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DICKINSON COUNTY COMMUNITY SCHOOLS
TRAFFIC SAFETY EDUCATION
CURRICULUM EVALUATION

Final Report
October, 1979

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16. Abstract

This final report documents the evaluation of the Dickinson County Community Schools Traffic Safety Education Project, begun in the Spring of 1976. Reported herein are the results of the data analysis for the two years of data collection as well as a review of the evaluation organization and instrument development. The results show significant changes (positive) in the post-test scores of the treatment group when compared to the pre-test scores. The control group scores are unchanged. The first and second years' activities are reported in HSRI reports numbered UM-HSRI-77-34 and UM-HSRI-78-30, respectively.

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1. INTRODUCTION

1.1 Project History

The Dickinson County Community Schools, Kingsford, Michigan, began a three year project in the spring of 1976 to integrate a "Traffic Safety Education Curriculum Guide for Grades 7-9"[1] into its junior high school curriculum. The purpose was to promote the use of traffic safety concepts in a variety of subject areas in the junior high school curriculum.

Typically, examples are used to illustrate points or concepts when presenting a lesson to a class. These examples are drawn from a diverse background of material to both assist in developing a concept and to show application in different situations. The use of story problems in mathematics is a good example of this use.

Driver education draws upon many subject areas to furnish the background for the various topics. Travel time, distance, and fuel consumption problems, for example, are the formulae and computational concepts presented in mathematics and applied in driver education. Thus, it has been the desire of driver educators to encourage the use of driving-related concepts in other subject matter areas so that students are familiar with them when they began driver education. Also, teachers of other subjects constantly need problem and content ideas, and would welcome a structure which allows a practical application of their concepts. The "Traffic Safety Education Curriculum" bridges this gap, in that it provides for the junior high school teacher a source of material related to the driving task.

The purpose of the "Traffic Safety Education Curriculum Guide Grades 7-9" is to promote the use of traffic safety concepts as subject matter for a variety of courses. In the day-to-day operation of an automobile, the driver applies his integrated knowledge of such subjects as physics, mathematics, general science, civics, etc. Likewise, in the teaching of various subjects, concrete examples are used in delivering

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[1]Traffic Safety Education Curriculum Guide, Grades 7-9. Michigan Department of Education, Lansing, Michigan, 1975.

the material to be learned. The use of driving-related examples is useful and logical, in that they can be taught as a natural part of a course and utilized later by the driver, both in a driver education setting and later as a licensed driver. Many subjects are amenable to using driving examples as a means of conveying certain course concepts.

Left to their own devices, teachers may utilize driving as a means of conveying course information without recognizing the added benefit to later use by the driver or student in another setting or class. With a little help in producing lesson plans, a teacher can incorporate driving examples into those plans. In this instance, resources were provided to develop lesson plans utilizing driving concepts.

1.2 Role of HSRI

HSRI's assistance was sought in planning an evaluation of this curriculum guide and in examining the results of the program. Our assistance was concentrated in four areas: (1) establishing the overall research evaluation design and methodology; (2) offering guidance in the preparation of lesson outlines and tests; (3) reviewing teacher-prepared curricula and tests; (4) performing the evaluation. Dickinson County's junior high teachers planned and implemented the curriculum as a unit in their classes.

HSRI's first year effort resulted in (1) specification of a research strategy and evaluation procedures; (2) conduct of a workshop in preparing lesson plans and tests; (3) review of the curriculum; and (4) review and revision of tests suitable for evaluation purposes. There were reported in "Dickinson County Community Schools Traffic Safety Education Curriculum Evaluation," July 15, 1977 (Report No. UM-HSRI-77-34).

HSRI's second and third year efforts were concentrated in evaluating the data collected as a result of the testing program. This report summarizes these testing results and reports the conclusions.

2. METHODOLOGY

2.1 Research Design and Test Development

2.1.1 Research Design

The question is: does the inclusion of driving-related material in a course other than driver education have any additional benefit for the student? Does the student learn the subject matter of the course and also something about driving? To answer these questions it is necessary to develop an experiment to measure the amount of driving knowledge gained as a result of inclusion of driving examples in the regular course material.

While a complicated experimental design is not needed, care must be taken to insure that the experiment will yield useful information and be free of (or at least controlled for) confounding variables. Thus, during the time of the experiment certain guidelines must be adhered to.

The design is quite simple. Students in one school are to receive the treatment (lessons), while students in another school(s) are controls and receive no lessons in traffic safety. These are called the treatment and control groups, respectively. The experiment will consist of giving all students a pretest, the treatment students the driving-oriented lesson, and then re-testing all students at the end. A comparison of scores on the two tests tells whether the driving-related lessons were successful in achieving the goal. The test instruments are teacher-constructed multiple-choice tests covering the material presented in the unit as it relates to driving.

As initially conceived by the school district, the project was to run for three years. The number of subject areas for possible inclusion in the program was roughly equal to the number of subjects taught in the school. This would have produced approximately 70-75 variations of the program--far too many for a proposed research project with limited scope.

While it is possible for each teacher to include this curriculum in the subject matter, it is impossible to sort out all the students to

provide for a clean experiment. To overcome this and other administrative problems of a multi-year, multi-grade program, several ground rules were established. For purposes of this experiment, all variations (classes) of a subject would receive the same treatment, regardless of the level of students in a particular class. As an example, 9th grade math is offered as Business Math, Algebra, Advanced Algebra, Industrial Math, and General Math. Therefore, one math curriculum using driving samples would be taught to all students in 9th grade math. Also the number of subject offerings would be limited to one per grade, except that 9th graders could be offered two subjects, and 7th graders could be offered two subjects in the final year of the experiment. (See Tables 1 and 2, below.)

Table 1 shows the subject areas as selected for each grade grade and Table 2 shows the progression of the subjects through the three years of the proposed evaluation.

TABLE 1

SUBJECT AREAS FOR EACH GRADE

Grade	Subject
7th	Social Studies (Soc. St.)
8th	English
9th	Health & Physical Education (HPE)
9th	Math

In the actual project, the number of years has been reduced to two as the first year was used for planning prior to a full-scale implementation.

Since it is impossible to control the assignment of students to a particular class, care must be taken to prevent overlap of different treatments, multiple exposure to the same treatment, or assignment to no treatment.

TABLE 2

EVALUATION DESIGN FOR THE THREE PROJECT YEARS

Year 1				Grade 7 Nothing	Grade 8 Nothing	Grade 9 HPE*
Year 2			Grade 7 Soc. St.	Grade 8 English	Grade 9 HPE	
Year 3	Grade 7 Soc. St.*	Grade 8 English	Grade 9 HPE			

*Because 9th grade students leave the system it is possible to divide the groups and offer alternative subjects without having to worry about subsequent grade-class assignments as in 7th and 8th grades. This is also possible in the 3rd year for 7th grade students as the experiment ends after that year. However, if there is a possibility of continuation of the experiment beyond these years, this should not be done.

Thus, the following design evolved: (1) one subject per grade level; (2) treatment concentrated on a two-week period; (3) use of a pre-test and post-test; (4) uniform treatment to all students in a subject area; (5) operation over a two-year period for all subjects .

The specific comparisons to be made are between the treatment students and control students for each grade and subject as depicted in the above diagram. The students receiving the Social Studies treatment in the 7th grade will be compared to the students not receiving the treatment in the 7th grade. The comparisons to be made and expected results are shown in Table 3. This is typical for each grade-subject area.

If the expected results are obtained, then comparison "a" says that the treatment and control groups were equal (as measured by the pre-test) before the treatment; comparison "b" says that the treatment produced a significant increase in knowledge in the treatment group;

TABLE 3

COMPARISONS TO BE MADE AND EXPECTED RESULTS

Group	Test	Reference No.
Treatment	Pre-Test	1
	Post-Test	2
Control	Pre-Test	3
	Post-Test	4

Comparisons Between:	Expected Results
a. Pre-Test, groups 1 & 3	No significant difference
b. Post-test, groups 1 & 2	Significant difference*
c. Post-test, groups 3 & 4	No significant difference
d. Post-test, groups 2 & 4	Significant difference*

*at 0.05 level

comparison "c" says that the control groups (which did not receive the treatment) showed no knowledge gain; and comparison "d" says that the treatment group showed a significant gain in knowledge over the control group.

The total number of students[2] expected to participate in this study in each of the two years is shown in Table 4.

With the student population of the size indicated in Table 4, it will be possible to detect significant differences in average scores based on the information given in Appendix D. In a preliminary trial of the Health and Physical Education curriculum (HPE during the 1976-77 school year), significant differences in test scores were detected between the pre- and post-test treatment groups and between the post-test treatment and control groups. No significant differences were detected between the pre-test scores for the treatment and control

[2]Based on 1976-77 school year figures. Subsequent year totals may vary slightly.

TABLE 4

NUMBER OF STUDENTS IN TREATMENT AND CONTROL GROUPS BY GRADE LEVEL

Group	Number	By Grade Level		
		7th	8th	9th
Treatment (Kingsford)	547	182	196	169
Control (Norway)	216	72	72	72
(Iron Mt.)	384	128	128	128
Total	600	200	200	200

groups and between the pre- and post-test control group scores. This is as was predicted and expected. However, small samples and only one subject area were employed in this trial. It is expected that sample sizes will be large enough to detect statistically significant differences and provide definitive results at the conclusion of the full experiment.

To summarize, all 9th graders during the first year were subjected to a two-week unit, with pre- and post-tests, as a pilot test for year two. During the 2nd year all 7th grade students received a two-week unit in Social Studies, 8th graders a unit in English, and 9th graders, HPE.

The analysis consisted of a comparison of the test scores for each grade and subject (pre- and post-test) as well as a comparison of test scores with the control students. The treatment group consisted of students from the Kingsford Junior High School (Kingsford). A control group was established, utilizing students in two adjacent school districts--Norway and Vulcan Junior High schools (Norway-Vulcan) and the Iron Mountain Junior High School (Iron Mt.). These students received pre- and post-tests but not the treatment. This design allowed for evaluation of the treatment in each subject area of interest and for the limited evaluation of the impact of two treatments for some students.

If the individual treatments were successful, then a gain in total score for each treatment would be evident. The application of a student's t test for statistical significance between the average scores for the treatment and control groups (paired T test) was utilized.

2.1.2 Curriculum Workshop

To assist in planning of the curriculum for each student groups, a workshop was held with the teachers from Kingsford Junior High School. The purpose of the workshop was to detail the evaluation requirements and research design, assist in developing the curriculum, and provide information on preparing multiple-choice test items. Several copies of the booklet "Preparing Instructional Objectives" by Mager were furnished to the teachers with encouragement to read the text and adopt the principles therein when preparing lesson plans.

The teachers were grouped according to subject matter and assigned the task of preparing lesson plans. These lesson plans were to be specific as to the content to be presented, method of presentation, and expected results (i.e., objectives and goals) since they would form the basis for identifying the content of the tests.

Lesson plans were prepared and forwarded to HSRI for evaluation. Each set of lesson plans represents a two-week unit utilizing driver-education-related concepts as the basis for the content and presentation of each lesson. The lessons for the four subject areas included as part of the experimental program were evaluated. The teachers not included in the four subject areas were also encouraged to prepare lesson plans for eventual inclusion in classroom activity after the experimental program was completed. These other lesson plans are not reproduced here.

At this same workshop, guidance was given in preparing multiple-choice test questions for use in the test instruments. The teachers in each subject area were asked to prepare candidate multiple-choice test items to be evaluated and included in a multiple-choice test. The workshop information included the mechanics of preparing good test items, selection of item content, and a review of test preparation and item evaluation procedures. The test items were prepared by the

teachers and reflected the content of each subject area. The curriculum outlines and test items were then forwarded to HSRI for review and revision.

2.1.3 Curriculum Review

Each of the four subject area lesson plans were reviewed by HSRI staff for completeness and uniformity of structure. Minor editorial changes were made to the lesson plans as submitted. These lesson plans, along with the included reference material, served as the content guide for review of the tests. The final versions of these lesson plans are shown in Appendix A.

2.1.4 Review and Revision of the Test Items

The candidate test items for each subject area were reviewed by the HSRI staff for proper construction and adequacy of content coverage. The major points in the lesson outlines were identified and the test items for that lesson were matched to check for content coverage. Items were revised or new items were prepared where gaps in coverage were detected.

Three of the four tests were administered to groups of students. Due to the lateness of the test administration in the school year, only the HPE, Social Studies, and English tests were given to students in this pre-test. The 9th grade math program was dropped from the project

Item difficulties were compiled for each item and item revisions were made, based upon these results. Items which appeared too easy were either revised or deleted from the candidate tests, and corrections were made to other items to clear up ambiguous points. The revised tests, including two marker items, were prepared for final distribution. These, along with answer sheets, are in Appendix C.

Based on the research design previously established, the following represents the methodology to be followed in presenting and evaluating these traffic safety units in the designated junior high curriculum.

1. All units should be presented simultaneously (or in close proximity) so as to minimize the effect of time and age on the results.

2. Each is a two-week unit designed to be conducted over a consecutive 10-day period.

3. All students in Kingsford Junior High School are to receive the treatment consisting of the appropriate unit for the 7th grade, 8th grade, and 9th grade. The same unit is to be taught to all students in a grade, regardless of class distinctions. An attempt should be made to keep the treatment uniform, recognizing that some variation is likely because of student/teacher differences.

4. Junior high students (grades 7-9) in the control schools are to receive no special instructional program. Classes are to continue as usual.

5. All students should be tested the day before the treatment is to begin in both the control and treatment schools. Test administration instructions are provided in Appendix B.

6. Immediately following the treatment, all students (treatment and control) are to be re-tested using the same test. This test session can be a part of the last day of the experimental period.

7. The test answer sheets should be prepared for data processing and punch cards (or other computer input medium) prepared.

8. The data will then be analyzed, utilizing the student's t test to ascertain if a significant difference exists between pre- and post-test scores for the various treatments for each grade level.

2.2 Analysis Methods

The analysis methodology utilized here consisted of: (1) preparing and scoring the tests (2) performing a matched pair T test on each grade/subject/year.

Data Reduction: The answers were marked on answer sheets and reduced to punched cards by the Cooperative Occupational Education Program students in Dickinson County. Students taking only one test (absent for the other) were eliminated from the data set. The punch cards were then forwarded to HSRI for processing.

Data Processing: The data cards were checked to assure that each student who took the pre-test also took the post-test and vice versa, resulting in a matched pair data set.

Analysis: Two types of analyses were performed on the data: (1) descriptive measures to describe each data set; and (2) paired T tests to determine if there existed a significant difference between the pre- and post-test scores (and hence learning).

The basic model used in the evaluation was a comparison of group means based on the design discussed earlier. This model takes the form:

	GROUP	
TEST PHASE	Treatment	Control
Pre	1*	3*
Post	2*	4*

*Reference Number

where the following comparisons of group means (based on total correct answers for each test) are made to determine if significant differences exist between the groups. If the treatment is successful, then the treatment group should perform better on the post-test (when compared to the pre-test) and the control group should perform essentially the same on the post-test as on the pre-test. Also the two groups should be virtually identical on the pre-test and perform significantly different on the post-test.

The comparisons of group differences and expected results are summarized in Table 5.

The T-Test used in the analysis to follow is based on matched samples. When matched samples are used, the number of observations needed to achieve statistical significance between two means is considerably less than is the case for two independent samples. This result follows from the fact that "matched samples" means <u>one</u> sample with at least two measurements; that is, the classical before and after design of an experiment.

TABLE 5

COMPARISONS OF GROUP DIFFERENCES AND EXPECTED RESULTS

Comparison	Between Groups	Expected Difference	Type of Test
1*	1-2, Treatment, Pre-Test	Significant	Paired T
2*	3-4, Control, Pre-test	Not Significant	Paired T
3*	2-4, Post-test, Treatment-Control	Significant	Stud T
4*	1-3, Pre-Test, Treatment-Control	Not Significant	Stud T

*Reference Number

3. RESULTS

3.1 Introduction

This section describes the results of tests taken by students in grades seven, eight, and nine at three different schools. As was mentioned earlier, each student included in the analysis presented below took the traffic safety test twice. Table 6 shows the number of these students by school and grade level for two different years.

TABLE 6

NUMBER OF STUDENTS TAKING BOTH TESTS

	Grade 7		Grade 8		Grade 9	
School	1977-78	1978-9	1977-78	1978-79	1977-78	1978-79
1. Kingsford (Treatment)	124	123	159	132	166	165
2. Iron Mountain (Control)	96	82	94	99	82	114
3. Norway-Vulcan (Control)	49	60	61	51	70	75
TOTAL (All Schools)	269	255	314	162	318	354
COMBINED CONTROL SCHOOLS	145	132	155	150	152	189

3.2 The 1976-77 School Year

During the 1976-77 school year, no teaching and evaluation testing was undertaken and hence no data analysis was performed Instead the time was devoted to the development and pre-testing of the evaluation instruments and to preparations for the testing to be undertaken in 1977-78.

3.3 The 1977-78 School Year

The basic findings from the tests taken in the 1977-1978 school year are presented by grade level in Table 7. Considering the seventh graders, the mean test score for the "treatment" group increased by almost five points. A slight decrease in average test score is observed among students in the control group. The mode, the score recorded for more students than any other, increased between the two tests for each group. The increase is much larger for the area treatment group, however. As measured by the standard error, a reduction in variation around the mean is observed for the treatment group. These data suggest that the better performance recorded by the treatment group can be attributed to instruction in highway safety.

TABLE 7A

SEVENTH GRADE TEST SCORES FOR 1977-1978

Seventh Grade	Treatment (Kingsford)	Control (Iron Mountain Norway-Vulcan)
First Test		
Number of Students	124	145
Range of Test Scores	16-31	17-32
Mode	25	25
Mean	24.5	25.2
Standard Deviation	3.1	3.4
Second Test		
Number of Students	124	145
Range of Test Scores	21-36	14-33
Mode	30	27
Mean	29.4	24.6
Standard Deviation	2.9	3.8

The findings for students in grades eight and nine are very similar to those seen for seventh grade students. The discussion now turns to the findings for the 1978-79 school year.

TABLE 7B

EIGHTH GRADE TEST SCORES FOR 1977-1978

Eighth Grade	Treatment	control
First Test		
Number of Students	159	155
Range of Test Scores	8-23	6-23
Mode	18	18
Mean	17.9	17.1
Standard Deviation	3.4	3.0
Second Test		
Number of Students	159	155
Range of Test Scores	15-24	6-24
Mode	21	19
Mean	20.7	17.3
Standard Deviation	1.9	3.2

TABLE 7C

NINTH GRADE TEST SCORES FOR 1977-1978

Ninth Grade	Treatment	Control
First Test		
Number of Students	166	152
Range of Test Scores	12-30	11-30
Mode	24	23
Mean	23.8	23.3
Standard Deviation	3.5	3.2
Second Test		
Number of Students	166	152
Range of Test Scores	13-31	10-31
Mode	29	26
Mean	28.5	23.9
Standard Deviation	2.2	4.0

3.4 The 1978-79 School Year

Descriptive statistics for the 1978-79 school year are presented in Table 8. For each grade level the mean test score increased by a larger amount in the treatment group than in the control group. Also, for each grade level, the highest score on the second test is recorded in the treatment group.

TABLE 8A

SEVENTH GRADE TEST SCORES FOR 1978-79

Seventh Grade	Treatment (Kingsford)	Control (Iron Mountain Norway-Vulcan)
First test		
Number of Students	123	132
Range of Test Scores	12-32	15-31
Mode	25	24
Mean	23.9	24.1
Standard Deviation	3.2	3.7
Second Test		
Number of Students	123	132
Range of Test Scores	16-34	13-32
Mode	27	27
Mean	27.3	24.4
Standard Deviation	3.5	3.8

3.5 The Two School Years Combined

Without question, instruction in traffic safety is followed by improvement in test scores. Table 9 summarizes the changes in average test scores for the two school years. The average test score for the treatment group is always higher for the second test than the first test. That is not always true for the control group. Compared with the control group, the treatment group averages from 2.6 to 5.4 more points gained between the two tests.

TABLE 8B

EIGHTH GRADE TEST SCORES FOR 1978-79

Eighth Grade	Treatment	Control
First Test		
Number of Students	132	150
Range of Test Scores	7-23	10-23
Mode	20	19
Mean	18.5	17.7
Standard Deviation	2.9	3.0
Second Test		
Number of Students	132	150
Range of Test Scores	15-24	9-23
Mode	21	20
Mean	21.3	17.5
Standard Deviation	1.9	3.0

TABLE 8C

NINTH GRADE TEST SCORES FOR 1978-79

Ninth Grade	Treatment	Control
First Test		
Number of Students	166	190
Range of Test Scores	13-31	14-30
Mode	23	21
Mean	22.5	22.7
Standard Deviation	3.7	3.0
Second Test		
Number of Students	166	190
Range of Test Scores	12-31	8-30
Mode	28	25
Mean	28.0	23.6
Standard Deviation	3.4	3.8

Evidence of some learning without formal instruction is observed among students in the control groups. The higher the grade level the

more likely is the second score better than the first score. It is reasonable to assume that this finding reflects a growing interest in cars and driving with age.

TABLE 9

CHANGE IN AVERAGE SCORE BETWEEN THE FIRST AND SECOND TEST

	1977-78		1978-79	
Grade Level	Treatment (Kingsford)	Control (I.M.+N-V)	Treatment (Kingsford)	Control (I.M.+N-V)
Seventh	+4.8	-0.6	+3.4	-0.3
Eighth	+3.1	+0.2	+2.8	+0.2
Ninth	+4.7	+0.7	+5.5	+0.9

Are the increases in test scores recorded for the treatment group statistically significant? The answer is a definite yes, as is shown by the data in Table 10. All changes for the six treatment groups are significant way beyond the 1 percent level of confidence (a T-Test of at least 3.0). Therefore, it is very unlikely that no real learning occurred during the time interval between the two tests. One of the six control groups exhibits a significant increase in average score between the two tests. This occurred in the ninth grade during the 1978-1979 school year. It should be mentioned, however, that the T-test for the treatment group exceed the T test for this control group by a margin of at least six to one.

TABLE 10

WHETHER CHANGE IN AVERAGE SCORE BETWEEN THE TWO TESTS IS "STATISTICALLY SIGNIFICANT"

Treatment or Control Group		Matched Sample T-Test		Significant at 99% Level of Confidence?	
		1977-78	1978-79	1977-78	1978-79
Seventh Grade					
T	Kingsford	19.5	12.0	Yes	Yes
C	Iron Mt./ Norway-Vulcan	2.15	.93	No	No
Eighth Grade					
T	Kingsford	13.3	12.4	Yes	Yes
C	Iron Mt./ Norway-Vulcan	1.0	0.7	No	No
Ninth Grade					
T	Kingsford	21.2	24.6	Yes	Yes
C	Iron Mt./ Norway-Vulcan	2.0	3.9	No	Yes

4. CONCLUSIONS

Based on the data analysis, the following conclusions can be drawn:

(1) The treatment and control groups within each of the three grades did not differ significantly in performance on the respective pre-tests. That is, the performance of the students in Kingsford Junior High 7th grade (treatment school) was not significantly different than those in the Iron Mountain and Norway-Vulcan 7th grade (control schools). This same statement applies equally to the 8th and 9th grades.

(2) The treatment group within each grade level performed significantly better on the post-test than on the pre-test. In the measurement of the 7th grade treatment school, the students performed substantially better on the post-test when compared to the pre-test. The same statement applied equally to the 8th and 9th grades.

(3) The control group within each grade level performed virtually no better on the post-test than on the pre-test. In the measurement of the 7th grade control school, the students performed about the same on the post-test when compared to the pre-test. The same statement applies equally to the 8th and 9th grades.

Thus it is reasonable to assume that the treatment program produced a measurable and significant change in the knowledge of the students participating in the programs, whereas the control students showed little or no gain. This is summarized in Table 11.

TABLE 11

DIFFERENCES IN AVERAGE TEST SCORE
(POINTS) PRE-AND POST-TEST

	Treatment		Control	
Grade	1977-78	2978-79	1977-78	1978-79
7	+4.85	+3.37	-0.62	-0.288
8	+3.06	+2.80	+0.21	+.160
9	+4.72	+5.51	+0.69	+.911

Students participating in such a program do learn the material presented and are able to retain it over the short term. An additional project is required to ascertain the length of retention and effect upon learning driver education activities.

5. DISCUSSION AND RECOMMENDATIONS

5.1 Discussion

A word of caution must be stated. Students were exposed to only limited driving concepts presented in the context of a class not labeled as "driver education." Therefore the conclusion cannot be drawn that this exposure when coupled with a driving course will make them better drivers.

The approach used here will, as demonstrated, help prepare them for the driver education class as concepts used in mathematics, social studies, science, English, etc., have been put into the driving context.

This evaluation was limited to answering the question of whether students learn about driving by the inclusion of driving related material in non-driving courses. The answer--as demonstrated here--is yes. However, as to the question, will they be safer drivers, no answer can be given. The content and application of these lessons can be viewed as "driving readiness activities." There are many activities of this nature which must be undertaken before one learns to drive. Predicting future driving performance on a limited set of skills is beyond the scope of the state-of-the-art.

This project is the first step in the evaluation of the concept of including driving readiness activities in the regular school curriculum. As has been demonstrated here, the material can be presented successfully in the context of the school curriculum. The next step in the evaluation process is to determine if the learning is retained and if it makes the teaching of driver education more efficient.

The course content was not selected on the basis of reduction of accidents or violations (as no currently defined basis exists). Therefore any effect these courses have on future driving performance can be considered incidental.

The benefit from offering these driving content areas in subject matter areas other than driver education is that the student is exposed early and on a continuing basis to driving concepts as they might occur in these other subjects, and his basis of knowledge and awareness is

broadened. Topics in a future driver education class can be presented more efficiently, since the student has been preconditioned to their applicability and can apply the topics with little effort and adaptation.

While the project is considered a success, certain factors need to be recognized and controlled for during any subsequent trials.

The major problem encountered was in the basic experimental design. The designation of treatment and control schools was established prior to HSRIs involvement in the design. The use of separate schools for treatment and control represents a compromise in the ability of the analysis to show true effects. A superior design would be to use the same school for both treatment and control by dividing the classes into the two categories. While this may present some scheduling problems, the advantages outweigh those.

The project as originally proposed was too large and ambitious for the size of the school. A compromise was reached, as reflected in this design. However, a project of more modest scope would be still more desirable from a research and design prospect. A project involving only one subject area is most desirable and controllable.

5.2 Recommendations

It is recommended that this project be continued.

A second step in the evaluation would then be to address the question of long-term retention and impact on driver education knowledge. Such an evaluation could be carried out by repeating this project and then tracking the students until they reach driver education. By re-testing on the material presented in this program (with proper controls) it would be possible to quantify the effect of material presented in the junior high on driver education.

APPENDIX A

Lesson Plans

7th Social Studies

8th English

9th Health & Physical Education

9th Math

SEVENTH GRADE - SOCIAL STUDIES

Performance Objective

The student will be able to identify road signs and signals, and will identify benefits of obeying traffic laws. Emphasis on bicycling.

First Week

Objective

The student will identify road signs, pavement markings, and traffic signals, and will know the appropriate turn-light signals and hand signals. How all are used at a given time will be derived through the making and using of charts and games.

Goals

1. Given a chart the student will identify each sign and light signal.
2. Given a chart or list the student will look up and define what each sign and signal means.
3. Given sets of circumstances each student will state when signals must be used and the method or procedure that is needed.
4. Given various traffic situations the student will identify orally or written, the best signal to be used.

Classroom Procedure

Monday

1. Student will make appropriate charts of various road signs and light signals with identifying features using:
    a. Poster Board
    b. Colored Construction Paper
    c. Glue, Scissors, Felt Pens

Tuesday

2. Student will have vocabulary lists with meanings derived from various reading lists.

    a. Vocabulary listed under Materials to be Used.

Wednesday

3. Games will be set up by students using light signals and road signs.

Thursday

4. Situations will be acted out by students and signs and light signals will be used.

Second Week

Objective

The student will demonstrate positive attitudes towards obeying traffic laws concerning bicycling.

Goals

1. Given a list of behavior and attitude traits the student will identify through discussion those traits which are positive.
2. Given various traffic situations the student will identify through written situations mature performance and behavior.
3. The student will be able to identify laws orally and written pertaining to bicycling. Also the duties and rights of rider and pedestrian will be identified in the same manner.

Classroom Procedures

Monday

1. Discussion of positive behavior and attitude traits.
    a. Lists to be made using sources from Materials to be Used

Tuesday

2. Identification of mature and immature behavior and performance through discussion and written situations.

    a. Use pamphlets and charts under Materials to be Used.

Wednesday

3. List and discuss laws.

    a. Use blackboard or have individual students make their own charts using manilla paper.

Thursday

4. Observe in community for violations - Make lists - Share in class.

Friday

5. Testing

EIGHTH GRADE - ENGLISH

First Week

Objective

The student will choose a sign and write a properly punctuated paragraph detailing what the sign means and where it is likely to be found. The student shall then read his paragraph to the class.

Goals

1. The student will know the meaning of the following sign categories:
   A. Warning
   B. Guide
   C. Regulatory
2. The student shall know and identify where the various types of signs are most likely found.
3. Give the student opportunity to present his paragraph to the class for two-three minutes and answer questions.
4. Administer a multiple-choice test at the end of the week measuring objectively information gained.

TRAFFIC SAFETY EDUCATION

English - 8th Grade

LESSON PLANS - WEEK ONE

Monday

Pass out books - What Every Driver Must Know. Students will read pp. 18-28, information concerning signs. The student will know the meaning of:

I. Warning Signs
   - A. curves, signals, crossroads
   - B. slippery
   - C. bike xing
   - D. school xing
   - E. pedestrian xing

II. Regulatory Signs
   - A. No U turns
   - B. No bicycles
   - C. No passing
   - D. Stop
   - E. Yield
   - F. Railroad

III. Guide
   - A. Trail
   - B. Bike Route
   - C. Exit
   - D. Hospital

Tuesday

Discuss meaning of signs briefly and student will write a list of signs and where they are usually located.

Wednesday

Students will write a properly punctuated paragraph discussing one type of sign (warning, reg., guide) where they are usually found, and their purposes. The paragraph will have correct grammar, usage, and mechanics.

Thursday

Each student will present his/her paragraph to the class and be prepared to answer any questions.

SECOND WEEK

Objective

The student shall be able to identify the "Rules for Safe Riding" contained in the pamphlet entitled "Bike Book of Rules for Safe Riding" published by Travelers Protective Association of America in St. Louis, Missouri. The student shall also be able to identify ten bicycle laws contained in the pamphlet "What You Should Know About Bicycling" published by the Michigan Department of State. The student will express the above laws and rules in properly puncturated paragraphs, and identify the correct rules and laws on a multiple-choice test.

Goals

1. Students shall be able to define and spell the following terms that pertain to bicyclists.

   A. pedestrian
   B. vehicle
   C. registration
   D. saddle
   E. reflector
   F. license
   G. right-of-way

2. The student shall read the pamphlet "Bike Book of Rules for Safe Riding," published by Travelers Protective Association.

3. The student shall read the pamphlet "What You Should Know About Bicycling," published by the Michigan Department of State.

4. The student shall write a paragraph/s summarizing a bicycle law.

5. The student shall answer the multiple test question developed for their subject area.

SECOND WEEK LESSON PLANS

Monday - Handout sheets will be given to each student containing the following terms: pedestrian, vehicle, registration, saddle, reflector, license, and right-of-way.

Students will look up the definition of the above terms in the Thorndike Junior Dictionary. The teacher will then write the correct definitions on the blackboard.

Tuesday - Pass out pamphlet "What You Should Know About Bicycling." Have students read this pamphlet out loud. Point out bicycle laws; follow flow of traffic, never drive more than two abreast - ride near the right, use bike paths when available, give pedestrians the right of way, never hitch rides - always sit on the seat, only ride the number of passengers which equal the number of seats on the bike. Point out proper use of periods for statements and commands. Student will change the statement of bike laws to exclamatory sentences.

pp. 234 and 236 in text English Grammar and Composition

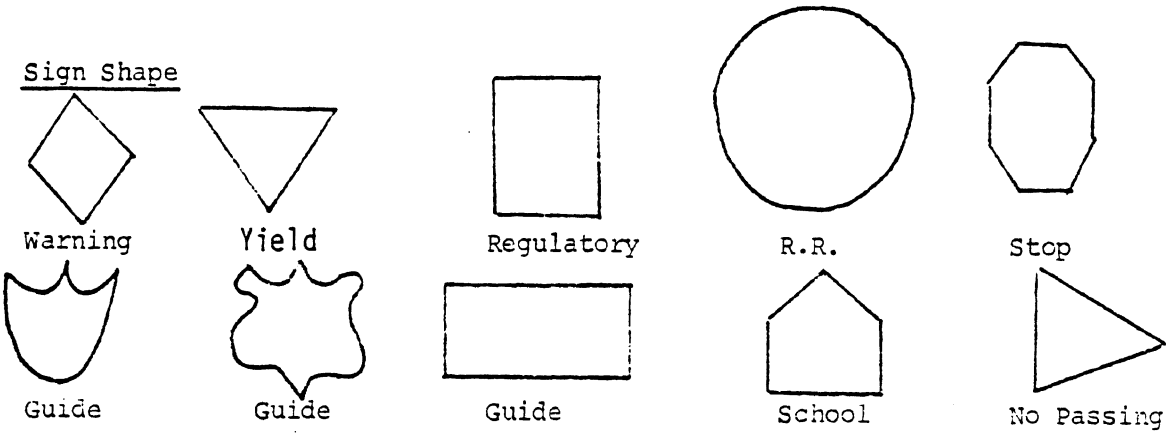
Wednesday - Teacher will lecture on commas, pp. 237-238 in text. Students will write correctly punctuated sentences using bicycle terms in series (Rule 13f) 1, 2, and 4.

Thursday - The student shall write two correctly punctuated paragraphs, one summarizing the rules presented in the pamphlet "Bike Book ----" and others summarizing the bicycle laws heretofore mentioned in the pamphlet "What You Should Know About Bicycling."

Friday - The student will take a multiple-choice test on the thirteen bike rules and the ten bike laws.

Information to be Used

Sign Shape



Sign Color

White on Green - Guide

White on Blue - Motorist Services

White on Brown - Recreation Areas

Black on White - Regulatory

Black on Yellow - No Passing, Warning

White on Red - Yield, Stop

Traffic Lights (Have Pictures)

Red - Stop - Behind Crosswalk

Yellow - Slow down and stop

Green - Go - Make sure there is no cross traffic or pedestrians

Flashing Red Arrow - Stop before entering intersection. Drive in arrow direction when clear.

Steady Green Arrow - Turn carefully in direction shown. Yield for pedestrians and traffic.

Flashing Red Light - Full stop. Go when clear.

Flashing Yellow Light - Drive carefully through intersection.

Hand - or Arm Signals

Right turn - Arm up - 90 degree angle

Left turn - Arm extended straight out

Stop - Arm down - 90 degree angle

Pedestrians

The law says drivers must do everything possible to keep from hitting people on streets and roadways.

Drivers must yield to pedestrians:

1. At crosswalks
2. When turning
3. At stop signs
4. At traffic signals
5. When entering a street
6. When meeting blind pedestrians

Bicycle Rules

1. Obey all traffic regulation
2. Keep to right - follow traffic - straight line
3. Proper front and rear lights
   Never ride at night without white light in front and red reflector in back.
4. Proper signalling device - horn or bell
5. Yield to pedestrians
6. Never hitch rides
7. Always ride single file
8. Check brakes
9. Watch intersections - be alert
10. Use hand signals

Terms to Define and Know

Regulatory	Right-of-way	Intersection	Flashing
Alert	Darting	Pride	Lane
Symbol	Proceed	Privilege	Obey
Octagon	Crosswalk	Hazard	Yield
Vertical	Pedestrian	Potential	Observe
Rectangle	Respect	Negligence	Regulatory
Pentagon	Responsibility	Attitude	Diamond
Barrier	Immature	Caution	Triangle
Prohibit	Mature	Courteous	Detour
Proceed	Intersection	Visibility	

Materials to be Used

Pamphlets

"New Signs for Safety"
"What You Should Know About Bicycling"

Charts

"State of Michigan Road Signs"
"Safe Drivers Recognize These Signs"
"Bicycle Safety Posters"

Games

Traffico

Book

Basic Driver Education

Filmstrips

If available or films

NINTH GRADE - HEALTH & PHYSICAL EDUCATION

First Aid for Sick and Injured
and Protecting Yourself
at the Scene of a Traffic Accident

Overall Objective - Identify actions to take when arriving at the scene of an accident in regard to injured victims and protecting yourself.

Monday - Objective - Students will be able to recite the "do's" and "dont's" at the scene of an accident.

Assignment: Students will be able to speak on one of the "do" or "don't" statements explaining it thoroughly.

Tuesday - Objective -

A. The student will be able to explain when to use direct pressure, the location of the pressure points and when they are used.

B. The student will be able to explain what a tourniquet is, how to make one, and how to use it.

C. The student will be able to explain what shock is, it's symptoms, and how to give aid to a person who is in shock.

Assignment: (Class will break up into three groups). Students will talk about direct pressure and pressure points. They will show a diagram locating the various pressure points.

Students will demonstrate the use of a tourniquet, explaining how to use a tourniquet, when to use, and where to place and remove it.

Students will explain what the symptoms of shock are and what to do for it.

Wednesday - Objective - Students will be able to name the two kinds of fractures. They will also learn how to make and apply splints and slings.

Assignment: Students will demonstrate what to do with fractures at the scene of an accident. They will explain how to construct a splint and sling, then how to apply the splint on a fractured arm or leg.

Thursday - Objective - The student will know what to do at the scene of a drowning accident. The student will know the steps involved in giving mount-to-mouth resuscitation.

Assignment: Students will explain artificial respiration and demonstrate artificial respiration on a manikin.

Friday - Objective - The students will take a test over the weeks unit to see what they have learned on first aid.

Reference Books:

First Aid - Red Cross
First Aid - Johnson and Johnson Company

Resource Personnel

Local Doctor
State Police
Water Safety Instruction
Red Cross Instructor on First Aid

First Aid for Sick and Injured at
the Scene of a Traffic Accident

Monday

A. Importance of right treatment at the right times is emphasized to students.

B. Proper procedures when you arrive at the scene of an accident. Traffic accident do's and don'ts.

1. If you arrive first at the scene of an accident:

DO'S
1. Do Stop
2. Do give aid to the injured
3. Do call the ambulance or doctor if necessary
4. Do protect the scene from further damage
5. Do report the accident to the authorities

DON'TS
1. Don't move an injured person. It would possibly add to his injury (unless to protect from further injury).
2. Don't comment on the accident

2. If you arrive at the scene of an accident where help has arrived, stay out of the way unless it is clear you can help. It is best for you to leave the scene to allow the authorities to perform their tasks and to prevent possible injury to yourself. (Secondary explosion, fire, etc.are a possible consequence of certain types of accidents).

3. If you are involved in an accident:

DO'S
1. Do Stop
2. Do give aid to the injured
3. Do call the ambulance or doctor if necessary
4. Do protect the scene from further damage
5. Do report the accident to the authorities
6. Do get information about the other driver and give information about yourself
7. Do get names and addresses of all involved
8. Do get names and statements of all witnesses
9. Do make written notes on the scene
10. Do see a doctor, if necessary
11. Do notify your insurance agency
12. Do consult your lawyer, if necessary

DON'TS

1. Don't leave the scene of an accident in which you are involved
2. Don't move an injured person. It could possibly add to his injury
3. Don't comment on the accident
4. Don't admit anything
5. Don't sign anything
6. Don't make any immediate payments of any kind to the other party
7. Don't make any arrangements with persons offering to adjust or handle your case, except an attorney of your own selection or your own insurance agent

Tuesday

A. Bleeding

1. Direct Pressure
   a. When you come upon the scene of an accident, first check to see if a person is breathing, then check for severe bleeding. Severe bleeding can cause death.
   b. If a person is bleeding, lay the victim down and apply direct pressure to the wound with a clean cloth, if possible. This action often controls bleeding.

2. Pressure Points
   a. When you come upon the scene of an accident where there is severe bleeding, , there is another method of stopping bleeding in the case of an injured arm or leg. If direct pressure on the wound fails to control bleeding, you should apply pressure to the supplying blood vessel.

   b. There are certain places where pressure will help control the bleeding of an injured arm or leg. They are called "pressure points". When you press on the pressure points, you move blood vessels against the bone, thereby slowing the blood in the vessels.

   c. There are TWO main pressure points on each side of the body, one on the inner side of the arm between the elbow and armpit and the other just below the groin on the front inner half of the thigh. (Can Show Diagram).

   d. The upper arm pressure points slow blood flow to the arms and the lower pressure points slow blood to the legs.

3. Tourniquet and its dangers

   a. Another way to stop severe bleeding is to apply a tourniquet

   b. A tourniquet is used as a last measure to stop severe bleeding

   c. If you must use a tourniquet, use a strip of material about two inches wide. Use rope, wire or cord only if that is all that is available.

   d. Apply the tourniquet just above the wound. A tourniquet is applied between the wound and the heart. Tightly wrap the tourniquet around the limb two times and tie in a half knot. After you have tied a half knot, place a short stick or something similar on the half knot. Then tie a full knot. Next, twist the stick until the bleeding stops. When you have twisted the stick and the bleeding has stopped, secure the stick in place with the loose ends of the tourniquet.

   e. A tourniquet improperly applied can increase bleeding and death can occur.

   f. Once you have applied a tourniquet, do not release it, a doctor should do this.

B. <u>Shock -- what it is</u>

1. A person who is severely bleeding will probably develop shock. Shock is a condition in which the blood fails to circulate normally.

2. Causes of shock

   a. Injury
   b. serious illness

3. Symptoms of a victim with shock

   a. Victim looks pale and is weak
   b. Skin feels cold and moist
   c. Victim's pulse is weak and rapid

4. What to do for shock

   a. Keep victim lying down and keep them warm

   b. Fluids can be given, but in some instances it may be harmful. Never give fluids to an unconscious person.

Wednesday

A. Fractures -- a broken bone

B. Two types of fractures

1. simple - bone is broken, but not the skin

2. compound -- when a wound extends from the break in the bone through the skin

C. Do not move if possible

D. Signs of fractures

1. Pain

2. Tenderness

3. Deformity -- part does not have its usual shape

4. Swelling

E. Get skilled help -- prevent victim from walking

F. Slings -- Splints

1. How to construct -- a splint can be devised from any stiff material, such as sticks or magazines. Pad a splint with cloth.

2. How to place a splint. (Diagrams and examples of students should be used.) How to splint ankle and forearm. Fractures in different parts of the body require different types of splinting. All fractures should be handled very carefully.

3. After you apply a splint on an arm, a sling should be applied by using a triangular bandage. (Demonstration and Diagram).

4. A sling is tied so that the wrist is a little higher than the elbow.

G. Sprains and Dislocations

1. A dislocation is a bone out of joint.

2. A sprain is when the tissues around the joint are injured. The tissues may be torn or bruised.

H. Treatment of sprains and dislocations

1. Apply an ice bag or cold cloth to the injured area and elevate. Injured area should be examined by a doctor and X-rays should be taken.

Thursday

A. Drownings -- possible in auto accidents near river or lake.

B. Work quickly -- think before you attempt to rescue someone. If you are not a good swimmer and are not certified by the Red Cross think before entering the water. Four key words -- REACH, THROW, ROW, and GO.

1. Reach something to victims

2. Throw something to victims

3. Row out to victim

4. Then finally go out as a last resort

C. If the victim is unconscious, start artificial respiration as soon as possible. (Commonly called mouth-to-mouth resuscitation). Steps to follow to give mouth-to-mouth resuscitation.

1. Lay victim down and keep warm.

2. Wipe foreign material from victim's mouth.

3. Tilt victim's head so that chin points straight up, this opens passageway to lungs.

4. Place one hand under neck and tilt back the head with your other hand.

5. After you have pulled the chin up, the jaw should jut out.

6. Now open your mouth wide and place it tightly over victim's mouth. Pinch his nose shut and blow into his mouth. No air should escape around your lips. Then put your ear next to victim's mouth to feel a return of air.

7. If victim does not breathe, roll victim over on side and hit them between the shoulder blades to dislodge any foreign objects. Start process over--you must work quickly.

8. For a small child place your mouth over victim's nose and mouth.

9. If victim's stomach swells and fills up with air, press gently on stomach to remove air from stomach.

10. For an adult, breathe 12 breaths per minute. For a child, breathe 20 breaths per minute.

11. Do not stop artificial respiration until a doctor or ambulance arrives.

NINTH GRADE - MATH

Week One

Objective

Given a line graph or bar graph the student will be able to accurately read the statistics pictured in the graph. Given all data required, the student will be able to construct a bar graph or line graph to accurately picture the data.

Lesson One - Reading Graphs

A. Given a bar graph which pictures the percent of deaths from auto accidents on different days of the week in relation to the driving population, the student will determine on which day the greatest percentage of deaths occurred and also the day with the least.

B. Given a broken line graph which pictures automobile production in the United States over a ten-year period, the student will accurately name the amounts for each year and tell the highest and lowest years of production.

C. Give a line graph showing stopping distance in meters in relation to speed in kilometers per hour. Show the graph variations for wet and dry roads. Point out that the graph is a curve, not a straight line, i.e., the stopping distance increases more rapidly as the speed increases. Also note that the increase for wet roads is even more pronounced than on dry roads. Questions will be asked relating to the graph, i.e., What is the stopping distance on a wet road when a car is traveling at 60 km ph? Also, other similar questions will be asked for students to answer.

D. Present a line graph giving speeds for two cars accelerating from a standing stop, plot speed in km ph versus time in seconds. Show the graph for a sports car (manual transmission) and a sedan (automatic transmission), which will show variations due to shifting manually. They will both be broken line graphs which form a curve. Also note the greatest increase in speed is during the first few seconds, then gradually levels off. Ask related questions, i.e., What was the difference of the speeds of the cars after ten seconds? Which accelerated faster? By how much? etc.

E. Straight line graph presented which shows a car's speed in all four gears in relation to the revolutions per minute of the engine (tachometer). These are proportionate quantities. Also, the increase in speed has a steeper slope for higher gear. Ask related questions, i.e., What is the speed at 2000 rpm in low gear? etc.

Learning Activities

The students will be given bar and line graphs to interpret and will be asked many questions pertinent to the graphs. Also, a discussion on various statistics relating to the graphs will be included.

Lessons Two and Three - Constructing Graphs

Given the following sets of data, the student will construct bar and line graphs which accurately picture the given information. (See sheet on stopping distances.)

A. Stopping distances at various speeds on dry roads.

Speed	Stopping Distance
10 mph (14.7 ft/sec)	19 feet (11' + 8')
20 mph (29.3 ft/sec)	42 feet (22' + 20')
30 mph (44 ft/sec)	73 feet (33' + 40')
40 mph (58.7 ft/sec)	116 feet (44' + 72')
50 mph (73.4 ft/sec)	173 feet (55' + 118')
60 mph (88 ft/sec)	248 feet (66' + 182')
70 mph (102.7 ft/sec)	343 feet (77' + 266')

Note that the total stopping distance is made up of the reaction time (about .75 seconds) which is the time it takes to apply the brakes and the length required to stop.

B. Number of deaths in Michigan due to auto accidents in the years 1962-1972.

1962 - 1,574	1970 - 2,177
1963 - 1,887	1971 - 2,152
1964 - 2,122	1972 - 2,258
1965 - 2,136	
1966 - 2,298	
1967 - 2,137	
1968 - 2,392	
1969 - 2,487	

C. Accidental auto deaths at various ages (per year).

Under 5 - 2,077	45 - 54 - 5,850
5 - 14 - 4,045	55 - 64 - 5,162
15 - 24 - 17,443	65 - 74 - 4,210
25 - 34 - 7,894	Over 75 - 3,117
35 - 44 - 5,974	

D. Total death from all types of accidents in a one-year period for ages 15 - 24.

Automobile	17,443	Suicide	2,731
Drowning	2,190	Career	2,730
Fire Arms	777	All other Acc.	3,582
Poison	676		
Homicide	3,779		

Insert in Lessons Two and Three

Stopping distances

The student will demonstrate knowledge of stopping distance concept by answering specific questions concerning various items affecting stopping distances.

1. Weight of the automobile - the heavier the automobile the greater the stopping distance due to greater inertia.

2. Condition of tires - tires with less tread will result in greater stopping distances than newer tires.

3. Condition of brakes - worn brake shoes, low fluid level, unadjusted brakes are all factors which result in greater stopping distances. Brakes should be adjusted every 5000 miles and checked over each time they are adjusted.

4. Type of tires - tires with more tread such as snow tires, better design such as radials; result in a shorter stopping distance.

5. Road surfaces of asphalt have a shorter stopping distance requirement than roads constructed of concrete, gravel, etc.

6. Weather conditions - if the pavement is wet, snow covered, icy, or the weather is foggy, snowy, rainy, etc., These will result in greater stopping distances than on clear, dry days.

7. Reaction time - the time it takes for the driver to react and apply the brakes. The average reaction time is (.75 seconds). This will vary according to the driver's physical and mental condition. Some factors which cause greater reaction time and thus greater stopping distances are: inattention, fatigue, drugs, and alcohol.

Lesson Four

Objective - The student will be able to name five effects of alcohol in relation to driving abilities and also given various charts, graphs, and statistics involving drinking and driving, the student will be able to interpret the meanings of the statistics, charts, and graphs and state data accurately.

MATH NINE

Week Two

Objective

The student will be able to identify the variable costs of owning an automobile, how to calculate gas mileage, how to calculate distances using (d = r x t) and identify the factors which cause tires to wear out.

Lesson One

Through class discussion and by working example problems, the student will be able to solve problems relating to the three variable costs of owning an automobile.

A. Oil and Gasoline
   1. The three types of gasoline - regular - average (59.9) premium - (63.9), lead free - (62.9) - their cost differentials, and which type to buy.

   2. Cost of oil changes, when to get them (after 3000 miles or every sixty days). Different weights of oil for different climates. You use a lighter weight oil in colder climates. Example: Problems on oil and gasoline costs.
      1. If a Buick Regal has a gas tank with a twenty gallon capacity and the prices of gasoline are as follows: regular 59.9 cents, lead free 61.9 cents, and premium 63.9 cents, how much would it cost to fill the empty tank with premium gasoline?

      2. Suppose the same car had approximately one-fourth of a tank full when he went to the gas station, then how much would it cost to fill the tank with premium gasoline?

   Other similar examples will be used with the three types of gasoline.

      3. An oil change $5.00, grease job $3.25, and oil filter $7.15 together cost $15.40. Oil changes should be made after every 3000 miles driven. If a man drives his automobile 27,000 miles in one year, how many times should his oil be changed and what would be the total cost in the year?

B. Maintenance
   1. What are the average costs of various types of repair work such as tune-ups of engines, brake work, winterizing (oil, antifreeze, etc.) and general check-ups?

   2. Example problems of various costs.
      A. If the cost of a tune-up is $37.50, a brake job costs $64.88, winterizing an automobile costs $12.69 and general check-ups cost $10.50. What does it cost for three tune-ups, two brake jobs, and yearly winterizing if a man owns his car for five years?

      B. In a six-year span, a man has the following work done on his automobile: three tune-ups, one brake job, six winterizings and eighteen general check-ups, what is his average yearly cost for these items?

C. Tires
   1. How often should they be rotated? (approximately every 5,000 miles) Rotation makes them last longer.

   2. What are the major differences between snow tires and regular tires, and how does the size of the tire relate to its cost? What are some of the various types of tires? Differences between snow and regular tires are in type of tread and design of tread. Snow tires go on rear wheels for greater traction. The larger the size of the tire, the greater the cost. Tires also vary in cost according to types such as regular polyester cord bodies, polyester plus steel belts and the steel belted radial tires. Bring examples of various tire construction to class (get from tire dealers).

   3. What is the proper tire inflation? (written on the tires in most cases and in owner's manual for car.

   4. Example problem. Steel belted radial tires are on sale at twenty percent off the regular price. If the cost of these tires is regularly $60.00 each for a Chevrolet Camaro, how much would a person pay for four tires at the sale? (tax not included)

Lesson Two

Through working example problems in class, the student will be able to calculate gas mileage.

A. Formula for gas mileage is the number of miles driven divided by the number of gallons used.

B. Give written assignment on calculation of gas mileage. Example: If a man drives 485 miles and uses 32.5 gallons of gas, what is his mileage? At this rate of gas usage, how far could he travel on a twenty gallon tank of gas?

Lesson Three

Through the use of example problems in class, the student will be able to calculate distance, rate or time by:

A. Using the formula distance equals rate (speed) times the time ($d = r \times t$).

B. Written assignment on calculating gas mileage Examples: (1) How far will Tom travel if he drives for six hours at an average rate of fifty miles per hour? (2) How long will it take Steve to travel 600 miles at an average rate of fifty miles per hour? (3) What is Joe's average speed if he travels 450 miles in 8 1/2 hours?

Lesson Four

I. Through discussion and by using practical examples, the student will identify seven factors which relate to tire wear out and the variable cost of tires in relation to ownership of an automobile.

A. High speeds result in producing greater heat (friction) which results in quicker wearing of tires and high speeds also use more gasoline. Avoiding high speeds saves money.

B. Hard cornering - accelerate coming out of a turn, de-accelerate going into the turn, and judge your speed according to road conditions and posted speed limits on corners.

C. Over and under inflation. When tires are over inflated, they will wear out quicker in the center of the tread, and when under inflated, both edges of the tread wear faster. Check tire inflation each week to assure longer tire life.

D. Wheel alignment - the front wheels should be checked to see if they are aligned properly at least twice each year. Improper alignment results in tires becoming cupped and weakening of tire sidewalls results, also causes front-end shimmy which will wear out tires quickly.

E. Tire rotation is important. Tires should be rotated every 5,000 miles to insure even tread wear. This makes them last longer.

F. Brakes - keep them evenly adjusted and check the brakes every 5,000 miles to insure longer tire life.

G. Rapid acceleration and quick stops, jackrabbit starting and stopping grinds tread off tires so avoid them. Don't "squeal" the tires as this burns off rubber.

II. The student will understand the meaning of and be able to perform the coin test to determine safe tire tread. When is tread unsafe or illegal? Lesson 5 Test.

Resources

Your Driving Costs, 1973-1974, American Automobile Association, 8111 Gatehouse Road, Falls Church, Va. 22042.

You and Your Car, Michigan Mutual Liability Company, Detroit, Michigan.

APPENDIX B

Test Administration Instructions

To the Examiner. . .

1. Administer the test (see the Instructructions to the Student). Circulate among the students during the first few minutes.

2. Do not answer any questions concerning the substance of the test. Define words only if you can do so without giving away the answer.

3. Do NOT show a copy of the test to the instructor. Note to the Instructor. If this is a pre-test, please do not teach the unit to this test.

4. No talking is permitted in the classroom. The instructor should be present to handle discipline problems, etc.

5. The test should be given at the beginning of the class period. Sufficent time should be allowed for all students to complete the test. This is not a timed test. If, however the test seems to be taking a long time, encourage the students to speed up.

6. The test probably will not take the full class period. When all the students are finished collect all the answer sheets and test booklets. Pencils should also be collected. Remind the students to be sure their name is on the answer sheet only.

7. Before the test is administered again, be sure that there are no stray marks in the test booklets. Also sharpen the pencils.

8. SUPPLIES NEEDED FOR EACH TEST : Test booklets, Answer sheets, Sharpened No. 2 pencils with eraser

9. Write on the black board the following information: Name of the School; Grade; Class Hour; Date.

Instructions to the Student

Today you are going to be taking a test about _(subject)_____ and driving. Please listen and follow the directions given.

1. Remove all books, etc. from your desk.

2. Use only a #2 or soft pencil when answering the test (pass out pencils to those who do not have them. Also, discourage last minute pencil sharpening).

3. Remain in your seat at all times. If you have a question, raise your hand and I will come to you. When you finish your test, close the booklet and leave it on your desk. Do not disturb others who have not yet finished the test.

4. Now I will pass out the answer sheets and test booklets. DO NOT write on the answer sheet or open the test booklet until I tell you to. (Pass out answer sheets and booklets).

5. Follow along with me as I read the instructions on the front of the test booklet. This test <u>may</u> count as part of your grade in this class.

READ. . .

This booklet contains questions to help find out how much you know about first aid and driving a car.

Consider each question by itself. Read the question carefully and then try to answer it the best you can. ANSWER EVERY QUESTION. Select the ONE best answer and record it in the appropriate space next to the question number on the ANSWER SHEET. Mark your answer as shown in the sample below. USE A PENCIL.

EXAMPLE 50. a  c

If you change your answer, erase the old one completely and then mark the new one.

DO NOT MAKE ANY MARKS IN THE TEST BOOKLET.

Print you Name and School on the answer sheet. Then mark your Sex, Grade and Class Hour. Also write in today's Date.

When the instructor tells you to, open the test booklet to the first page and begin answering the questions.

continued . . .

When you have finished the test, check to see that you have answered all the questions, indicated your choices clearly on the answer sheet and NOT made any marks in this booklet. Then close your booklet and wait for further instructions.

6. Are there any questions? (Pause)

7. Now turn to the next page and begin with question 1 making sure that you place the answer to question 1 next to the "1" on your answer sheet.

WHEN THE TEST IS COMPLETED . . .

1. Place your answer sheet inside your test booklet and pass them forward.

2. If you borrowed a pencil from me, please return it.

   (pause until booklets and pencils are returned.

3. Do I have all the test booklets and pencils?

4. Thank you.

APPENDIX C

Test Booklets

ENGLISH

TEST BOOKLET

This booklet contains questions to help find out how much you know about riding a bicycle and driving a car.

Consider each question by itself. Read the question carefully and then try to answer it the best you can. ANSWER EVERY QUESTION. Select the ONE best answer and record it in the appropriate space next to the question number on the ANSWER SHEET. Mark your answer as shown in the sample below. USE A PENCIL.

EXAMPLE 50. a X c

If you change your answer, erase the old one completely and then mark the new one.

DO NOT MAKE ANY MARKS IN THE TEST BOOKLET.

Print you Name and School on the answer sheet. Then mark your Sex, Grade and Class Hour. Also write in today's Date.

When the instructor tells you to, open the test booklet to the first page and begin answering the questions.

When you have finished the test, check to see that you have answered all the questions, indicated your choices clearly on the answer sheet and NOT made any marks in this booklet. Then close your booklet and wait for further instructions.

1. When walking on a road where there are no sidewalks, you should:

   a) walk on the left side facing traffic.
   b) walk on the right side with your back to the cars.
   c) walk on the edge of the pavement.

2. You must ride your bicycle on the:

   a) left side of the road, against the traffic flow.
   b) right side of the road, with the flow of traffic.
   c) on the side of the road with the least traffic.

3. At a stop sign, you must:

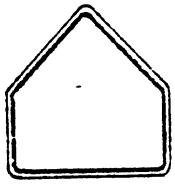
   a) stop behind a marked or unmarked crosswalk
   b) slow down only if people are in your path
   c) look in all directions and if there is no traffic enter the intersection without stopping completely

4. This sign means:

   a) the right lane ends; merge left
   b) there is a sharp curve ahead
   c) slippery when wet

5. The message on this sign is:

   a) yield
   b) no passing
   c) school crossing



6. What are the two main purposes of traffic laws?

   a) increase speed and number of cars on the road
   b) determine right-of-way and responsibility for accidents
   c) prevent accidents and make highway use efficient

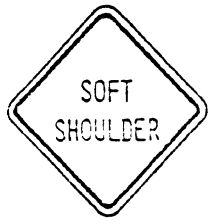
7. When you get off and walk with your bicycle, you must obey the traffic laws for:

   a) bicycles
   b) pedestrians
   c) cars and trucks

8. When a bicycle path is provided, you:

a) must use the path only when traffic is heavy
b) may choose either the road or path
c) must always ride on the path

9. This sign means:



a) the road ahead will change to dirt or gravel
b) the edge of the road is unpaved and may be soft
c) the pavement is new; watch out for a sharp rise or dip ahead

10. Warning signs are:

a) red with white letters
b) yellow with black letters
c) green with white letters

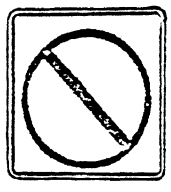
11. It is illegal for bicycle riders to:

a) ride on a busy street
b) grab onto any other moving vehicle
c) walk their bicycles on the sidewalk

12. When walking on a road where there is no sidewalk, you should walk:

a) on the left shoulder of the road, facing oncoming traffic
b) on the right shoulder of the road, with your back to oncoming traffic
c) on the pavement edge

13. A sign having a red circle with a line through it is used:



a) to help you stay on the right side of the road
b) to tell you what <u>not</u> to do
c) to tell you which traffic rules to ignore

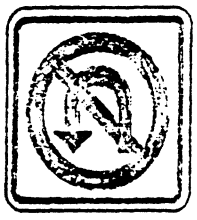
14. If you ride at night, your bicycle is required to have:

a) a red rear reflector
b) reflective tape on the front fender
c) a leg or arm light

15. This sign means:

a) other cars must give you the right-of-way
b) slow down and prepare to turn
c) slow down and prepare to give up the right-of-way

16. This sign means:

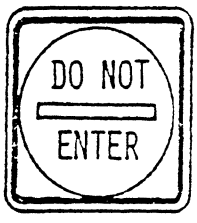


a) no right turn
b) no passing
c) no U turn

17. The hand signal for a left turn is:

a) the left arm held straight out
b) the left arm bent up
c) the left arm bent down

18. You should expect this sign:



a) on a divided highway
b) at the entrance to a dead end road
c) when a one way road intersects another road

19. Your bicycle is required by law to have:

a) a seat cover
b) turn signals
c) a bell or horn

20. At a railroad crossing where a train is coming:

a) stop only if you can see the train
b) you do not need to stop if only red lights are flashing
c) stop at least fifteen feet from the tracks

21. The main cause of pedestrian accidents is:

a) not enough traffic control devices
b) limited visibility on city streets
c) walking habits of pedestrians

22. Which one of the following is a regulatory sign:

a) 

b) 

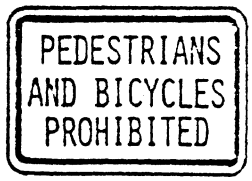
c) 

23. In most situations bicycle riders:

a) have the right-of-way over all other vehicles
b) are subject to the same rules as motor vehicles
c) must ride against the flow of traffic so they can see and be seen

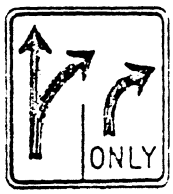
24. This sign means:

a) you should watch for people walking and on bicycles
b) people walking and on bicycles must yield to other traffic
c) people may not walk or ride bicycles in this area



25. This sign means:

a) traffic in right (curb) lane must turn right
b) traffic in left lane must go straight ahead
c) traffic in left lane must turn right



End of Test

Answer Key

ANSWER SHEET

Name English

School _____

15 Grade 7 8 9 (mark one) Class Hour 1 2 3 4 5 6 7 8 (mark one) 17

19 Sex M F (mark one) Date ___/___/___ mo day yr

do not write here

School code __ 1

Subject __ __ __ __ 2-5

Phase 1 2 7

Test __ __ 8-9

Ach __ __ __ __ 10-13

Mark only one answer for each question. If you change your mind, erase the old answer completely before marking the new choice.

1. X b c 21	17. X b c	33. a b c
2. a X c	18. a b X	34. a b c
3. X b c	19. a b X	35. a b c
4. X b c	20. a b X	36. a b c
5. a b X	21. a b X	37. a b c
6. X b c	22. a X c	38. a b c
7. a X c	23. a X c	39. a b c
8. a b X	24. a b X	40. a b c
9. a X c	25. X b c	41. a b c
10. a X c	26. a b c	42. a b c
11. a X c	27. a b c	43. a b c
12. X b c	28. a b c	44. a b c
13. a X c	29. a b c	45. a b c
14. X b c	30. a b c	46. a b c
15. a b X	31. a b c	47. a b c
16. a b X	32. a b c	48. a b c

SOCIAL STUDIES

TEST BOOKLET

This booklet contains questions to help find out how much you know about Social Studies and driving a car.

Consider each question by itself. Read the question carefully and then try to answer it the best you can. ANSWER EVERY QUESTION. Select the ONE best answer and record it in the appropriate space next to the question number on the ANSWER SHEET. Mark your answer as shown in the sample below. USE A PENCIL.

EXAMPLE 5C. a X c

If you change your answer, erase the old one completely and then mark the new one.

DO NOT MAKE ANY MARKS IN THE TEST BOOKLET.

Print you Name and School on the answer sheet. Then mark your Sex, Grade and Class Hour. Also write in today's Date.

When the instructor tells you to, open the test booklet to the first page and begin answering the questions.

When you have finished the test, check to see that you have answered all the questions, indicated your choices clearly on the answer sheet and NOT made any marks in this booklet. Then close your booklet and wait for further instructions.

1. When walking on a road where there are no sidewalks, you should:

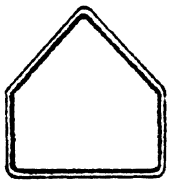
   a) walk on the left side facing traffic.
   b) walk on the right side with your back to the cars.
   c) walk on the edge of the pavement.

2. You must ride your bicycle on the:

   a) left side of the road, against the traffic flow.
   b) right side of the road, with the flow of traffic.
   c) on the side of the road with the least traffic.

3. This sign shape means:

   a) pedestrian crossing
   b) bicycle crossing
   c) school crossing



4. The most accurate description of the show-off is:

   a) courageous
   b) pretender
   c) attractive

5. If a traffic officer waves you on at an intersection when the traffic light is red, you should:

   a) follow the directions of the officer.
   b) wait until the light turns green, then go.
   c) stop to find out what is wrong with the light.

6. Flashing red lights at a railroad crossing mean that:

   a) you must stop until the train goes by.
   b) caution is needed when going through the crossing.
   c) a train is coming and traffic should stop.

7. A bicycle rider's behavior is greatly influenced by:

   a) his age.
   b) his attitude.
   c) his income.

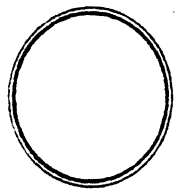
8. The legal hand signal for a right turn is your:

   a) left arm bent up.
   b) right arm held out straight.
   c) left arm bent down.

9. A steady yellow traffic light tells you that:

a) the light is about to turn red.
b) turning vehicles should continue.
c) pedestrians are crossing the street.

10. Circular signs like this are:



a) black on yellow.
b) black on red.
c) black on orange.

11. When driving toward an intersection where a crossing guard is helping children cross the street in front of you, you must:

a) sound your horn.
b) slow down.
c) stop.

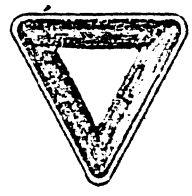
12. When crossing rail road tracks on your bicycle you should:

a) ride across as fast as you can.
b) cross the tracks at a right angle.
c) carry your bicycle across.

13. A flashing yellow traffic signal at an intersection means you should:

a) stop and yield to cross traffic.
b) slow down and continue carefully.
c) drive through at your normal speed.

14. A triangular sign like this is colored:



a) green and white.
b) red and white.
c) black and white.

15. Your bicycle is required to be equipped with:

a) a horn.
b) a chain guard.
c) a basket.

16. Which of the following signs is a guide sign:

a) 

b) 

c) 

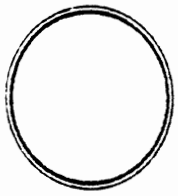
17. When several bicyclists are riding together, it is safest to ride:

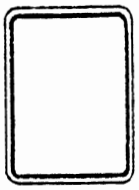
a) against the flow of traffic.
b) side by side in the right lane.
c) single file with the flow of traffic.

18. Whenever you change lanes on a bicycle you must first:

a) stop and look.
b) give a hand signal.
c) move to the center of the lane.

19. Which of the following sign shapes would tell you to stop?

a) 

b) 

c) 

20. A bicycle rider is required by law to:

a) observe all traffic signals and other traffic rules.
b) observe only stop signs and traffic signals.
c) observe only bicycle path signs.

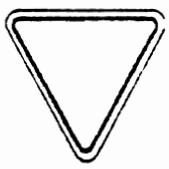
21. What colors will you usually find on this sign:

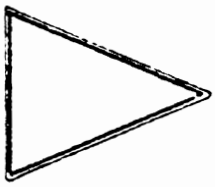
a) black and white.
b) black, red, and white.
c) red, white, and blue.

22. When making a right turn on red and you notice a person about to step off the corner you should:

a) make a wide turn around the pedestrian.
b) wait for the pedestrian.
c) wait until the light turns green.

23. NO PASSING ZONE would be the message on which of the following sings?

a) 

b) 

c) 

24. When you approach a stop sign at a corner on your bicycle you should:

a) continue if you are turning right.
b) slow down if no cars are present.
c) stop and go when the way is clear.

25. The color of Motorist Service Signs (such as GAS-FOOD, NEXT RIGHT) are usually:

a) white on green.
b) white on blue.
c) white on black.

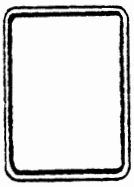
26. When you see this sign, you should:

a) stop at every cross walk.
b) slow down and watch for children.
c) be alert for handicapped people.

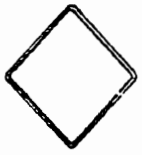
27. A <u>steady</u> red traffic light means:

a) yield the right-of-way.
b) stop until the light changes.
c) stop unless you are turning right.

28. The shape of a warning sign is:

a) 

b) 

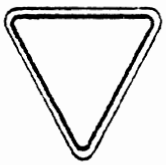
c) 

29. If a bicycle path is provided, you <u>must</u> use it:

a) only when traffic on the street is heavy.
b) unless you are riding faster than 25 mph.
c) instead of riding in the street.

30. A sign of this shape means you should:

a) stop and then yield to traffic on the left.
b) stop and then yield to traffic on the right.
c) slow down and proceed when the way is clear.



31. If you ride your bicycle at night, you are required to have:

a) an arm light and rear reflector.
b) a headlight and rear reflector.
c) a spoke reflector and turn signals.

32. When packages are carried on a bicycle they should be:

a) placed on a carrier or in a basket.
b) balanced on the handlebars.
c) held firmly under your arm.

33. The background color of most regulatory signs showing rules like KEEP RIGHT is:

a) black.
b) white.
c) yellow.

34. You must ride your bicycle:

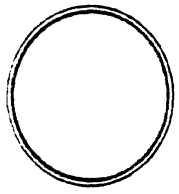
a) in the center of the traffic lane.
b) next to the right-hand curb or shoulder.
c) between two lines of traffic.

35. A <u>steady</u> green traffic signal means:

a) speed up before the light changes.
b) slow down and prepare to stop when light changes.
c) check traffic and continue through the intersection.

36. When you see a sign of this shape, you should:

a) stop and let other traffic pass.
b) speed up and pass the sign quickly.
c) slow down and be prepared to stop.



End of Test

Answer Key

ANSWER SHEET

Name Social Studies

School _____

15 Grade 7 8 9 (mark one) Class Hour 1 2 3 4 5 6 7 8 (mark one) 17

19 Sex M F (mark one) Date ___/___/___ mo day yr

do not write here

School code __ 1

Subject __ __ __ __ 2-5

Phase 1 2 7

Test __ __ 8-9

Ach __ __ __ __ 10-13

Mark only one answer for each question. If you change your mind, erase the old answer completely before marking the new choice.

1. X b c 21	17. a b X	33. a X c
2. a X c	18. a X c	34. a X c
3. a b X	19. a b X	35. a b X
4. a X c	20. X b c	36. a b X
5. X b c	21. a b X	37. a b c
6. a b X	22. a X c	38. a b c
7. a X c	23. a X c	39. a b c
8. X b c	24. a b X	40. a b c
9. X b c	25. a X c	41. a b c
10. X b c	26. a X c	42. a b c
11. a b X	27. a X c	43. a b c
12. a X c	28. a b X	44. a b c
13. a X c	29. a b X	45. a b c
14. a X c	30. a b X	46. a b c
15. X b c	31. a X c	47. a b c
16. a b X	32. X b c	48. a b c

HEALTH and PHYSICAL EDUCATION
Ninth Grade

TEST BOOKLET

This booklet contains questions to help find out how much you know about first aid and driving a car.

Consider each question by itself. Read the question carefully and then try to answer it the best you can. ANSWER EVERY QUESTION. Select the ONE best answer and record it in the appropriate space next to the question number on the ANSWER SHEET. Mark your answer as shown in the sample below. USE A PENCIL.

EXAMPLE 50. a X c

If you change your answer, erase the old one completely and then mark the new one.

DO NOT MAKE ANY MARKS IN THE TEST BOOKLET.

Print you Name and School on the answer sheet. Then mark your Sex, Grade and Class Hour. Also write in today's Date.

When the instructor tells you to, open the test booklet to the first page and begin answering the questions.

When you have finished the test, check to see that you have answered all the questions, indicated your choices clearly on the answer sheet and NOT made any marks in this booklet. Then close your booklet and wait for further instructions.

1. When walking on a road where there are no sidewalks, you should:

   a) walk on the left side facing traffic.
   b) walk on the right side with your back to the cars.
   c) walk on the edge of the pavement.

2. You must ride your bicycle on the:

   a) left side of the road, against the traffic flow.
   b) right side of the road, with the flow of traffic.
   c) on the side of the road with the least traffic.

3. When you arrive at the scene of an accident, you should:

   a) take charge immediately.
   b) see if your help is needed.
   c) call an ambulance right away.

4. The symptoms of shock include:

   a) the skin is cold and covered with a rash.
   b) the skin is warm and the pulse is slow.
   c) the skin is pale and feels moist.

5. Once you have applied a tourniquet:

   a) release it every five seconds.
   b) let a doctor take it off.
   c) change it every half hour.

6. First aid treatment for a sprain is to:

   a) apply a hot towel.
   b) exercise the sprained area.
   c) apply an ice pack.

7. When you are involved in an accident you must stop and:

   a) move the injured people.
   b) agree to pay for the damage.
   c) give your name and address.

8. Before starting artificial respiration you should:

   a) sit the victim up.
   b) see if the victim is breathing.
   c) slap the victim on the back.

9. A splint is best made from:

a) a triangular bandage and adhesive tape.
b) stiff materials (like magazines) and cloth.
c) an ace bandage and an ice bag.

10. If your help is no longer needed at an accident scene, you should:

a) stick around anyway.
b) leave the area.
c) talk to newspaper reporters.

11. The upper arm pressure point controls bleeding in the:

a) lower leg.
b) neck.
c) lower arm.

12. The area around a broken bone may:

a) be swollen and painful.
b) appear pale and moist.
c) require the use of hot packs.

13. If a victim doesn't start to breathe after first trying artificial respiration then:

a) keep the victim warm until the doctor arrives.
b) roll the victim on his side and hit him on the back.
c) sit the victim up and pump his arms.

14. A sprain should be:

a) treated with hot packs and exercise.
b) left to heal on its own.
c) examined by a doctor.

15. You should move an injured person at the scene of an accident:

a) only when in immediate danger of further injury.
b) right away so as to get him out of the way.
c) only when directed by a policeman.

16. The only place to apply a tourniquet is:

a) above the wound.
b) on the wound.
c) below the wound.

17. When you come upon the scene of a drowning, you should:

a) swim out to the victim quickly.
b) scream loudly.
c) reach, throw, row and go.

18. A sprain results when:

a) tissues around the joint are injured.
b) a bone breaks with bleeding.
c) a victim goes into shock.

19. In order to make a sling you need a:

a) tourniquet.
b) splint.
c) triangular bandage.

20. When you come upon a victim of an accident the first thing to check for is:

a) head injuries.
b) bleeding.
c) breathing.

21. Shock is a result of:

a) the blood failing to circulate properly.
b) failure to keep the victim cool.
c) artificial respiration.

22. Artificial respiration should be continued until:

a) the victim's stomach fills with air.
b) the doctor or ambulance arrives.
c) you get tired.

23. Which of the following things <u>should</u> you do at the scene of an accident:

a) comment on the accident to everyone.
b) protect the scene from further damage.
c) move the injured.

24. The number of main pressure points on <u>each</u> side of your body which control arm and leg bleeding are:

a) 2.
b) 3.
c) 4.

25. A fracture in which the bone is broken but there is no break in the skin is called a:

a) simple fracture.
b) compound fracture.
c) reduced fracture.

26. If a victim isn't breathing:

a) start artificial respiration.
b) keep the victim warm.
c) pound on the victim's chest.

27. If you were called on to give first aid at the scene of an accident for bleeding you would <u>first</u> try:

a) a tourniquet.
b) direct pressure.
c) a pressure point.

28. A victim of shock should:

a) walk around in the fresh air.
b) lay down and keep warm.
c) be forced to drink ice cold water.

29. When giving mouth-to-mouth resuscitation to a child you should breathe:

a) five times per minute.
b) twelve times per minute.
c) twenty times per minute.

30. The best thing to use for a tourniquet is:

a) a rope.
b) a strip of material.
c) a piece of wire.

31. When there is severe bleeding and direct pressure doesn't work, you should try:

a) a pressure point.
b) a tourniquet.
c) an ice pack.

END OF TEST

hpe

Answer key

ANSWER SHEET

Name Health & Physical Education

School _____

15 Grade 7 8 9 (mark one) Class Hour 1 2 3 4 5 6 7 8 (mark one) 17

19 Sex M F (mark one) Date ___/___/___ mo day yr

do not write here

School code __ 1

Subject __ __ __ __ 2-5

Phase 1 2 7

Test __ __ 8-9

Ach __ __ __ __ 10-13

Mark only one answer for each question. If you change your mind, erase the old answer completely before marking the new choice.

1. X b c 21	17. a b X	33. a b c
2. a X c	18. X b c	34. a b c
3. a X c	19. a b X	35. a b c
4. a b X	20. a b X	36. a b c
5. a X c	21. X b c	37. a b c
6. a b X	22. a X c	38. a b c
7. a b X	23. a X c	39. a b c
8. a X c	24. X b c	40. a b c
9. a X c	25. X b c	41. a b c
10. a X c	26. X b c	42. a b c
11. a b X	27. a X c	43. a b c
12. X b c	28. a X c	44. a b c
13. a X c	29. a b X	45. a b c
14. a b X	30. a X c	46. a b c
15. X b c	31. X b c	47. a b c
16. X b c	32. a b c	48. a b c

MATH

TEST BOOKLET

This booklet contains questions to help find out how much you know about math and driving a car.

Consider each question by itself. Read the question carefully and then try to answer it the best you can. ANSWER EVERY QUESTION. Select the ONE best answer and record it in the appropriate space next to the question number on the ANSWER SHEET. Mark your answer as shown in the sample below. USE A PENCIL.

EXAMPLE 50. a X c

If you change your answer, erase the old one completely and then mark the new one.

DO NOT MAKE ANY MARKS IN THE TEST BOOKLET.

Print you Name and School on the answer sheet. Then mark your Sex, Grade and Class Hour. Also write in today's Date.

When the instructor tells you to, open the test booklet to the first page and begin answering the questions.

When you have finished the test, check to see that you have answered all the questions, indicated your choices clearly on the answer sheet and NOT made any marks in this booklet. Then close your booklet and wait for further instructions.

SPECIAL NOTE: If you need scratch paper to calculate on, use either paper provided or the back of the answer sheet. Do not figure in the test booklet.

1. When walking on a road where there are no sidewalks, you should:

   a) walk on the left side facing traffic.
   b) walk on the right side with your back to the cars.
   c) walk on the edge of the pavement.

2. You must ride your bicycle on the:

   a) left side of the road, against the traffic flow.
   b) right side of the road, with the flow of traffic.
   c) on the side of the road with the least traffic.

3. If a car gets 14.5 miles per gallon, how far can it go on a full tank of 20 gallons of gas?

   a) 137 miles.
   b) 290 miles.
   c) 280 miles.

4. Which of the following weights of oil would be best for driving in extremely cold weather?

   a) 10w.
   b) 20w.
   c) 30w.

5. To find the gas mileage of a car which formula would be used:

   a) miles driven/gallons used
   b) miles per hour/gallons used
   c) gallons used/miles driven

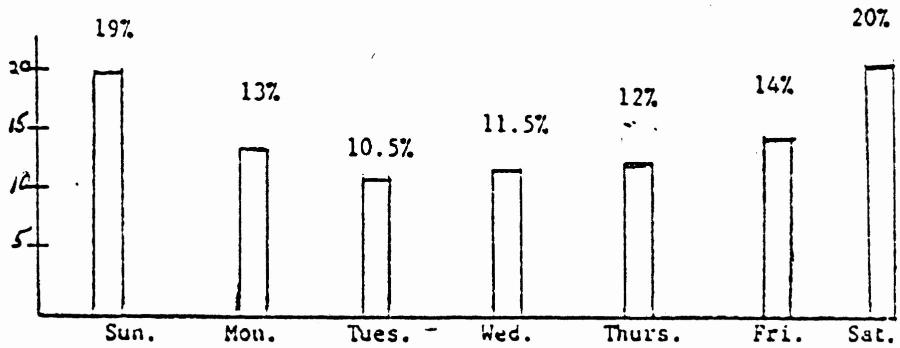
6. If premium gas costs 63.9 cents per gallon and the tank on the car takes 15 gallons to fill, how much would it cost to fill the tank.

   a) $4.26
   b) $958.50
   c) $9.59

7. Which of the following formulas is correct for calculating rate, distance, or time?

   a) d = r x t.
   b) r = d x t.
   c) t = r x d.

Questions 8-10 refer to Graph A.



GRAPH A: PERCENT OF DEATHS FROM AUTO ACCIDENTS ON DIFFERENT DAYS OF THE WEEK.

8. Which day has the least number of auto deaths on the average?

a) Sunday
b) Tuesday
c) Thursday

9. Which day has the greatest number of auto deaths?

a) Wednesday
b) Friday
c) Saturday

10. During which part of the week do most auto deaths occur?

a) the beginning of the week (Sun., Mon., Tues.)
b) the middle of the week (Tues., Wed., Thurs.)
c) the weekend (Fri., Sat., Sun.)

* *

11. Tires should be rotated approximately every:

a) 2,000 miles.
b) 3,000 miles.
c) 5,000 miles.

12. How long will it take to travel 400 miles at an average speed of 50 mph?

a) 2 hours.
b) 4 hours.
c) 8 hours.

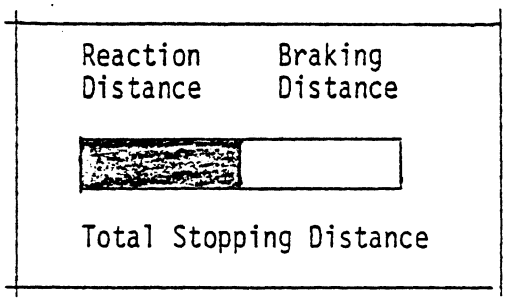
Number of Automobiles Produced
Million

Year

Stopping Distance in Meters

Speed (Miles per hour)

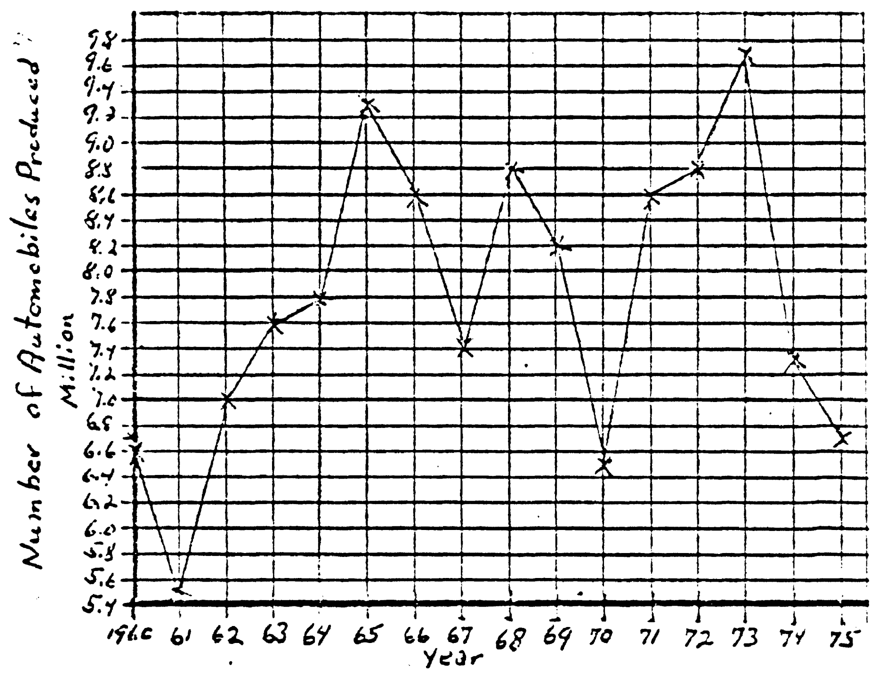
Stopping Distance (Feet)



13. If a man drives 552 miles and uses 32.5 gallons of gas, what was his mileage per gallon?

a) 0.058 mpg.
b) 179.40 mpg.
c) 16.98 mph.

Questions 14-16 refer to Graph B.



GRAPH B: AUTOMOBILE PRODUCTION BY YEAR FOR YEARS 1960-1975.

14. Which year had the highest production of automobiles?

a) 1965
b) 1970
c) 1973.

15. Which year showed the greatest drop in production from the year before?

a) 1973
b) 1974.
c) 1975

16. About how many automobiles were produced during the three year period of 1970, 1971, and 1972?

a) 6.5 million
b) 23.9 million
c) 70 million

* *

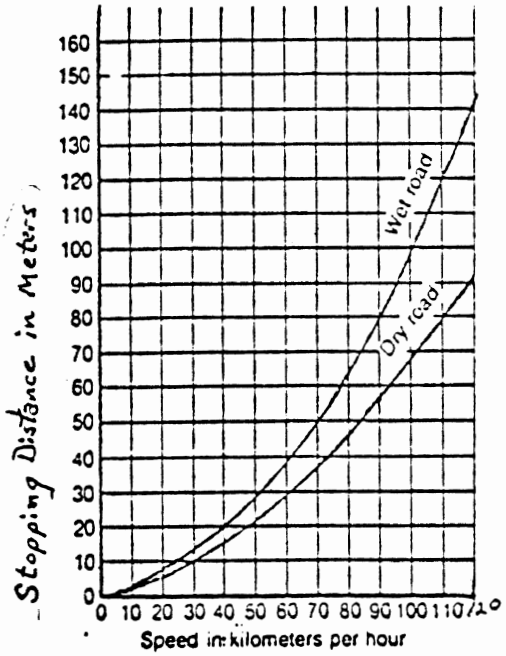
17. Which one of the following causes tires to wear out faster?

a) proper wheel alignment.
b) balanced tires.
c) under-inflation of tires.

18. If a car is driven 18,321 miles in one year, how many oil changes would be required if the oil is changed every 3,000 miles?

a) 3
b) 6
c) 10

Questions 19-22 refer to Graph C.



GRAPH C: STOPPING DISTANCE IN METERS OF A CAR MOVING AT VARIOUS SPEEDS ON WET AND DRY PAVEMENT.

19. What is the stopping distance on a dry road for an automobile traveling at 60 km per hour?

a) 30 meters
b) 39 meters
c) 93 meters

20. What is the automobile's speed when the stopping distance is 60 meters on a wet road?

a) 40 km per hour
b) 78 km per hour
c) 93 km per hour

21. What is the difference between stopping distances on wet and dry roads at 70 km per hour?

a) 6 meters
b) 12 meters
c) 18 meters

22. As the speed of an automobile increases, the stopping distance on wet or dry roads:

a) increases
b) decreases
c) stays the same

* *

Questions 23-25 refer to the following information:

USE THESE MAINTENANCE COSTS IN ANSWERING. OIL CHANGE - $5.00; GREASE JOB - $3.25; OIL FILTER - $2.75; and TUNE-UP - $37.50.

23. What would 3 oil changes and 2 oil filters cost:

a) $7.75.
b) $12.75.
c) $20.50.

24. What would 2 tune-ups cost?

a) $75.00.
b) $37.50.
c) $70.50.

25. How much would a tune-up, grease job, oil change and a new oil filter cost?

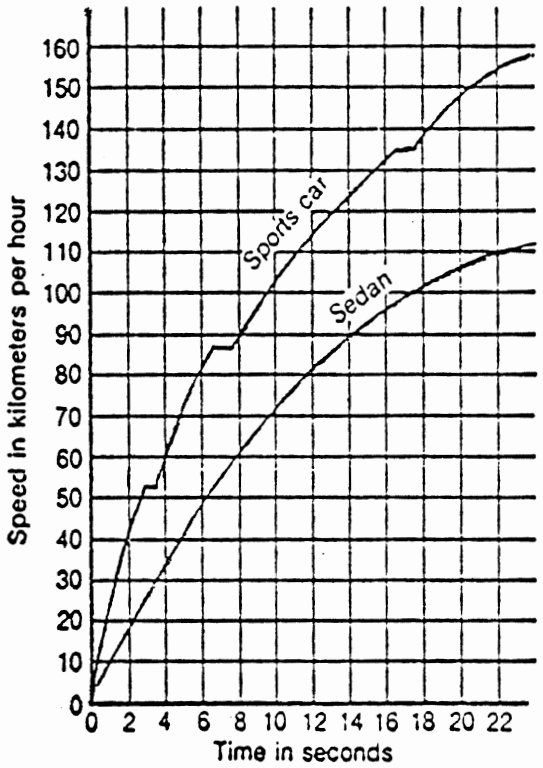
a) $37.50.
b) $47.40.
c) $48.50.

* *

26. Which is the right thing to do in making a smooth turn?

a) accelerate coming out of the turn.
b) accelerate going into the turn.
c) brake through the turn.

Questions 27-31 refer to Graph D.



GRAPH D: THE RELATIONSHIP BETWEEN THE SPEED OF A VEHICLE AND THE TIME TO REACH THAT SPEED FOR TWO VEHICLES--A SEDAN WITH AUTOMATIC TRANSMISSION AND A SPORTS CAR WITH A NORMAL TRANSMISSION.

27. What was the speed of the sedan after 14 seconds?

a) 33 km per hour.
b) 90 km per hour.
c) 125 km per hour.

28. How many seconds did it take the sports car to reach 90 km per hour?

a) 14 seconds.
b) 8 seconds.
c) 6 seconds.

29. After 10 seconds, what was the difference in the speeds of the two cars?

a) 30 km per hour.
b) 70 km per hour.
c) 100 km per hour.

30. The greatest acceleration for the sedan occurs during:

a) the first 6 seconds.
b) the second 6 seconds.
c) the third 6 seconds.

31. The uneven jumps in the curve for the sports car are due to:

a) an automatic transmission.
b) manual gear shifting.
c) radial tires.

* *

32. One result of high speed driving is:

a) faster tire wear.
b) under inflation of tires.
c) increased gas mileage.

33. What distance would be travelled in 3½ hours if the average speed was 53 mph?

a) 15.1 miles.
b) 185.5 miles.
c) 1855 miles.

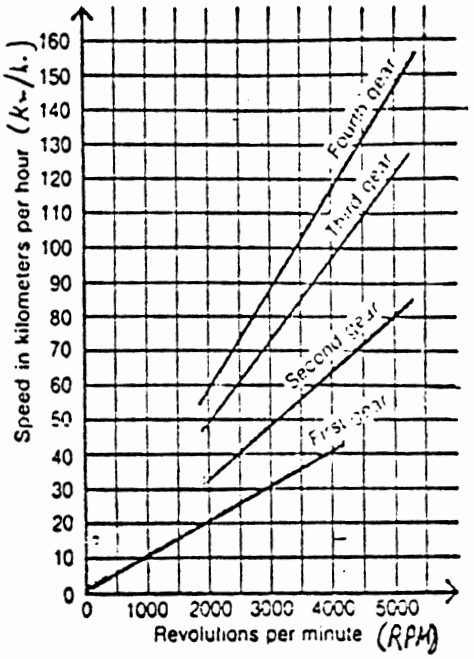
34. Eight gallons of gas is used in travelling 116 miles. How many gallons of gas will be used to go 522 miles?

a) 14.5 gallons.
b) 65¼ gallons.
c) 36 gallons.

35. If tires are on sale at 25% off and the regular price is $32.00 per tire, how much would <u>two</u> tires cost?

a) $8.00.
b) $48.00.
c) $64.00.

Questions 36-40 refer to Graph E.



GRAPH E: THE SPEED OF A VEHICLE AND THE SPEED OF ITS ENGINE (REVOLUTIONS PER MINUTE) FOR VARIOUS TRANSMISSION GEARS.

36. What is the maximum speed the vehicle can go in first gear?

a) 31 km/hr.
b) 43 km/hr.
c) 4200 km/hr.

37. How many RPM's are required to move the vehicle at 40 km per hour in 2nd gear?

a) 2000 RPM.
b) 2500 RPM.
c) 5500 RPM.

38. What is the vehicle speed at 2000 RPM in first gear?

a) 20 km/hr.
b) 32 km/hr.
c) 48 km/hr.

39. What is the difference in vehicle speed between 2nd and 4th gear at 3000 RPM?

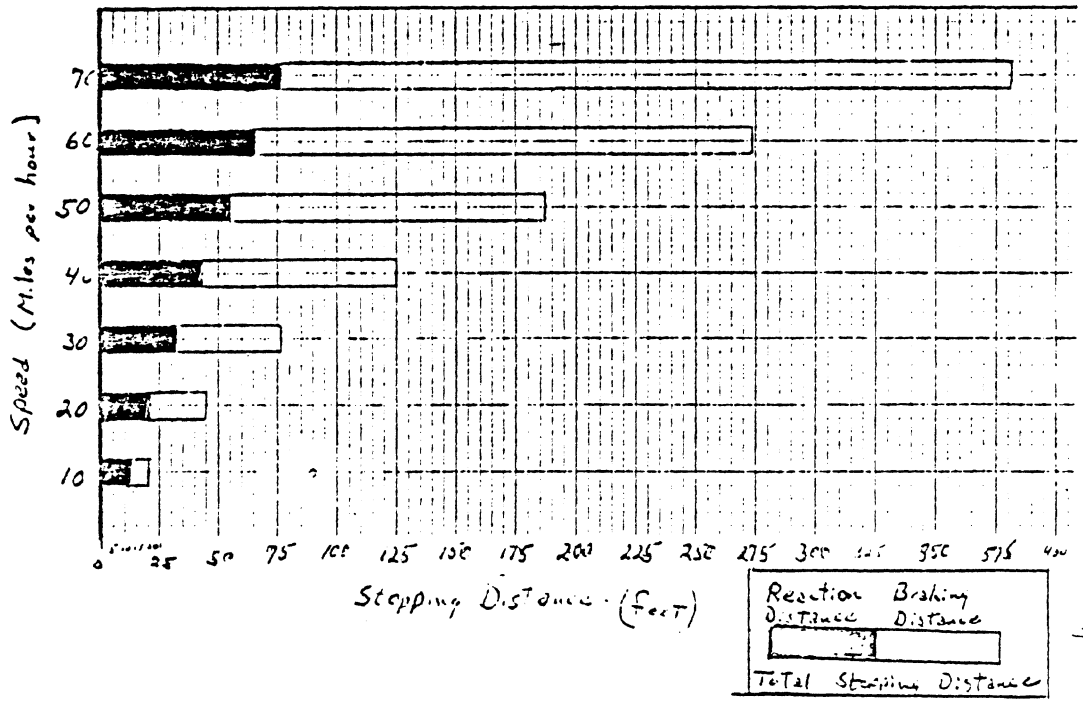
a) 20 km/hr.
b) 40 km/hr.
c) 60 km/hr.

40. In which gear is the engine speed (RPM) the lowest at a vehicle speed of 50 km per hour?

a) 1st gear.
b) 2nd gear.
c) 3rd gear.

* *

Questions 41-42 refer to Graph F.



GRAPH F: DRIVER REACTION DISTANCES, BRAKING DISTANCES, AND TOTAL STOPPING DISTANCES FOR VARIOUS CAR SPEEDS ON DRY ROAD.

41. What is the total stopping distance for a vehicle traveling at 30 miles per hour?

a) 20 feet.
b) 32 feet.
c) 76 feet.

42. The driver reaction distance for a vehicle traveling at 50 miles per hour is:

a) 50 feet.
b) 55 feet.
c) 187 feet.

* *

End of Test

Answer key

ANSWER SHEET

Name Math

School _____

15 Grade 7 8 9 Class Hour 1 2 3 4 5 6 7 8 17
mark one mark one

19 Sex M F Date ___/___/___
mark one mo day yr

do not write here

School code __ 1

Subject __ __ __ __ 2-5

Phase 1 2 7

Test __ __ 8-9

Ach __ __ __ __ 10-13

Mark only one answer for each question. If you change your mind, erase the old answer completely before marking the new choice.

1. X b c 21	17. a b X	33. a X c
2. a X c	18. a X c	34. a b X
3. a X c	19. X b c	35. a X c
4. X b c	20. a X c	36. a X c
5. X b c	21. a X c	37. a X c
6. a b X	22. X b c	38. X b c
7. X b c	23. a b X	39. a X c
8. a X c	24. X b c	40. a b X
9. a b X	25. a b X	41. a b X
10. a b X	26. X b c	42. a X c
11. a b X	27. a X c	43. a b c
12. a b X	28. a X c	44. a b c
13. a b X	29. X b c	45. a b c
14. a b X	30. X b c	46. a b c
15. a X c	31. a X c	47. a b c
16. a X c	32. X b c	48. a b c

APPENDIX D

SAMPLE SIZE CALCULATION TO DETERMINE POWER AND SIGNIFICANCE

Certain sample size calculations are necessary to assure that the sample size is adequate to detect a significant difference in mean test score between the pre- and post-tests.

Assume that a difference of 15 points in the improvement from the pre- to post-test scores is important. Then the table below gives the number of students in each of the control and test groups which one would need to obtain power (probability of detecting a 15-point difference in average scores) of 90%, 95%, and 99%, for each of the significance levels 5% and 1% (two-sided tests). Four different hypothesized values of sigma, the standard deviation on the differences in scores, are given.

Table C1: Sample Size Required in Each Group to Detect a 15-Point Difference in Scores.

Standard Deviation (Sigma)	Significance Level					
	5%			1%		
Power	90%	95%	99%	90%	95%	99%
10	11	13	18	15	18	24
15	23	27	38	32	38	50
20	39	48	67	55	66	88
30	86	106	160	123	144	200

A second method can be employed to estimate the probability of detecting a difference in mean scores when the population is known. Table C2 below gives the detectable difference in terms of the ratio of the difference in scores to the standard deviation of the difference scores. For example, if 100 students in each group

are used, and if the level is 5%, then one has a 95% chance of detecting a difference of 5 points between the improvement of the test and control subjects if the standard deviation is 20 points. Similarly, with a level of 1%, one has a 90% power of detecting a difference of 3.15 if the standard deviation is 15. Thus the formula:

difference in mean score = standard deviation (Detectable Difference)

Table C2: Estimation of Probability of Detecting a Difference in Mean Score Using a Population of Either 100 or 175 Students.

	Significance Level					
	5%			1%		
Power	90%	95%	99%	90%	95%	99%
n	Detectable Difference					
100	.23	.255	.32	.275	.30	.35
175	.17	.19	.24	.21	.23	.265