	E	0	2	2	1	-0.1	
	OTH	6	16	40	25	-0.3	
78	A	5	7	24	15	-0.1	0.331
	B	3	5	15	9	-0.1	
	C*	20	9	53	33	0.3	
	D	4	3	17	11	0.0	
	E	0	1	2	1	-0.0	
	OTH	8	15	49	31	-0.2	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 | National Computer Systems | Page: 14
Test Date.: 00/00/00 | MicroTEST Score II Plus

Item Analysis

Test Name: | Test ID: 1 | Sort: None
Instructor: All | Grade: All | Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
79	A	2	5	14	9	-0.1	0.587
	B	2	2	12	8	0.0	
	C*	29	19	94	59	0.3	
	D	0	4	8	5	-0.1	
	E	0	1	1	1	-0.0	
	OTH	7	9	31	19	-0.1	
80	A	0	4	11	7	-0.1	0.550
	B*	31	11	88	55	0.5	
	C	1	6	18	11	-0.1	
	D	4	5	22	14	-0.0	
	E	1	1	2	1	0.0	
	OTH	3	13	19	12	-0.3	
81	A*	15	4	38	24	0.3	0.237
	B	14	11	53	33	0.1	
	C	0	6	13	8	-0.2	
	D	2	6	11	7	-0.1	
	E	1	0	2	1	0.0	
	OTH	8	13	43	27	-0.1	
82	A	5	9	31	19	-0.1	0.512
	B	2	5	16	10	-0.1	
	C*	30	14	82	51	0.4	
	D	1	1	8	5	0.0	
	E	0	1	1	1	-0.0	
	OTH	2	10	22	14	-0.2	
83	A	3	8	20	13	-0.1	0.119
	B	28	10	77	48	0.4	
	C*	2	5	19	12	-0.1	
	D	2	3	9	6	-0.0	
	E	0	0	0	0	0.0	
	OTH	5	14	35	22	-0.2	
84	A*	17	4	41	26	0.3	0.256
	B	2	4	16	10	-0.1	
	C	0	8	20	13	-0.2	
	D	8	5	21	13	0.1	
	E	0	0	0	0	0.0	
	OTH	13	19	62	39	-0.2	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 15
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
85	A	2	5	13	8	-0.1	0.469
	B	1	5	17	11	-0.1	
	C*	30	6	75	47	0.6	
	D	3	2	11	7	0.0	
	E	0	0	0	0	0.0	
	OTH	4	22	44	28	-0.4	
86	A*	7	4	35	22	0.1	0.219
	B	26	8	58	36	0.4	
	C	2	5	12	8	-0.1	
	D	1	2	9	6	-0.0	
	E	0	0	0	0	0.0	
	OTH	4	21	46	29	-0.4	
87	A	21	13	65	41	0.2	0.075
	B*	1	4	12	8	-0.1	
	C	12	5	35	22	0.2	
	D	2	3	11	7	-0.0	
	E	0	0	0	0	0.0	
	OTH	4	15	37	23	-0.3	
88	A	24	11	67	42	0.3	0.069
	B	0	7	13	8	-0.2	
	C*	5	1	11	7	0.1	
	D	4	3	15	9	0.0	
	E	0	1	1	1	-0.0	
	OTH	7	17	53	33	-0.3	
89	A	4	4	14	9	0.0	0.106
	B	26	9	73	46	0.4	
	C*	4	6	17	11	-0.1	
	D	0	4	7	4	-0.1	
	E	0	1	1	1	-0.0	
	OTH	6	16	48	30	-0.3	
90	A	3	6	26	16	-0.1	0.438
	B	5	6	22	14	-0.0	
	C*	29	12	70	44	0.4	
	D	0	3	13	8	-0.1	
	E	0	0	0	0	0.0	
	OTH	3	13	29	18	-0.3	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 16
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
91	A	7	4	25	16	0.1	0.287
	B	7	13	35	22	-0.2	
	C	3	5	22	14	-0.1	
	D*	20	5	46	29	0.4	
	E	0	0	0	0	0.0	
	OTH	3	13	32	20	-0.3	
92	A	2	5	15	9	-0.1	0.637
	B	0	3	6	4	-0.1	
	C*	35	14	102	64	0.5	
	D	1	3	13	8	-0.1	
	E	0	1	1	1	-0.0	
	OTH	2	14	23	14	-0.3	
93	A	10	9	42	26	0.0	0.269
	B*	15	10	43	27	0.1	
	C	1	6	14	9	-0.1	
	D	7	2	25	16	0.1	
	E	0	0	0	0	0.0	
	OTH	7	13	36	23	-0.2	
94	A	7	7	29	18	0.0	0.381
	B*	23	8	61	38	0.4	
	C	2	8	24	15	-0.2	
	D	6	6	22	14	0.0	
	E	1	0	1	1	0.0	
	OTH	1	11	23	14	-0.3	
95	A	5	7	28	18	-0.1	0.206
	B	6	5	25	16	0.0	
	C*	10	7	33	21	0.1	
	D	8	6	29	18	0.1	
	E	1	0	2	1	0.0	
	OTH	10	15	43	27	-0.1	
96	A	0	5	10	6	-0.1	0.338
	B	9	6	41	26	0.1	
	C*	22	4	54	34	0.4	
	D	3	12	21	13	-0.2	
	E	0	0	0	0	0.0	
	OTH	6	13	34	21	-0.2	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 17
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
97	A*	12	9	36	23	0.1	0.225
	B	8	5	26	16	0.1	
	C	9	6	39	24	0.1	
	D	2	2	9	6	0.0	
	E	0	0	0	0	0.0	
	OTH	9	18	50	31	-0.2	
98	A	3	5	11	7	-0.1	0.256
	B*	18	6	41	26	0.3	
	C	3	8	30	19	-0.1	
	D	3	3	17	11	0.0	
	E	1	0	1	1	0.0	
	OTH	12	18	60	38	-0.2	
99	A*	23	5	45	28	0.4	0.281
	B	6	9	22	14	-0.1	
	C	1	8	31	19	-0.2	
	D	1	2	13	8	-0.0	
	E	0	0	0	0	0.0	
	OTH	9	16	49	31	-0.2	
100	A	0	4	9	6	-0.1	0.512
	B*	30	10	82	51	0.5	
	C	0	5	14	9	-0.1	
	D	1	4	10	6	-0.1	
	E	0	0	0	0	0.0	
	OTH	9	17	45	28	-0.2	
101	A	2	4	12	8	-0.1	0.119
	B*	6	3	19	12	0.1	
	C	6	7	22	14	-0.0	
	D	5	6	26	16	-0.0	
	E	0	1	2	1	-0.0	
	OTH	21	19	79	49	0.1	
102	A	9	5	34	21	0.1	0.075
	B	4	7	22	14	-0.1	
	C*	4	4	12	8	0.0	
	D	2	3	9	6	-0.0	
	E	0	0	0	0	0.0	
	OTH	21	21	83	52	0.0	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 18
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
103	A	10	4	26	16	0.2	0.094
	B*	2	6	15	9	-0.1	
	C	0	2	16	10	-0.1	
	D	5	7	18	11	-0.1	
	E	0	0	0	0	0.0	
	OTH	23	21	85	53	0.1	
104	A	5	11	36	23	-0.2	0.344
	B	0	4	11	7	-0.1	
	C*	23	8	55	34	0.4	
	D	2	2	11	7	0.0	
	E	0	0	0	0	0.0	
	OTH	10	15	47	29	-0.1	
105	A	12	2	23	14	0.3	0.100
	B	11	8	47	29	0.1	
	C	3	9	19	12	-0.2	
	D*	1	4	16	10	-0.1	
	E	0	0	0	0	0.0	
	OTH	13	17	55	34	-0.1	
106	A	10	10	53	33	0.0	0.194
	B	3	1	13	8	0.1	
	C*	10	11	31	19	-0.0	
	D	2	2	7	4	0.0	
	E	0	0	0	0	0.0	
	OTH	15	16	56	35	-0.0	
107	A	3	4	16	10	-0.0	0.262
	B*	16	7	42	26	0.2	
	C	12	5	44	28	0.2	
	D	2	9	16	10	-0.2	
	E	0	0	0	0	0.0	
	OTH	7	15	42	26	-0.2	
108	A	3	5	23	14	-0.1	0.313
	B	0	7	23	14	-0.2	
	C*	27	6	50	31	0.5	
	D	4	8	24	15	-0.1	
	E	0	0	0	0	0.0	
	OTH	6	14	40	25	-0.2	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 19
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
109	A	5	4	20	13	0.0	0.281
	B*	18	7	45	28	0.3	
	C	11	10	41	26	0.0	
	D	1	2	13	8	-0.0	
	E	0	0	1	1	0.0	
	OTH	5	17	40	25	-0.3	
110	A	1	1	5	3	0.0	0.563
	B*	31	13	90	56	0.4	
	C	2	4	21	13	-0.1	
	D	0	7	13	8	-0.2	
	E	0	0	0	0	0.0	
	OTH	6	15	31	19	-0.2	
111	A*	27	12	77	48	0.4	0.481
	B	1	6	17	11	-0.1	
	C	2	4	20	13	-0.1	
	D	2	2	10	6	0.0	
	E	0	1	2	1	-0.0	
	OTH	8	15	34	21	-0.2	
112	A	4	5	16	10	-0.0	0.325
	B	5	6	26	16	-0.0	
	C	4	5	18	11	-0.0	
	D*	17	6	52	33	0.3	
	E	0	0	0	0	0.0	
	OTH	10	18	48	30	-0.2	
113	A	4	6	14	9	-0.1	0.481
	B	1	4	17	11	-0.1	
	C*	27	11	77	48	0.4	
	D	2	0	8	5	0.1	
	E	0	0	1	1	0.0	
	OTH	6	19	43	27	-0.3	
114	A	3	6	16	10	-0.1	0.438
	B*	29	4	70	44	0.6	
	C	0	3	9	6	-0.1	
	D	2	7	20	13	-0.1	
	E	0	0	0	0	0.0	
	OTH	6	20	45	28	-0.3	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 20
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
115	A*	19	9	49	31	0.3	0.306
	B	5	4	19	12	0.0	
	C	2	7	14	9	-0.1	
	D	9	3	33	21	0.2	
	E	0	0	1	1	0.0	
	OTH	5	17	44	28	-0.3	
116	A*	22	10	55	34	0.3	0.344
	B	4	4	20	13	0.0	
	C	2	4	16	10	-0.1	
	D	6	5	29	18	0.0	
	E	0	0	0	0	0.0	
	OTH	6	17	40	25	-0.3	
117	A	4	5	26	16	-0.0	0.219
	B	8	5	28	18	0.1	
	C*	17	3	35	22	0.3	
	D	3	6	17	11	-0.1	
	E	0	0	0	0	0.0	
	OTH	8	21	54	34	-0.3	
118	A	4	4	18	11	0.0	0.269
	B	3	9	26	16	-0.2	
	C*	17	6	43	27	0.3	
	D	10	6	32	20	0.1	
	E	0	0	0	0	0.0	
	OTH	6	15	41	26	-0.2	
119	A	12	7	44	28	0.1	0.237
	B*	15	5	38	24	0.3	
	C	3	5	19	12	-0.1	
	D	0	6	11	7	-0.2	
	E	2	0	2	1	0.1	
	OTH	8	17	46	29	-0.2	
120	A	15	9	54	34	0.2	0.306
	B	0	3	6	4	-0.1	
	C	1	7	15	9	-0.2	
	D*	18	7	49	31	0.3	
	E	0	0	2	1	0.0	
	OTH	6	14	34	21	-0.2	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 21
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
121	A	1	5	7	4	-0.1	0.800
	B	0	2	4	3	-0.1	
	C*	36	23	128	80	0.3	
	D	0	2	6	4	-0.1	
	E	0	0	0	0	0.0	
	OTH	3	8	15	9	-0.1	
122	A	2	5	22	14	-0.1	0.631
	B*	35	17	101	63	0.4	
	C	0	5	7	4	-0.1	
	D	0	2	8	5	-0.1	
	E	0	0	0	0	0.0	
	OTH	3	11	22	14	-0.2	
123	A	4	6	24	15	-0.1	0.456
	B	2	4	19	12	-0.1	
	C	0	6	12	8	-0.2	
	D*	29	11	73	46	0.4	
	E	0	0	0	0	0.0	
	OTH	5	13	32	20	-0.2	
124	A	1	6	17	11	-0.1	0.156
	B	11	4	29	18	0.2	
	C	5	5	25	16	0.0	
	D*	11	4	25	16	0.2	
	E	0	1	1	1	-0.0	
	OTH	12	20	63	39	-0.2	
125	A	17	4	51	32	0.3	0.112
	B	6	8	26	16	-0.1	
	C*	6	3	18	11	0.1	
	D	2	5	10	6	-0.1	
	E	0	0	0	0	0.0	
	OTH	9	20	55	34	-0.3	
126	A	5	7	21	13	-0.1	0.175
	B*	9	1	28	18	0.2	
	C	5	5	19	12	0.0	
	D	8	5	27	17	0.1	
	E	0	1	1	1	-0.0	
	OTH	13	21	64	40	-0.2	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 22
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
127	A*	27	13	71	44	0.3	0.444
	B	2	4	17	11	-0.1	
	C	4	3	19	12	0.0	
	D	3	2	12	8	0.0	
	E	0	1	1	1	-0.0	
	OTH	4	17	40	25	-0.3	
128	A	1	3	19	12	-0.1	0.556
	B	2	3	11	7	-0.0	
	C	1	5	8	5	-0.1	
	D*	31	12	89	56	0.5	
	E	0	1	1	1	-0.0	
	OTH	5	16	32	20	-0.3	
129	A*	28	13	91	57	0.4	0.569
	B	1	5	16	10	-0.1	
	C	4	6	17	11	-0.1	
	D	2	0	7	4	0.1	
	E	0	1	1	1	-0.0	
	OTH	5	15	28	18	-0.3	
130	A*	32	8	90	56	0.6	0.563
	B	5	11	30	19	-0.2	
	C	0	0	5	3	0.0	
	D	0	4	7	4	-0.1	
	E	0	2	2	1	-0.1	
	OTH	3	15	26	16	-0.3	
131	A*	28	11	82	51	0.4	0.512
	B	8	9	36	23	-0.0	
	C	0	2	8	5	-0.1	
	D	0	4	6	4	-0.1	
	E	0	1	1	1	-0.0	
	OTH	4	13	27	17	-0.2	
132	A	4	6	16	10	-0.1	0.381
	B	4	8	25	16	-0.1	
	C	3	4	23	14	-0.0	
	D*	24	5	61	38	0.5	
	E	0	1	1	1	-0.0	
	OTH	5	16	34	21	-0.3	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 23
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
133	A	2	4	13	8	-0.1	0.275
	B*	7	7	44	28	0.0	
	C	12	7	32	20	0.1	
	D	7	3	15	9	0.1	
	E	0	1	1	1	-0.0	
	OTH	12	18	55	34	-0.2	
134	A*	16	10	43	27	0.2	0.269
	B	1	3	11	7	-0.1	
	C	6	4	31	19	0.1	
	D	5	3	16	10	0.1	
	E	0	1	1	1	-0.0	
	OTH	12	19	58	36	-0.2	
135	A	2	6	20	13	-0.1	0.594
	B*	29	11	95	59	0.4	
	C	4	4	14	9	0.0	
	D	0	0	3	2	0.0	
	E	1	1	2	1	0.0	
	OTH	4	18	26	16	-0.3	
136	A	5	8	24	15	-0.1	0.463
	B	5	3	29	18	0.1	
	C*	29	8	74	46	0.5	
	D	0	3	7	4	-0.1	
	E	0	1	2	1	-0.0	
	OTH	1	17	24	15	-0.4	
137	A	5	5	15	9	0.0	0.313
	B*	21	3	50	31	0.4	
	C	6	5	29	18	0.0	
	D	2	5	13	8	-0.1	
	E	0	1	1	1	-0.0	
	OTH	6	21	52	33	-0.4	
138	A	4	5	16	10	-0.0	0.206
	B	4	5	18	11	-0.0	
	C*	11	3	33	21	0.2	
	D	13	5	38	24	0.2	
	E	0	1	1	1	-0.0	
	OTH	8	21	54	34	-0.3	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 24
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
139	A	0	6	7	4	-0.2	0.794
	B	1	7	13	8	-0.2	
	C	0	1	5	3	-0.0	
	D*	38	19	127	79	0.5	
	E	0	1	1	1	-0.0	
	OTH	1	6	7	4	-0.1	
140	A*	38	21	131	82	0.4	0.819
	B	1	7	11	7	-0.2	
	C	0	4	6	4	-0.1	
	D	0	3	5	3	-0.1	
	E	0	0	1	1	0.0	
	OTH	1	5	6	4	-0.1	
141	A	0	5	7	4	-0.1	0.788
	B	1	3	9	6	-0.1	
	C*	38	19	126	79	0.5	
	D	1	4	8	5	-0.1	
	E	0	2	2	1	-0.1	
	OTH	0	7	8	5	-0.2	
142	A	0	4	4	3	-0.1	0.781
	B	1	5	11	7	-0.1	
	C*	38	20	125	78	0.4	
	D	1	2	11	7	-0.0	
	E	0	1	1	1	-0.0	
	OTH	0	8	8	5	-0.2	
143	A	0	2	4	3	-0.1	0.712
	B	5	11	30	19	-0.2	
	C*	34	19	114	71	0.4	
	D	0	1	4	3	-0.0	
	E	0	1	1	1	-0.0	
	OTH	1	6	7	4	-0.1	
144	A	0	3	5	3	-0.1	0.850
	B*	40	20	136	85	0.5	
	C	0	6	7	4	-0.2	
	D	0	5	6	4	-0.1	
	E	0	1	1	1	-0.0	
	OTH	0	5	5	3	-0.1	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 25
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
145	A	0	7	8	5	-0.2	0.831
	B	0	4	4	3	-0.1	
	C*	39	18	133	83	0.5	
	D	1	2	6	4	-0.0	
	E	0	1	1	1	-0.0	
	OTH	0	8	8	5	-0.2	
146	A*	36	19	115	72	0.4	0.719
	B	4	3	13	8	0.0	
	C	0	6	10	6	-0.2	
	D	0	2	9	6	-0.1	
	E	0	1	2	1	-0.0	
	OTH	0	9	11	7	-0.2	
147	A	4	3	23	14	0.0	0.594
	B*	31	14	95	59	0.4	
	C	4	6	17	11	-0.1	
	D	0	0	4	3	0.0	
	E	0	1	1	1	-0.0	
	OTH	1	16	20	13	-0.4	
148	A	4	3	11	7	0.0	0.762
	B	1	4	11	7	-0.1	
	C*	35	19	122	76	0.4	
	D	0	2	4	3	-0.1	
	E	0	1	1	1	-0.0	
	OTH	0	11	11	7	-0.3	
149	A*	21	10	58	36	0.3	0.363
	B	9	7	30	19	0.1	
	C	0	3	7	4	-0.1	
	D	10	8	49	31	0.1	
	E	0	1	1	1	-0.0	
	OTH	0	11	15	9	-0.3	
150	A	4	9	21	13	-0.1	0.225
	B*	17	3	36	23	0.3	
	C	7	2	22	14	0.1	
	D	2	3	17	11	-0.0	
	E	0	0	1	1	0.0	
	OTH	10	23	63	39	-0.3	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 26
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
151	A	18	9	44	28	0.2	0.106
	B	3	4	19	12	-0.0	
	C	2	1	16	10	0.0	
	D*	5	1	17	11	0.1	
	E	0	2	2	1	-0.1	
	OTH	12	23	62	39	-0.3	
152	A	2	4	18	11	-0.1	0.150
	B	3	2	15	9	0.0	
	C*	8	7	24	15	0.0	
	D	5	2	22	14	0.1	
	E	0	1	2	1	-0.0	
	OTH	22	24	79	49	-0.1	
153	A	10	4	23	14	0.2	0.156
	B*	5	4	25	16	0.0	
	C	1	5	16	10	-0.1	
	D	2	4	17	11	-0.1	
	E	0	1	1	1	-0.0	
	OTH	22	22	78	49	0.0	
154	A	2	7	13	8	-0.1	0.181
	B	3	4	20	13	-0.0	
	C	8	4	32	20	0.1	
	D*	9	3	29	18	0.2	
	E	0	1	1	1	-0.0	
	OTH	18	21	65	41	-0.1	
155	A	4	5	16	10	-0.0	0.519
	B*	27	8	83	52	0.5	
	C	4	1	9	6	0.1	
	D	2	5	13	8	-0.1	
	E	0	1	1	1	-0.0	
	OTH	3	20	38	24	-0.4	
156	A*	34	7	86	54	0.7	0.538
	B	2	5	14	9	-0.1	
	C	0	6	14	9	-0.2	
	D	2	0	6	4	0.1	
	E	0	2	2	1	-0.1	
	OTH	2	20	38	24	-0.4	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 27
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
157	A	23	8	62	39	0.4	0.225
	B	0	4	10	6	-0.1	
	C*	10	8	36	23	0.1	
	D	6	0	11	7	0.2	
	E	0	2	3	2	-0.1	
	OTH	1	18	38	24	-0.4	
158	A	21	6	58	36	0.4	0.100
	B*	4	5	16	10	-0.0	
	C	7	3	22	14	0.1	
	D	2	3	13	8	-0.0	
	E	1	1	2	1	0.0	
	OTH	5	22	49	31	-0.4	
159	A	3	7	14	9	-0.1	0.250
	B	5	1	9	6	0.1	
	C*	21	1	40	25	0.5	
	D	10	8	50	31	0.1	
	E	0	2	3	2	-0.1	
	OTH	1	21	44	28	-0.5	
160	A	6	5	21	13	0.0	0.162
	B*	4	8	26	16	-0.1	
	C	0	2	8	5	-0.1	
	D	26	4	60	38	0.6	
	E	0	2	2	1	-0.1	
	OTH	4	19	43	27	-0.4	
161	A	23	9	66	41	0.3	0.138
	B	4	2	12	8	0.1	
	C*	7	6	22	14	0.0	
	D	3	6	21	13	-0.1	
	E	0	0	0	0	0.0	
	OTH	3	17	39	24	-0.3	
162	A	2	4	10	6	-0.1	0.287
	B	4	8	25	16	-0.1	
	C*	22	3	46	29	0.5	
	D	3	4	23	14	-0.0	
	E	0	1	1	1	-0.0	
	OTH	9	20	55	34	-0.3	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 28
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
163	A	5	3	12	8	0.1	0.300
	B*	19	8	48	30	0.3	
	C	2	3	26	16	-0.0	
	D	2	5	13	8	-0.1	
	E	0	1	2	1	-0.0	
	OTH	12	20	59	37	-0.2	
164	A	2	9	23	14	-0.2	0.206
	B	3	1	15	9	0.1	
	C*	16	2	33	21	0.3	
	D	3	3	20	13	0.0	
	E	0	1	1	1	-0.0	
	OTH	16	24	68	43	-0.2	
165	A	2	2	12	8	0.0	0.369
	B*	23	5	59	37	0.4	
	C	7	6	33	21	0.0	
	D	3	6	20	13	-0.1	
	E	0	1	1	1	-0.0	
	OTH	5	20	35	22	-0.4	
166	A	0	6	11	7	-0.2	0.419
	B*	25	8	67	42	0.4	
	C	2	1	10	6	0.0	
	D	8	4	36	23	0.1	
	E	0	1	1	1	-0.0	
	OTH	5	20	35	22	-0.4	
167	A	0	0	5	3	0.0	0.369
	B	2	5	26	16	-0.1	
	C*	32	2	59	37	0.8	
	D	1	9	18	11	-0.2	
	E	0	2	4	3	-0.1	
	OTH	5	22	48	30	-0.4	
168	A	0	3	7	4	-0.1	0.519
	B*	34	6	83	52	0.7	
	C	0	4	9	6	-0.1	
	D	2	2	13	8	0.0	
	E	0	1	2	1	-0.0	
	OTH	4	24	46	29	-0.5	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 29
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
169	A	22	5	59	37	0.4	0.112
	B	3	3	13	8	0.0	
	C*	3	3	18	11	0.0	
	D	0	3	7	4	-0.1	
	E	0	1	1	1	-0.0	
	OTH	12	25	62	39	-0.3	
170	A	4	3	18	11	0.0	0.081
	B*	4	3	13	8	0.0	
	C	15	4	34	21	0.3	
	D	2	4	19	12	-0.1	
	E	0	2	3	2	-0.1	
	OTH	15	24	73	46	-0.2	
171	A	1	5	11	7	-0.1	0.663
	B	0	2	11	7	-0.1	
	C*	39	11	106	66	0.7	
	D	0	6	15	9	-0.2	
	E	0	1	1	1	-0.0	
	OTH	0	15	16	10	-0.4	
172	A	0	4	7	4	-0.1	0.356
	B	1	5	10	6	-0.1	
	C	15	12	67	42	0.1	
	D*	23	3	57	36	0.5	
	E	0	1	1	1	-0.0	
	OTH	1	15	18	11	-0.3	
173	A*	27	9	75	47	0.4	0.469
	B	1	5	13	8	-0.1	
	C	2	6	14	9	-0.1	
	D	8	6	39	24	0.1	
	E	0	1	1	1	-0.0	
	OTH	2	13	18	11	-0.3	
174	A	0	7	13	8	-0.2	0.669
	B	1	5	14	9	-0.1	
	C	0	0	7	4	0.0	
	D*	39	14	107	67	0.6	
	E	0	1	2	1	-0.0	
	OTH	0	13	17	11	-0.3	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 30
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
175	A	4	5	17	11	-0.0	0.287
	B*	17	4	46	29	0.3	
	C	2	7	22	14	-0.1	
	D	17	6	53	33	0.3	
	E	0	1	1	1	-0.0	
	OTH	0	17	21	13	-0.4	
176	A	0	4	8	5	-0.1	0.394
	B	8	5	22	14	0.1	
	C*	21	8	63	39	0.3	
	D	10	3	42	26	0.2	
	E	0	1	1	1	-0.0	
	OTH	1	19	24	15	-0.4	
177	A*	38	12	106	66	0.6	0.663
	B	0	3	10	6	-0.1	
	C	0	4	14	9	-0.1	
	D	0	5	8	5	-0.1	
	E	0	1	1	1	-0.0	
	OTH	2	15	21	13	-0.3	
178	A	4	3	15	9	0.0	0.619
	B*	34	12	99	62	0.6	
	C	1	4	13	8	-0.1	
	D	0	1	7	4	-0.0	
	E	0	1	1	1	-0.0	
	OTH	1	19	25	16	-0.4	
179	A*	31	8	77	48	0.6	0.481
	B	1	3	16	10	-0.1	
	C	6	7	37	23	-0.0	
	D	1	2	5	3	-0.0	
	E	0	2	2	1	-0.1	
	OTH	1	18	23	14	-0.4	
180	A	1	2	15	9	-0.0	0.438
	B	1	4	12	8	-0.1	
	C*	30	7	70	44	0.6	
	D	2	3	18	11	-0.0	
	E	0	1	2	1	-0.0	
	OTH	6	23	43	27	-0.4	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 31
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
181	A*	20	5	41	26	0.4	0.256
	B	3	5	18	11	-0.1	
	C	1	4	23	14	-0.1	
	D	4	2	15	9	0.1	
	E	1	1	2	1	0.0	
	OTH	11	23	61	38	-0.3	
182	A	1	5	14	9	-0.1	0.500
	B*	35	7	80	50	0.7	
	C	1	3	11	7	-0.1	
	D	0	3	15	9	-0.1	
	E	0	1	1	1	-0.0	
	OTH	3	21	39	24	-0.4	
183	A	1	7	23	14	-0.2	0.394
	B	8	10	40	25	-0.1	
	C	1	2	13	8	-0.0	
	D*	28	4	63	39	0.6	
	E	0	1	1	1	-0.0	
	OTH	2	16	20	13	-0.3	
184	A	2	4	21	13	-0.1	0.494
	B*	34	10	79	49	0.6	
	C	0	2	12	8	-0.1	
	D	2	4	19	12	-0.1	
	E	0	1	1	1	-0.0	
	OTH	2	19	28	18	-0.4	
185	A	7	9	48	30	-0.1	0.387
	B	1	4	12	8	-0.1	
	C*	27	8	62	39	0.5	
	D	3	2	13	8	0.0	
	E	0	2	2	1	-0.1	
	OTH	2	15	23	14	-0.3	
186	A*	32	9	64	40	0.6	0.400
	B	1	1	11	7	0.0	
	C	2	6	26	16	-0.1	
	D	4	4	22	14	0.0	
	E	0	1	1	1	-0.0	
	OTH	1	19	36	23	-0.4	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 32
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
187	A	0	1	11	7	-0.0	0.331
	B	3	5	22	14	-0.1	
	C	6	5	23	14	0.0	
	D*	28	5	53	33	0.6	
	E	0	1	2	1	-0.0	
	OTH	3	23	49	31	-0.5	
188	A	4	5	13	8	-0.0	0.269
	B	3	6	23	14	-0.1	
	C*	17	3	43	27	0.3	
	D	12	3	36	23	0.2	
	E	1	1	3	2	0.0	
	OTH	3	22	42	26	-0.5	
189	A*	25	4	65	41	0.5	0.406
	B	11	10	49	31	0.0	
	C	2	5	10	6	-0.1	
	D	0	2	7	4	-0.1	
	E	1	1	2	1	0.0	
	OTH	1	18	27	17	-0.4	
190	A	23	6	56	35	0.4	0.112
	B	1	2	8	5	-0.0	
	C	2	5	20	13	-0.1	
	D*	7	3	18	11	0.1	
	E	0	1	2	1	-0.0	
	OTH	7	23	56	35	-0.4	
191	A	5	6	22	14	-0.0	0.094
	B*	5	2	15	9	0.1	
	C	3	4	26	16	-0.0	
	D	18	5	44	28	0.3	
	E	0	2	2	1	-0.1	
	OTH	9	21	51	32	-0.3	
192	A*	9	3	26	16	0.2	0.162
	B	9	5	35	22	0.1	
	C	10	5	30	19	0.1	
	D	3	2	12	8	0.0	
	E	0	1	2	1	-0.0	
	OTH	9	24	55	34	-0.4	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX I

Date Run..: 05/06/91 National Computer Systems Page: 33
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
193	A	3	3	17	11	0.0	0.138
	B	21	7	64	40	0.3	
	C*	7	5	22	14	0.1	
	D	2	3	11	7	-0.0	
	E	0	1	1	1	-0.0	
	OTH	7	21	45	28	-0.3	
194	A	5	5	20	13	0.0	0.231
	B*	12	2	37	23	0.3	
	C	10	7	26	16	0.1	
	D	5	2	26	16	0.1	
	E	0	1	2	1	-0.0	
	OTH	8	23	49	31	-0.4	

Total in Upper Quarter = 40
Total in Lower Quarter = 40

Number of Respondents = 160
Number of Test Items = 194
Kuder Richardson 20 = 0.94

APPENDIX J

Date Run..: 05/06/91 — National Computer Systems — Page: 1
Test Date.: 00/00/00 — MicroTEST Score II Plus

Item Analysis

Test Name: — Test ID: 1 — Sort: None
Instructor: All — Grade: All — Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
1	A	3	0	18	11	0.1	0.272
	B	9	33	76	47	-0.6	
	C*	25	3	44	27	0.5	
	D	1	0	11	7	0.0	
	E	0	0	0	0	0.0	
	OTH	3	5	13	8	-0.0	
2	A*	29	35	108	67	-0.1	0.667
	B	4	1	21	13	0.1	
	C	5	0	16	10	0.1	
	D	1	0	4	2	0.0	
	E	0	0	0	0	0.0	
	OTH	2	5	13	8	-0.1	
3	A	1	7	12	7	-0.1	0.636
	B	0	4	12	7	-0.1	
	C	0	23	31	19	-0.6	
	D*	40	3	103	64	0.9	
	E	0	0	0	0	0.0	
	OTH	0	4	4	2	-0.1	
4	A	6	1	25	15	0.1	0.136
	B*	11	0	22	14	0.3	
	C	8	28	61	38	-0.5	
	D	3	7	21	13	-0.1	
	E	0	0	0	0	0.0	
	OTH	13	5	33	20	0.2	
5	A	6	2	12	7	0.1	0.815
	B	1	2	7	4	-0.0	
	C*	34	33	132	81	0.0	
	D	0	0	6	4	0.0	
	E	0	0	0	0	0.0	
	OTH	0	4	5	3	-0.1	
6	A	1	2	17	10	-0.0	0.469
	B*	31	7	76	47	0.6	
	C	3	20	37	23	-0.4	
	D	2	4	14	9	-0.0	
	E	1	0	1	1	0.0	
	OTH	3	8	17	10	-0.1	

Total in Upper Quarter = 41
Total in Lower Quarter = 41

Number of Respondents = 162
Number of Test Items = 173
Kuder Richardson 20 = 0.98

APPENDIX J

Date Run..: 05/06/91 National Computer Systems Page: 2
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
7	A	1	3	8	5	-0.0	0.673
	B*	40	3	109	67	0.9	
	C	0	23	32	20	-0.6	
	D	0	2	2	1	-0.0	
	E	0	0	0	0	0.0	
	OTH	0	10	11	7	-0.2	
8	A	11	14	68	42	-0.1	0.407
	B*	29	8	66	41	0.5	
	C	0	1	3	2	-0.0	
	D	0	10	14	9	-0.2	
	E	0	0	0	0	0.0	
	OTH	1	8	11	7	-0.2	
9	A	2	2	12	7	0.0	0.710
	B*	39	11	115	71	0.7	
	C	0	18	23	14	-0.4	
	D	0	4	6	4	-0.1	
	E	0	0	0	0	0.0	
	OTH	0	6	6	4	-0.1	
10	A	1	4	14	9	-0.1	0.494
	B*	31	19	80	49	0.3	
	C	7	5	31	19	0.0	
	D	1	1	13	8	0.0	
	E	0	0	0	0	0.0	
	OTH	1	12	24	15	-0.3	
11	A	6	0	23	14	0.1	0.562
	B*	34	6	91	56	0.7	
	C	0	2	4	2	-0.0	
	D	0	29	39	24	-0.7	
	E	0	0	0	0	0.0	
	OTH	1	4	5	3	-0.1	
12	A	1	5	13	8	-0.1	0.519
	B	3	8	21	13	-0.1	
	C	2	16	31	19	-0.3	
	D*	33	4	84	52	0.7	
	E	0	0	0	0	0.0	
	OTH	2	8	13	8	-0.1	

Total in Upper Quarter = 41
Total in Lower Quarter = 41

Number of Respondents = 162
Number of Test Items = 173
Kuder Richardson 20 = 0.98

APPENDIX J

Date Run..: 05/06/91 National Computer Systems Page: 3
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
13	A	0	2	8	5	-0.0	0.315
	B	2	4	28	17	-0.0	
	C	17	5	53	33	0.3	
	D*	21	13	51	31	0.2	
	E	0	0	0	0	0.0	
	OTH	1	17	22	14	-0.4	
14	A	9	4	39	24	0.1	0.296
	B*	22	10	48	30	0.3	
	C	4	0	24	15	0.1	
	D	2	8	21	13	-0.1	
	E	0	0	0	0	0.0	
	OTH	4	19	30	19	-0.4	
15	A	16	9	50	31	0.2	0.309
	B	2	3	15	9	-0.0	
	C*	16	11	50	31	0.1	
	D	4	1	19	12	0.1	
	E	0	0	0	0	0.0	
	OTH	3	17	28	17	-0.3	
16	A*	35	8	77	48	0.7	0.475
	B	2	10	36	22	-0.2	
	C	4	9	29	18	-0.1	
	D	0	3	4	2	-0.1	
	E	0	1	1	1	-0.0	
	OTH	0	10	15	9	-0.2	
17	A	0	5	11	7	-0.1	0.685
	B*	41	7	111	69	0.8	
	C	0	1	5	3	-0.0	
	D	0	17	24	15	-0.4	
	E	0	0	0	0	0.0	
	OTH	0	11	11	7	-0.3	
18	A	0	25	31	19	-0.6	0.654
	B	0	3	9	6	-0.1	
	C	0	2	9	6	-0.0	
	D*	41	6	106	65	0.9	
	E	0	1	1	1	-0.0	
	OTH	0	4	6	4	-0.1	

Total in Upper Quarter = 41
Total in Lower Quarter = 41

Number of Respondents = 162
Number of Test Items = 173
Kuder Richardson 20 = 0.98

APPENDIX J

Date Run..: 05/06/91 — National Computer Systems — Page: 4
Test Date.: 00/00/00 — MicroTEST Score II Plus

Item Analysis

Test Name: — Test ID: 1 — Sort: None
Instructor: All — Grade: All — Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
19	A	5	7	34	21	-0.0	0.420
	B	1	20	34	21	-0.5	
	C*	34	1	68	42	0.8	
	D	1	8	19	12	-0.2	
	E	0	1	1	1	-0.0	
	OTH	0	4	6	4	-0.1	
20	A	0	9	24	15	-0.2	0.179
	B	10	6	38	23	0.1	
	C	20	4	48	30	0.4	
	D*	8	7	29	18	0.0	
	E	0	0	0	0	0.0	
	OTH	3	15	23	14	-0.3	
21	A	6	8	29	18	-0.0	0.475
	B*	29	6	77	48	0.6	
	C	3	6	25	15	-0.1	
	D	2	4	10	6	-0.0	
	E	0	1	1	1	-0.0	
	OTH	1	16	20	12	-0.4	
22	A	13	5	40	25	0.2	0.222
	B*	16	5	36	22	0.3	
	C	4	8	25	15	-0.1	
	D	1	6	29	18	-0.1	
	E	0	2	2	1	-0.0	
	OTH	7	15	30	19	-0.2	
23	A	5	6	28	17	-0.0	0.111
	B	6	22	55	34	-0.4	
	C	17	7	42	26	0.2	
	D*	8	0	18	11	0.2	
	E	0	0	0	0	0.0	
	OTH	5	6	19	12	-0.0	
24	A	1	20	35	22	-0.5	0.265
	B*	18	6	43	27	0.3	
	C	14	5	50	31	0.2	
	D	4	2	15	9	0.0	
	E	0	1	1	1	-0.0	
	OTH	4	7	18	11	-0.1	

Total in Upper Quarter = 41
Total in Lower Quarter = 41

Number of Respondents = 162
Number of Test Items = 173
Kuder Richardson 20 = 0.98

APPENDIX J

Date Run..: 05/06/91   National Computer Systems   Page: 5
Test Date.: 00/00/00   MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1   Sort: None
Instructor: All   Grade: All   Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
25	A*	39	16	104	64	0.6	0.642
	B	0	6	12	7	-0.1	
	C	2	5	27	17	-0.1	
	D	0	2	6	4	-0.0	
	E	0	0	0	0	0.0	
	OTH	0	12	13	8	-0.3	
26	A	1	4	22	14	-0.1	0.617
	B*	38	9	100	62	0.7	
	C	2	4	12	7	-0.0	
	D	0	11	14	9	-0.3	
	E	0	0	0	0	0.0	
	OTH	0	13	14	9	-0.3	
27	A	0	7	12	7	-0.2	0.617
	B	2	9	19	12	-0.2	
	C	3	4	20	12	-0.0	
	D*	36	11	100	62	0.6	
	E	0	0	0	0	0.0	
	OTH	0	10	11	7	-0.2	
28	A	0	5	17	10	-0.1	0.605
	B*	37	9	98	60	0.7	
	C	2	2	10	6	0.0	
	D	0	14	24	15	-0.3	
	E	0	0	0	0	0.0	
	OTH	2	11	13	8	-0.2	
29	A	0	4	8	5	-0.1	0.642
	B	0	4	14	9	-0.1	
	C*	34	9	104	64	0.6	
	D	4	12	21	13	-0.2	
	E	0	0	0	0	0.0	
	OTH	3	12	15	9	-0.2	
30	A*	29	8	69	43	0.5	0.426
	B	4	6	31	19	-0.0	
	C	3	8	25	15	-0.1	
	D	3	6	21	13	-0.1	
	E	0	1	1	1	-0.0	
	OTH	2	12	15	9	-0.2	

Total in Upper Quarter = 41
Total in Lower Quarter = 41

Number of Respondents = 162
Number of Test Items = 173
Kuder Richardson 20 = 0.98

APPENDIX J

Date Run..: 05/06/91 National Computer Systems Page: 6
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
31	A	3	2	26	16	0.0	0.617
	B*	37	30	100	62	0.2	
	C	0	3	22	14	-0.1	
	D	0	1	8	5	-0.0	
	E	0	0	0	0	0.0	
	OTH	1	5	6	4	-0.1	
32	A	2	1	22	14	0.0	0.383
	B	1	19	38	23	-0.4	
	C*	33	10	62	38	0.6	
	D	3	4	31	19	-0.0	
	E	0	0	0	0	0.0	
	OTH	2	7	9	6	-0.1	
33	A	2	1	24	15	0.0	0.414
	B	0	2	9	6	-0.0	
	C	1	32	54	33	-0.8	
	D*	37	2	67	41	0.9	
	E	0	0	1	1	0.0	
	OTH	1	4	7	4	-0.1	
34	A*	39	1	77	48	0.9	0.475
	B	0	33	50	31	-0.8	
	C	0	0	7	4	0.0	
	D	2	3	21	13	-0.0	
	E	0	0	0	0	0.0	
	OTH	0	4	7	4	-0.1	
35	A	2	2	24	15	0.0	0.685
	B*	38	29	111	69	0.2	
	C	0	4	6	4	-0.1	
	D	1	1	14	9	0.0	
	E	0	0	0	0	0.0	
	OTH	0	5	7	4	-0.1	
36	A	1	2	17	10	-0.0	0.642
	B	3	5	30	19	-0.0.	
	C	1	2	5	3	-0.0	
	D*	36	28	104	64	0.2	
	E	0	0	0	0	0.0	
	OTH	0	4	6	4	-0.1	

Total in Upper Quarter = 41
Total in Lower Quarter = 41

Number of Respondents = 162
Number of Test Items = 173
Kuder Richardson 20 = 0.98

APPENDIX J

Date Run..: 05/06/91 National Computer Systems Page: 7
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
37	A	5	0	19	12	0.1	0.463
	B	0	30	47	29	-0.7	
	C*	34	2	75	46	0.8	
	D	2	4	15	9	-0.0	
	E	0	0	0	0	0.0	
	OTH	0	5	6	4	-0.1	
38	A	3	22	44	27	-0.5	0.556
	B	0	1	4	2	-0.0	
	C	0	4	13	8	-0.1	
	D*	38	5	90	56	0.8	
	E	0	0	0	0	0.0	
	OTH	0	9	11	7	-0.2	
39	A	6	5	23	14	0.0	0.642
	B	0	1	13	8	-0.0	
	C*	34	23	104	64	0.3	
	D	1	1	9	6	0.0	
	E	0	0	0	0	0.0	
	OTH	0	11	13	8	-0.3	
40	A	0	24	30	19	-0.6	0.673
	B	0	4	11	7	-0.1	
	C*	41	4	109	67	0.9	
	D	0	2	2	1	-0.0	
	E	0	0	0	0	0.0	
	OTH	0	7	10	6	-0.2	
41	A*	40	7	108	67	0.8	0.667
	B	1	3	8	5	-0.0	
	C	0	11	21	13	-0.3	
	D	0	11	16	10	-0.3	
	E	0	0	0	0	0.0	
	OTH	0	9	9	6	-0.2	
42	A	12	17	53	33	-0.1	0.191
	B	16	4	50	31	0.3	
	C*	9	1	31	19	0.2	
	D	0	9	11	7	-0.2	
	E	0	0	0	0	0.0	
	OTH	4	10	17	10	-0.1	

Total in Upper Quarter = 41
Total in Lower Quarter = 41

Number of Respondents = 162
Number of Test Items = 173
Kuder Richardson 20 = 0.98

APPENDIX J

Date Run..: 05/06/91 National Computer Systems Page: 8
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
43	A	3	8	20	12	-0.1	0.599
	B*	31	23	97	60	0.2	
	C	6	5	29	18	0.0	
	D	0	0	2	1	0.0	
	E	0	0	1	1	0.0	
	OTH	1	5	13	8	-0.1	
44	A	3	16	30	19	-0.3	0.438
	B	15	4	46	28	0.3	
	C*	22	11	71	44	0.3	
	D	0	3	4	2	-0.1	
	E	0	0	0	0	0.0	
	OTH	1	7	11	7	-0.1	
45	A	0	2	8	5	-0.0	0.728
	B*	40	12	118	73	0.7	
	C	1	10	16	10	-0.2	
	D	0	2	3	2	-0.0	
	E	0	0	0	0	0.0	
	OTH	0	15	17	10	-0.4	
46	A	0	2	7	4	-0.0	0.642
	B*	40	5	104	64	0.9	
	C	1	7	15	9	-0.1	
	D	0	10	18	11	-0.2	
	E	0	1	1	1	-0.0	
	OTH	0	16	17	10	-0.4	
47	A	0	12	24	15	-0.3	0.611
	B	0	17	28	17	-0.4	
	C*	40	4	99	61	0.9	
	D	0	1	1	1	-0.0	
	E	0	0	0	0	0.0	
	OTH	1	7	10	6	-0.1	
48	A*	36	25	118	73	0.3	0.728
	B	0	6	11	7	-0.1	
	C	5	3	24	15	0.0	
	D	0	1	1	1	-0.0	
	E	0	0	0	0	0.0	
	OTH	0	6	8	5	-0.1	

Total in Upper Quarter = 41
Total in Lower Quarter = 41

Number of Respondents = 162
Number of Test Items = 173
Kuder Richardson 20 = 0.98

APPENDIX J

Date Run..: 05/06/91 | National Computer Systems | Page: 9
Test Date.: 00/00/00 | MicroTEST Score II Plus

Item Analysis

Test Name: | Test ID: 1 | Sort: None
Instructor: All | Grade: All | Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
49	A	8	15	44	27	-0.2	0.358
	B*	25	5	58	36	0.5	
	C	6	1	34	21	0.1	
	D	0	7	8	5	-0.2	
	E	0	0	0	0	0.0	
	OTH	2	13	18	11	-0.3	
50	A*	37	4	84	52	0.8	0.519
	B	0	16	28	17	-0.4	
	C	4	3	26	16	0.0	
	D	0	6	9	6	-0.1	
	E	0	0	0	0	0.0	
	OTH	0	12	15	9	-0.3	
51	A	0	3	15	9	-0.1	0.617
	B*	41	9	100	62	0.8	
	C	0	8	20	12	-0.2	
	D	0	8	12	7	-0.2	
	E	0	0	0	0	0.0	
	OTH	0	13	15	9	-0.3	
52	A	1	19	35	22	-0.4	0.580
	B*	40	3	94	58	0.9	
	C	0	6	19	12	-0.1	
	D	0	2	3	2	-0.0	
	E	0	0	0	0	0.0	
	OTH	0	11	11	7	-0.3	
53	A	1	9	21	13	-0.2	0.593
	B	1	3	11	7	-0.0	
	C*	38	5	96	59	0.8	
	D	1	10	19	12	-0.2	
	E	0	0	0	0	0.0	
	OTH	0	14	15	9	-0.3	
54	A	0	6	12	7	-0.1	0.599
	B*	40	4	97	60	0.9	
	C	1	12	27	17	-0.3	
	D	0	3	9	6	-0.1	
	E	0	1	1	1	-0.0	
	OTH	0	15	16	10	-0.4	

Total in Upper Quarter = 41
Total in Lower Quarter = 41

Number of Respondents = 162
Number of Test Items = 173
Kuder Richardson 20 = 0.98

APPENDIX J

Date Run..: 05/06/91 National Computer Systems Page: 10
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
55	A*	41	4	103	64	0.9	0.636
	B	0	19	31	19	-0.5	
	C	0	4	11	7	-0.1	
	D	0	4	6	4	-0.1	
	E	0	0	0	0	0.0	
	OTH	0	10	11	7	-0.2	
56	A	1	4	6	4	-0.1	0.580
	B	0	24	44	27	-0.6	
	C*	39	3	94	58	0.9	
	D	0	0	2	1	0.0	
	E	0	0	0	0	0.0	
	OTH	1	10	16	10	-0.2	
57	A	6	2	27	17	0.1	0.580
	B	0	5	13	8	-0.1	
	C*	35	9	94	58	0.6	
	D	0	10	12	7	-0.2	
	E	0	0	0	0	0.0	
	OTH	0	15	16	10	-0.4	
58	A	1	2	13	8	-0.0	0.648
	B*	36	17	105	65	0.5	
	C	2	4	17	10	-0.0	
	D	0	5	6	4	-0.1	
	E	0	0	1	1	0.0	
	OTH	2	13	20	12	-0.3	
59	A	0	20	44	27	-0.5	0.525
	B	0	3	16	10	-0.1	
	C*	41	7	85	52	0.8	
	D	0	1	4	2	-0.0	
	E	0	0	0	0	0.0	
	OTH	0	10	13	8	-0.2	
60	A	1	3	21	13	-0.0	0.543
	B*	37	12	88	54	0.6	
	C	3	8	27	17	-0.1	
	D	0	2	7	4	-0.0	
	E	0	0	0	0	0.0	
	OTH	0	16	19	12	-0.4	

Total in Upper Quarter = 41
Total in Lower Quarter = 41

Number of Respondents = 162
Number of Test Items = 173
Kuder Richardson 20 = 0.98

APPENDIX J

Date Run..: 05/06/91 National Computer Systems Page: 11
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
61	A	3	3	19	12	0.0	0.673
	B*	35	22	109	67	0.3	
	C	3	4	16	10	-0.0	
	D	0	1	5	3	-0.0	
	E	0	0	0	0	0.0	
	OTH	0	11	13	8	-0.3	
62	A	3	4	13	8	-0.0	0.537
	B*	36	4	87	54	0.8	
	C	2	6	28	17	-0.1	
	D	0	7	11	7	-0.2	
	E	0	0	0	0	0.0	
	OTH	0	20	23	14	-0.5	
63	A	0	18	29	18	-0.4	0.611
	B	4	2	16	10	0.0	
	C*	36	7	99	61	0.7	
	D	0	1	4	2	-0.0	
	E	0	0	0	0	0.0	
	OTH	1	13	14	9	-0.3	
64	A	1	13	28	17	-0.3	0.512
	B*	38	3	83	51	0.9	
	C	2	5	23	14	-0.1	
	D	0	4	9	6	-0.1	
	E	0	0	1	1	0.0	
	OTH	0	16	18	11	-0.4	
65	A*	37	6	87	54	0.8	0.537
	B	4	9	38	23	-0.1	
	C	0	3	11	7	-0.1	
	D	0	2	4	2	-0.0	
	E	0	1	1	1	-0.0	
	OTH	0	20	21	13	-0.5	
66	A	1	5	10	6	-0.1	0.630
	B	2	2	17	10	0.0	
	C*	38	5	102	63	0.8	
	D	0	9	12	7	-0.2	
	E	0	0	0	0	0.0	
	OTH	0	20	21	13	-0.5	

Total in Upper Quarter = 41
Total in Lower Quarter = 41

Number of Respondents = 162
Number of Test Items = 173
Kuder Richardson 20 = 0.98

APPENDIX J

Date Run..: 05/06/91 — National Computer Systems — Page: 12
Test Date.: 00/00/00 — MicroTEST Score II Plus

Item Analysis

Test Name: — Test ID: 1 — Sort: None
Instructor: All — Grade: All — Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
67	A	8	5	36	22	0.1	0.500
	B*	33	4	81	50	0.7	
	C	0	9	19	12	-0.2	
	D	0	5	6	4	-0.1	
	E	0	1	1	1	-0.0	
	OTH	0	17	19	12	-0.4	
68	A	0	7	23	14	-0.2	0.469
	B*	36	3	76	47	0.8	
	C	4	6	31	19	-0.0	
	D	0	3	7	4	-0.1	
	E	0	0	0	0	0.0	
	OTH	1	22	25	15	-0.5	
69	A*	40	4	99	61	0.9	0.611
	B	0	5	19	12	-0.1	
	C	1	8	18	11	-0.2	
	D	0	3	4	2	-0.1	
	E	0	1	1	1	-0.0	
	OTH	0	20	21	13	-0.5	
70	A*	41	2	89	55	1.0	0.549
	B	0	5	14	9	-0.1	
	C	0	11	27	17	-0.3	
	D	0	4	10	6	-0.1	
	E	0	0	1	1	0.0	
	OTH	0	19	21	13	-0.5	
71	A	7	4	31	19	0.1	0.475
	B	0	10	18	11	-0.2	
	C	0	3	12	7	-0.1	
	D*	34	5	77	48	0.7	
	E	0	0	0	0	0.0	
	OTH	0	19	24	15	-0.5	
72	A	0	5	9	6	-0.1	0.648
	B*	41	3	105	65	0.9	
	C	0	8	14	9	-0.2	
	D	0	4	9	6	-0.1	
	E	0	0	0	0	0.0	
	OTH	0	21	25	15	-0.5	

Total in Upper Quarter = 41
Total in Lower Quarter = 41

Number of Respondents = 162
Number of Test Items = 173
Kuder Richardson 20 = 0.98

APPENDIX J

Date Run..: 05/06/91 National Computer Systems Page: 13
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
73	A	1	25	44	27	-0.6	0.451
	B	2	2	21	13	0.0	
	C	1	5	15	9	-0.1	
	D*	37	4	73	45	0.8	
	E	0	0	0	0	0.0	
	OTH	0	5	9	6	-0.1	
74	A	1	24	37	23	-0.6	0.531
	B*	35	4	86	53	0.8	
	C	5	6	26	16	-0.0	
	D	0	3	9	6	-0.1	
	E	0	1	1	1	-0.0	
	OTH	0	3	3	2	-0.1	
75	A	3	10	28	17	-0.2	0.346
	B	6	18	43	27	-0.3	
	C	2	4	26	16	-0.0	
	D*	28	4	56	35	0.6	
	E	0	1	1	1	-0.0	
	OTH	2	4	8	5	-0.0	
76	A	0	14	23	14	-0.3	0.611
	B	0	6	11	7	-0.1	
	C*	40	3	99	61	0.9	
	D	1	12	22	14	-0.3	
	E	0	1	1	1	-0.0	
	OTH	0	5	6	4	-0.1	
77	A	0	8	16	10	-0.2	0.654
	B*	38	10	106	65	0.7	
	C	2	3	13	8	-0.0	
	D	0	8	13	8	-0.2	
	E	0	1	1	1	-0.0	
	OTH	1	11	13	8	-0.2	
78	A	29	7	72	44	0.5	0.154
	B*	7	0	25	15	0.2	
	C	2	9	24	15	-0.2	
	D	2	5	15	9	-0.1	
	E	0	1	1	1	-0.0	
	OTH	1	19	25	15	-0.4	

Total in Upper Quarter = 41
Total in Lower Quarter = 41

Number of Respondents = 162
Number of Test Items = 173
Kuder Richardson 20 = 0.98

APPENDIX J

Date Run..: 05/06/91 National Computer Systems Page: 14
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
79	A	2	0	11	7	0.0	0.580
	B	5	3	25	15	0.0	
	C*	27	28	94	58	-0.0	
	D	7	1	19	12	0.1	
	E	0	1	1	1	-0.0	
	OTH	0	8	12	7	-0.2	
80	A	6	2	20	12	0.1	0.556
	B*	26	24	90	56	0.0	
	C	8	5	26	16	0.1	
	D	0	7	16	10	-0.2	
	E	0	0	0	0	0.0	
	OTH	1	3	10	6	-0.0	
81	A	8	9	39	24	-0.0	0.370
	B	3	16	37	23	-0.3	
	C	1	4	11	7	-0.1	
	D*	29	1	60	37	0.7	
	E	0	1	1	1	-0.0	
	OTH	0	10	14	9	-0.2	
82	A	3	6	14	9	-0.1	0.407
	B*	25	6	66	41	0.5	
	C	11	23	62	38	-0.3	
	D	2	1	11	7	0.0	
	E	0	0	0	0	0.0	
	OTH	0	5	9	6	-0.1	
83	A	3	6	21	13	-0.1	0.438
	B*	21	19	71	44	0.0	
	C	14	4	38	23	0.2	
	D	1	1	15	9	0.0	
	E	1	2	3	2	-0.0	
	OTH	1	9	14	9	-0.2	
84	A	0	8	24	15	-0.2	0.494
	B*	39	3	80	49	0.9	
	C	0	4	14	9	-0.1	
	D	2	6	17	10	-0.1	
	E	0	1	1	1	-0.0	
	OTH	0	19	26	16	-0.5	

Total in Upper Quarter = 41
Total in Lower Quarter = 41

Number of Respondents = 162
Number of Test Items = 173
Kuder Richardson 20 = 0.98

APPENDIX J

Date Run..: 05/06/91 National Computer Systems Page: 15
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
85	A	0	1	9	6	-0.0	0.506
	B	2	3	16	10	-0.0	
	C	0	24	36	22	-0.6	
	D*	38	3	82	51	0.9	
	E	0	1	1	1	-0.0	
	OTH	1	9	18	11	-0.2	
86	A	17	10	39	24	0.2	0.259
	B	4	16	40	25	-0.3	
	C*	17	1	42	26	0.4	
	D	2	3	17	10	-0.0	
	E	0	0	0	0	0.0	
	OTH	1	11	24	15	-0.2	
87	A	6	14	43	27	-0.2	0.469
	B*	33	3	76	47	0.7	
	C	1	11	20	12	-0.2	
	D	0	2	8	5	-0.0	
	E	0	1	1	1	-0.0	
	OTH	1	10	14	9	-0.2	
88	A	2	15	33	20	-0.3	0.525
	B*	36	5	85	52	0.8	
	C	1	6	19	12	-0.1	
	D	0	0	6	4	0.0	
	E	1	0	1	1	0.0	
	OTH	1	15	18	11	-0.3	
89	A*	7	1	21	13	0.1	0.130
	B	7	22	48	30	-0.4	
	C	9	1	32	20	0.2	
	D	11	3	34	21	0.2	
	E	1	1	2	1	0.0	
	OTH	6	13	25	15	-0.2	
90	A	0	6	9	6	-0.1	0.623
	B	0	6	19	12	-0.1	
	C*	34	17	101	62	0.4	
	D	5	2	21	13	0.1	
	E	0	0	0	0	0.0	
	OTH	2	10	12	7	-0.2	

Total in Upper Quarter = 41
Total in Lower Quarter = 41

Number of Respondents = 162
Number of Test Items = 173
Kuder Richardson 20 = 0.98

APPENDIX J

Date Run..: 05/06/91 | National Computer Systems | Page: 16
Test Date.: 00/00/00 | MicroTEST Score II Plus

Item Analysis

Test Name: | Test ID: 1 | Sort: None
Instructor: All | Grade: All | Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
91	A	0	10	18	11	-0.2	0.642
	B*	40	5	104	64	0.9	
	C	0	3	7	4	-0.1	
	D	1	11	20	12	-0.2	
	E	0	1	1	1	-0.0	
	OTH	0	11	12	7	-0.3	
92	A*	38	3	85	52	0.9	0.525
	B	0	2	13	8	-0.0	
	C	0	27	37	23	-0.7	
	D	3	2	18	11	0.0	
	E	0	0	0	0	0.0	
	OTH	0	7	9	6	-0.2	
93	A	0	6	19	12	-0.1	0.648
	B*	40	13	105	65	0.7	
	C	0	5	13	8	-0.1	
	D	1	5	11	7	-0.1	
	E	0	0	0	0	0.0	
	OTH	0	12	14	9	-0.3	
94	A*	36	6	91	56	0.7	0.562
	B	1	20	34	21	-0.5	
	C	1	2	11	7	-0.0	
	D	2	6	16	10	-0.1	
	E	1	0	1	1	0.0	
	OTH	0	7	9	6	-0.2	
95	A	4	8	30	19	-0.1	0.352
	B	9	4	31	19	0.1	
	C*	27	7	57	35	0.5	
	D	1	13	30	19	-0.3	
	E	0	0	0	0	0.0	
	OTH	0	9	14	9	-0.2	
96	A	0	4	11	7	-0.1	0.537
	B	2	10	19	12	-0.2	
	C	0	16	30	19	-0.4	
	D*	39	1	87	54	0.9	
	E	0	0	0	0	0.0	
	OTH	0	10	15	9	-0.2	

Total in Upper Quarter = 41
Total in Lower Quarter = 41

Number of Respondents = 162
Number of Test Items = 173
Kuder Richardson 20 = 0.98

APPENDIX J

Date Run..: 05/06/91 National Computer Systems Page: 17
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
97	A*	32	9	87	54	0.6	0.537
	B	7	10	32	20	-0.1	
	C	0	5	14	9	-0.1	
	D	0	4	8	5	-0.1	
	E	0	0	1	1	0.0	
	OTH	2	13	20	12	-0.3	
98	A	4	3	17	10	0.0	0.340
	B	0	13	27	17	-0.3	
	C	9	8	43	27	0.0	
	D*	27	3	55	34	0.6	
	E	0	0	0	0	0.0	
	OTH	1	14	20	12	-0.3	
99	A	4	10	30	19	-0.1	0.556
	B*	36	8	90	56	0.7	
	C	0	3	13	8	-0.1	
	D	0	4	9	6	-0.1	
	E	0	0	0	0	0.0	
	OTH	1	16	20	12	-0.4	
100	A	1	2	13	8	-0.0	0.673
	B*	40	16	109	67	0.6	
	C	0	6	10	6	-0.1	
	D	0	0	11	7	0.0	
	E	0	0	1	1	0.0	
	OTH	0	17	18	11	-0.4	
101	A	1	3	12	7	-0.0	0.537
	B	1	5	26	16	-0.1	
	C*	39	5	87	54	0.8	
	D	0	4	8	5	-0.1	
	E	0	1	1	1	-0.0	
	OTH	0	23	28	17	-0.6	
102	A	0	5	10	6	-0.1	0.636
	B	0	4	9	6	-0.1	
	C*	39	5	103	64	0.8	
	D	2	2	13	8	0.0	
	E	0	1	1	1	-0.0	
	OTH	0	24	26	16	-0.6	

Total in Upper Quarter = 41
Total in Lower Quarter = 41

Number of Respondents = 162
Number of Test Items = 173
Kuder Richardson 20 = 0.98

APPENDIX J

Date Run..: 05/06/91 National Computer Systems Page: 18
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
103	A	5	7	26	16	-0.0	0.179
	B*	7	3	29	18	0.1	
	C	1	1	8	5	0.0	
	D	26	5	69	43	0.5	
	E	0	1	1	1	-0.0	
	OTH	2	24	29	18	-0.5	
104	A	1	5	9	6	-0.1	0.327
	B	0	6	13	8	-0.1	
	C*	13	9	53	33	0.1	
	D	24	1	62	38	0.6	
	E	0	1	1	1	-0.0	
	OTH	3	19	24	15	-0.4	
105	A	1	9	18	11	-0.2	0.494
	B	0	9	18	11	-0.2	
	C*	34	2	80	49	0.8	
	D	5	1	24	15	0.1	
	E	0	2	2	1	-0.0	
	OTH	1	18	20	12	-0.4	
106	A	0	12	18	11	-0.3	0.395
	B	0	4	7	4	-0.1	
	C*	24	4	64	40	0.5	
	D	17	2	52	32	0.4	
	E	0	1	1	1	-0.0	
	OTH	0	18	20	12	-0.4	
107	A	0	6	11	7	-0.1	0.636
	B	0	9	17	10	-0.2	
	C	1	5	10	6	-0.1	
	D*	39	2	103	64	0.9	
	E	0	1	2	1	-0.0	
	OTH	1	18	19	12	-0.4	
108	A	3	2	22	14	0.0	0.506
	B	0	5	12	7	-0.1	
	C	1	10	23	14	-0.2	
	D*	36	4	82	51	0.8	
	E	0	1	3	2	-0.0	
	OTH	1	19	20	12	-0.4	

Total in Upper Quarter = 41
Total in Lower Quarter = 41

Number of Respondents = 162
Number of Test Items = 173
Kuder Richardson 20 = 0.98

APPENDIX J

Date Run..: 05/06/91 National Computer Systems Page: 19
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
109	A	1	4	6	4	-0.1	0.364
	B	4	3	25	15	0.0	
	C	10	12	43	27	-0.0	
	D*	23	1	59	36	0.5	
	E	0	1	2	1	-0.0	
	OTH	3	20	27	17	-0.4	
110	A	0	0	5	3	0.0	0.358
	B*	17	17	58	36	0.0	
	C	1	2	9	6	-0.0	
	D	22	2	66	41	0.5	
	E	0	1	2	1	-0.0	
	OTH	1	19	22	14	-0.4	
111	A	0	18	32	20	-0.4	0.593
	B*	40	1	96	59	1.0	
	C	1	4	13	8	-0.1	
	D	0	2	4	2	-0.0	
	E	0	0	0	0	0.0	
	OTH	0	16	17	10	-0.4	
112	A*	38	5	95	59	0.8	0.586
	B	1	3	14	9	-0.0	
	C	2	6	14	9	-0.1	
	D	0	7	18	11	-0.2	
	E	0	0	0	0	0.0	
	OTH	0	20	21	13	-0.5	
113	A	1	3	18	11	-0.0	0.617
	B	0	2	10	6	-0.0	
	C*	38	13	100	62	0.6	
	D	2	4	14	9	-0.0	
	E	0	0	0	0	0.0	
	OTH	0	19	20	12	-0.5	
114	A*	37	2	80	49	0.9	0.494
	B	0	13	29	18	-0.3	
	C	0	4	10	6	-0.1	
	D	4	3	20	12	0.0	
	E	0	0	0	0	0.0	
	OTH	0	19	23	14	-0.5	

Total in Upper Quarter = 41
Total in Lower Quarter = 41

Number of Respondents = 162
Number of Test Items = 173
Kuder Richardson 20 = 0.98

APPENDIX J

Date Run..: 05/06/91 National Computer Systems Page: 20
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
115	A	5	6	24	15	-0.0	0.475
	B	1	3	20	12	-0.0	
	C*	33	4	77	48	0.7	
	D	1	8	20	12	-0.2	
	E	1	0	1	1	0.0	
	OTH	0	20	20	12	-0.5	
116	A*	37	10	92	57	0.7	0.568
	B	4	6	24	15	-0.0	
	C	0	2	14	9	-0.0	
	D	0	5	11	7	-0.1	
	E	0	0	0	0	0.0	
	OTH	0	18	21	13	-0.4	
117	A	1	5	12	7	-0.1	0.451
	B	2	5	21	13	-0.1	
	C	2	6	32	20	-0.1	
	D*	36	2	73	45	0.8	
	E	0	1	1	1	-0.0	
	OTH	0	22	23	14	-0.5	
118	A	2	4	21	13	-0.0	0.531
	B*	36	4	86	53	0.8	
	C	3	9	26	16	-0.1	
	D	0	9	13	8	-0.2	
	E	0	0	0	0	0.0	
	OTH	0	15	16	10	-0.4	
119	A	1	11	28	17	-0.2	0.358
	B	0	11	29	18	-0.3	
	C	7	3	31	19	0.1	
	D*	33	2	58	36	0.8	
	E	0	0	0	0	0.0	
	OTH	0	14	16	10	-0.3	
120	A*	26	13	78	48	0.3	0.481
	B	13	1	35	22	0.3	
	C	0	4	13	8	-0.1	
	D	0	11	20	12	-0.3	
	E	0	0	0	0	0.0	
	OTH	2	12	16	10	-0.2	

Total in Upper Quarter = 41
Total in Lower Quarter = 41

Number of Respondents = 162
Number of Test Items = 173
Kuder Richardson 20 = 0.98

APPENDIX J

Date Run..: 05/06/91 National Computer Systems Page: 21
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
121	A	0	1	16	10	-0.0	0.586
	B	2	1	17	10	0.0	
	C*	35	25	95	59	0.2	
	D	4	4	22	14	0.0	
	E	0	0	0	0	0.0	
	OTH	0	10	12	7	-0.2	
122	A*	34	2	66	41	0.8	0.407
	B	0	25	43	27	-0.6	
	C	7	1	31	19	0.1	
	D	0	2	7	4	-0.0	
	E	0	0	0	0	0.0	
	OTH	0	11	15	9	-0.3	
123	A	0	4	18	11	-0.1	0.389
	B	6	1	27	17	0.1	
	C*	33	0	63	39	0.8	
	D	1	23	37	23	-0.5	
	E	0	0	0	0	0.0	
	OTH	1	13	17	10	-0.3	
124	A	15	3	38	23	0.3	0.395
	B	0	7	21	13	-0.2	
	C*	26	2	64	40	0.6	
	D	0	4	12	7	-0.1	
	E	0	0	1	1	0.0	
	OTH	0	25	26	16	-0.6	
125	A	7	14	45	28	-0.2	0.309
	B*	28	0	50	31	0.7	
	C	2	3	27	17	-0.0	
	D	2	4	13	8	-0.0	
	E	1	0	1	1	0.0	
	OTH	1	20	26	16	-0.5	
126	A	1	6	19	12	-0.1	0.401
	B	5	6	34	21	-0.0	
	C	1	3	17	10	-0.0	
	D*	33	4	65	40	0.7	
	E	1	0	1	1	0.0	
	OTH	0	22	26	16	-0.5	

Total in Upper Quarter = 41
Total in Lower Quarter = 41

Number of Respondents = 162
Number of Test Items = 173
Kuder Richardson 20 = 0.98

APPENDIX J

Date Run..: 05/06/91 National Computer Systems Page: 22
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
127	A*	35	12	82	51	0.6	0.506
	B	3	1	27	17	0.0	
	C	2	4	18	11	-0.0	
	D	0	8	15	9	-0.2	
	E	1	1	2	1	0.0	
	OTH	0	15	18	11	-0.4	
128	A	6	7	32	20	-0.0	0.185
	B	5	2	21	13	0.1	
	C*	13	1	30	19	0.3	
	D	12	19	56	35	-0.2	
	E	0	1	1	1	-0.0	
	OTH	5	11	22	14	-0.1	
129	A	13	23	58	36	-0.2	0.136
	B*	5	4	22	14	0.0	
	C	13	3	44	27	0.2	
	D	2	1	12	7	0.0	
	E	0	1	1	1	-0.0	
	OTH	8	9	25	15	-0.0	
130	A	0	24	34	21	-0.6	0.599
	B*	38	3	97	60	0.9	
	C	2	2	10	6	0.0	
	D	1	0	7	4	0.0	
	E	0	1	2	1	-0.0	
	OTH	0	11	12	7	-0.3	
131	A	0	22	31	19	-0.5	0.321
	B	14	3	54	33	0.3	
	C	2	1	10	6	0.0	
	D*	25	2	52	32	0.6	
	E	0	0	0	0	0.0	
	OTH	0	13	15	9	-0.3	
132	A	1	4	16	10	-0.1	0.586
	B*	37	10	95	59	0.7	
	C	3	6	16	10	-0.1	
	D	0	9	19	12	-0.2	
	E	0	0	0	0	0.0	
	OTH	0	12	16	10	-0.3	

Total in Upper Quarter = 41
Total in Lower Quarter = 41

Number of Respondents = 162
Number of Test Items = 173
Kuder Richardson 20 = 0.98

APPENDIX J

Date Run..: 05/06/91 National Computer Systems Page: 23
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
133	A	4	2	13	8	0.0	0.426
	B	1	11	27	17	-0.2	
	C*	29	3	69	43	0.6	
	D	7	4	29	18	0.1	
	E	0	1	1	1	-0.0	
	OTH	0	20	23	14	-0.5	
134	A*	23	8	67	41	0.4	0.414
	B	1	2	8	5	-0.0	
	C	13	7	51	31	0.1	
	D	0	1	7	4	-0.0	
	E	0	1	1	1	-0.0	
	OTH	4	22	28	17	-0.4	
135	A	2	3	23	14	-0.0	0.512
	B	1	22	37	23	-0.5	
	C*	36	6	83	51	0.7	
	D	0	0	3	2	0.0	
	E	0	0	0	0	0.0	
	OTH	2	10	16	10	-0.2	
136	A*	36	7	87	54	0.7	0.537
	B	2	11	28	17	-0.2	
	C	0	15	26	16	-0.4	
	D	3	4	15	9	-0.0	
	E	0	1	1	1	-0.0	
	OTH	0	3	5	3	-0.1	
137	A	3	4	16	10	-0.0	0.444
	B	2	19	36	22	-0.4	
	C	0	7	22	14	-0.2	
	D*	35	3	72	44	0.8	
	E	1	0	2	1	0.0	
	OTH	0	8	14	9	-0.2	
138	A*	32	7	79	49	0.6	0.488
	B	0	3	20	12	-0.1	
	C	5	8	28	17	-0.1	
	D	2	12	19	12	-0.2	
	E	0	0	0	0	0.0	
	OTH	2	11	16	10	-0.2	

Total in Upper Quarter = 41
Total in Lower Quarter = 41

Number of Respondents = 162
Number of Test Items = 173
Kuder Richardson 20 = 0.98

APPENDIX J

Date Run..: 05/06/91 National Computer Systems Page: 24
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
139	A	5	1	23	14	0.1	0.315
	B*	26	2	51	31	0.6	
	C	4	2	17	10	0.0	
	D	4	33	62	38	-0.7	
	E	0	0	0	0	0.0	
	OTH	2	3	9	6	-0.0	
140	A	1	30	41	25	-0.7	0.414
	B*	30	2	67	41	0.7	
	C	3	0	20	12	0.1	
	D	4	5	23	14	-0.0	
	E	0	0	1	1	0.0	
	OTH	3	4	10	6	-0.0	
141	A	0	3	12	7	-0.1	0.654
	B	3	1	19	12	0.0	
	C*	33	30	106	65	0.1	
	D	3	2	14	9	0.0	
	E	0	1	1	1	-0.0	
	OTH	2	4	10	6	-0.0	
142	A	1	1	11	7	0.0	0.389
	B*	27	3	63	39	0.6	
	C	6	30	67	41	-0.6	
	D	4	3	8	5	0.0	
	E	0	0	0	0	0.0	
	OTH	3	4	13	8	-0.0	
143	A	0	3	14	9	-0.1	0.599
	B	8	5	33	20	0.1	
	C*	30	28	97	60	0.0	
	D	2	1	11	7	0.0	
	E	0	0	0	0	0.0	
	OTH	1	4	7	4	-0.1	
144	A*	29	1	55	34	0.7	0.340
	B	1	33	52	32	-0.8	
	C	1	2	19	12	-0.0	
	D	9	2	30	19	0.2	
	E	0	0	0	0	0.0	
	OTH	1	3	6	4	-0.0	

Total in Upper Quarter = 41
Total in Lower Quarter = 41

Number of Respondents = 162
Number of Test Items = 173
Kuder Richardson 20 = 0.98

APPENDIX J

Date Run. : 05/06/91 National Computer Systems Page: 25
Test Date. : 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
145	A	6	4	23	14	0.0	0.377
	B*	26	2	61	38	0.6	
	C	4	31	52	32	-0.7	
	D	4	1	15	9	0.1	
	E	0	0	0	0	0.0	
	OTH	1	3	11	7	-0.0	
146	A	4	28	47	29	-0.6	0.432
	B	4	4	30	19	0.0	
	C*	31	4	70	43	0.7	
	D	1	2	5	3	-0.0	
	E	0	0	0	0	0.0	
	OTH	1	3	10	6	-0.0	
147	A	0	3	20	12	-0.1	0.519
	B*	24	29	84	52	-0.1	
	C	12	3	30	19	0.2	
	D	4	2	22	14	0.0	
	E	0	0	0	0	0.0	
	OTH	1	4	6	4	-0.1	
148	A	0	4	13	8	-0.1	0.772
	B	0	2	7	4	-0.0	
	C*	41	28	125	77	0.3	
	D	0	3	13	8	-0.1	
	E	0	1	1	1	-0.0	
	OTH	0	3	3	2	-0.1	
149	A	13	18	65	40	-0.1	0.278
	B	1	10	21	13	-0.2	
	C	11	1	25	15	0.2	
	D*	15	8	45	28	0.2	
	E	0	1	1	1	-0.0	
	OTH	1	3	5	3	-0.0	
150	A	11	8	48	30	0.1	0.296
	B	3	9	23	14	-0.1	
	C	5	6	23	14	-0.0	
	D*	21	2	48	30	0.5	
	E	0	1	1	1	-0.0	
	OTH	1	15	19	12	-0.3	

Total in Upper Quarter = 41
Total in Lower Quarter = 41

Number of Respondents = 162
Number of Test Items = 173
Kuder Richardson 20 = 0.98

APPENDIX J

Date Run..: 05/06/91 National Computer Systems Page: 26
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
151	A*	18	10	62	38	0.2	0.383
	B	19	3	49	30	0.4	
	C	4	6	21	13	-0.0	
	D	0	4	12	7	-0.1	
	E	0	2	2	1	-0.0	
	OTH	0	16	16	10	-0.4	
152	A	0	2	6	4	-0.0	0.642
	B	1	6	14	9	-0.1	
	C*	39	6	104	64	0.8	
	D	1	3	12	7	-0.0	
	E	0	1	1	1	-0.0	
	OTH	0	23	25	15	-0.6	
153	A	14	7	45	28	0.2	0.235
	B	11	3	40	25	0.2	
	C*	14	3	38	23	0.3	
	D	0	4	10	6	-0.1	
	E	0	1	1	1	-0.0	
	OTH	2	23	28	17	-0.5	
154	A*	35	2	86	53	0.8	0.531
	B	3	5	24	15	-0.0	
	C	0	8	16	10	-0.2	
	D	1	8	15	9	-0.2	
	E	0	0	0	0	0.0	
	OTH	2	18	21	13	-0.4	
155	A	2	4	17	10	-0.0	0.691
	B*	37	24	112	69	0.3	
	C	1	4	11	7	-0.1	
	D	1	3	14	9	-0.0	
	E	0	0	0	0	0.0	
	OTH	0	6	8	5	-0.1	
156	A	8	24	54	33	-0.4	0.488
	B	0	4	9	6	-0.1	
	C*	32	2	79	49	0.7	
	D	1	5	12	7	-0.1	
	E	0	0	0	0	0.0	
	OTH	0	6	8	5	-0.1	

Total in Upper Quarter = 41
Total in Lower Quarter = 41

Number of Respondents = 162
Number of Test Items = 173
Kuder Richardson 20 = 0.98

APPENDIX J

Date Run..: 05/06/91 National Computer Systems Page: 27
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
157	A	0	16	31	19	-0.4	0.580
	B	1	2	14	9	-0.0	
	C*	39	8	94	58	0.8	
	D	1	8	15	9	-0.2	
	E	0	0	0	0	0.0	
	OTH	0	7	8	5	-0.2	
158	A*	3	19	34	21	-0.4	0.210
	B	36	5	93	57	0.8	
	C	1	5	11	7	-0.1	
	D	0	3	12	7	-0.1	
	E	0	0	0	0	0.0	
	OTH	1	9	12	7	-0.2	
159	A*	29	2	71	44	0.7	0.438
	B	12	3	38	23	0.2	
	C	0	16	27	17	-0.4	
	D	0	10	16	10	-0.2	
	E	0	1	1	1	-0.0	
	OTH	0	9	9	6	-0.2	
160	A	4	10	24	15	-0.1	0.574
	B*	37	5	93	57	0.8	
	C	0	0	9	6	0.0	
	D	0	18	27	17	-0.4	
	E	0	0	1	1	0.0	
	OTH	0	8	8	5	-0.2	
161	A	8	15	52	32	-0.2	0.432
	B	2	3	14	9	-0.0	
	C*	30	8	70	43	0.5	
	D	0	3	10	6	-0.1	
	E	0	1	1	1	-0.0	
	OTH	1	11	15	9	-0.2	
162	A	5	3	25	15	0.0	0.216
	B*	12	6	35	22	0.1	
	C	21	9	56	35	0.3	
	D	0	7	23	14	-0.2	
	E	0	1	1	1	-0.0	
	OTH	3	15	22	14	-0.3	

Total in Upper Quarter = 41
Total in Lower Quarter = 41

Number of Respondents = 162
Number of Test Items = 173
Kuder Richardson 20 = 0.98

APPENDIX J

Date Run..: 05/06/91 National Computer Systems Page: 28
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
163	A	2	4	17	10	-0.0	0.340
	B	4	13	45	28	-0.2	
	C	0	4	20	12	-0.1	
	D*	34	1	55	34	0.8	
	E	0	1	1	1	-0.0	
	OTH	1	18	24	15	-0.4	
164	A*	36	2	69	43	0.8	0.426
	B	0	5	19	12	-0.1	
	C	3	12	34	21	-0.2	
	D	2	3	19	12	-0.0	
	E	0	0	0	0	0.0	
	OTH	0	19	21	13	-0.5	
165	A	8	6	32	20	0.0	0.333
	B	1	14	32	20	-0.3	
	C	4	6	28	17	-0.0	
	D*	25	6	54	33	0.5	
	E	0	0	0	0	0.0	
	OTH	3	9	16	10	-0.1	
166	A	0	3	10	6	-0.1	0.648
	B*	40	16	105	65	0.6	
	C	1	2	16	10	-0.0	
	D	0	7	18	11	-0.2	
	E	0	0	0	0	0.0	
	OTH	0	13	13	8	-0.3	
167	A	0	4	19	12	-0.1	0.494
	B	0	7	17	10	-0.2	
	C	2	14	32	20	-0.3	
	D*	39	3	80	49	0.9	
	E	0	0	0	0	0.0	
	OTH	0	13	14	9	-0.3	
168	A	13	2	40	25	0.3	0.228
	B	7	18	53	33	-0.3	
	C*	20	2	37	23	0.4	
	D	0	4	14	9	-0.1	
	E	0	0	0	0	0.0	
	OTH	1	15	18	11	-0.3	

Total in Upper Quarter = 41
Total in Lower Quarter = 41

Number of Respondents = 162
Number of Test Items = 173
Kuder Richardson 20 = 0.98

APPENDIX J

Date Run..: 05/06/91 National Computer Systems Page: 29
Test Date.: 00/00/00 MicroTEST Score II Plus

Item Analysis

Test Name: Test ID: 1 Sort: None
Instructor: All Grade: All Class: All
Scoring: Raw Score

Total Test

Question		Upper Quarter	Lower Quarter	Total Count	Total %	Discrimination Index	Difficulty Factor
169	A	14	13	47	29	0.0	0.302
	B	4	6	27	17	-0.0	
	C*	18	3	49	30	0.4	
	D	3	2	18	11	0.0	
	E	0	0	0	0	0.0	
	OTH	2	17	21	13	-0.4	
170	A*	30	5	66	41	0.6	0.407
	B	4	1	21	13	0.1	
	C	2	12	32	20	-0.2	
	D	2	3	12	7	-0.0	
	E	0	0	0	0	0.0	
	OTH	3	20	31	19	-0.4	
171	A	4	1	27	17	0.1	0.506
	B	4	2	23	14	0.0	
	C*	28	27	82	51	0.0	
	D	2	6	17	10	-0.1	
	E	0	0	0	0	0.0	
	OTH	3	5	13	8	-0.0	
172	A	1	3	12	7	-0.0	0.407
	B	14	1	47	29	0.3	
	C*	24	14	66	41	0.2	
	D	1	17	29	18	-0.4	
	E	0	1	1	1	-0.0	
	OTH	1	5	7	4	-0.1	
173	A	34	14	89	55	0.5	0.099
	B*	1	3	16	10	-0.0	
	C	4	4	21	13	0.0	
	D	2	12	25	15	-0.2	
	E	0	1	1	1	-0.0	
	OTH	0	7	10	6	-0.2	

Total in Upper Quarter = 41
Total in Lower Quarter = 41

Number of Respondents = 162
Number of Test Items = 173
Kuder Richardson 20 = 0.98

APPENDIX K

Sign Test Results on Means

Hypotheses	# of Tests	# of + Means	Z
Hypothesis One	**11**	**0**	**-3.32**
Hypothesis Two	**77**	**18**	**-4.67**
Gender	22	6	-2.13
Female	11	6	0.30
Male	11	0	-3.32
Race	22	2	-3.83
Caucasians	11	0	-3.32
Non-Caucasians	11	2	-2.11
Parental Education Level	33	10	-2.26
< HS	11	4	-0.90
HS	11	0	-3.32
> HS	11	6	0.30
Hypothesis Three	**11**	**3**	**-1.51**
Overall	**99**	**21**	**-5.73**