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A Comparison of Student Health Knowledge in Michigan and Selected New York State Schools

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A Comparison of Student Health Knowledge
in Michigan and Selected New York State
Schools

by

G. Greg Wojtowicz

A Thesis Submitted in Partial Fulfillment
of the Requirements for the Degree of

MASTER OF SCIENCE IN EDUCATION

(HEALTH EDUCATION)

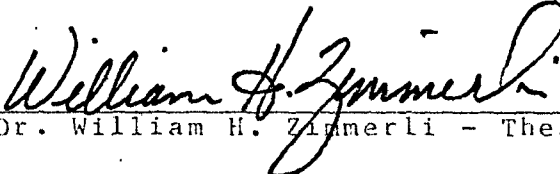
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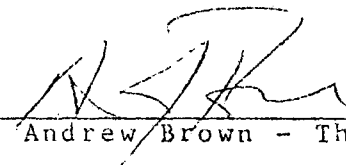
COLLEGE AT BROCKPORT

1986

To the Resident Instructional Staff:

The members of the Committee selected to examine the thesis of G. Greg Wojtowicz, find it satisfactory and recommend it be accepted.

 June 10, 1986
Dr. William H. Zimmerli - Thesis Advisor

 June 10, 1986
Dr. Andrew Brown - Thesis Reader

DEDICATION

"and' now it begins...

all is done, save what shall have no end."

ACKNOWLEDGMENTS

This investigator wishes to express his deepest appreciation to Dr. William H. Zimmerli for his guidance, counsel and motivational input. The completion of this research project would have been impossible without the benefit of his expertise.

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CHAPTER 1

INTRODUCTION

Historically, health educators have been called upon to design and implement new methods of instruction that would effectively facilitate the assimilation of new information. While the body of contemporary health related knowledge is growing at an unprecedented rate, educational programs can not teach all there is to learn nor can an individual be expected to learn all there is to know. Recently however, The School Health Education Evaluation study (SHEE) ¹ has shown that program evaluation can be a valuable tool in establishment of educational priorities directed at improving the effectiveness of instruction through the identification of essential educational variables. This study will concentrate on the assessment of existing health knowledge in order to shed light on its importance as an educational variable and its possible function as a mediator of wellness behaviors.

The SHEE study found that "health education programs are effective and work best where there is attention to the building of foundations of basic knowledge." ²

1 D.B. Connell, L.K. Olsen, R.R. Turner and R. Simon, School Health Education Evaluation, "Final Report", Cambridge, Mass., Abt Associates, Inc., 1985

2 L.W. Green, T. Cook, M.E. Doster, S.W. Fors, R. Hambleton, A. Smith and H.J. Walberg "Thoughts From The School Health Education Evaluation Advisory Panel", Journal of School Health, October, 1985, Volume 55, Number 8, p. 300.

One important outcome of the study was to indicate the need to "stringently select topics that provide a lean core of subject matter that all students can master."³ Mastery of fundamental health knowledge allows an individual to take advantage of existing and newly discovered information in order to achieve a level of wellness. Basic knowledge also helps one to protect oneself from health hazards and problems. Effective health education programs are basic to acquiring such knowledge. The SHEE findings supported these contentions when it reported "statistically significant gains in student knowledge accompanied by student reports of healthier attitudes, improved decision-making skills and a positive reduction in the number of students who reported that they were smoking."⁴ In addition, one of the methodological implications of the SHEE study stemmed from the discovery of the positive impact of time-on-task activities with basic knowledge as a philosophical base. The study concluded that the more time spent on specifically selected topics, the more effectively these topics were learned.

3 T.D. Cook and H.J., Walberg, "Methodological and Substantive Significance", Journal of School Health, October, 1985, Volume 55, Number 8, p. 342.

4 D.B. Connell, R.R. Turner and E.F. Mason, "Summary of Findings of the School Health Education Evaluation, Health Promotion Effectiveness, Implementation, and Costs", Journal of School Health, October, 1985, Volume 55, Number 8, p. 316.

"The SHEE study represents another valuable contribution to the existing body of knowledge on the impact of school health education."⁵ It emphasizes the unique role that health education plays in helping students acquire the information necessary for making wise decisions and proves that evaluation of existing knowledge is fundamental to curricular planning and improvement.

In order to determine the impact of any existing health education program the essential elements of school health programs must be identified and evaluated; specifically, health knowledge and its impact on the health decisions made by students. In this way the essential elements of health education programs can be identified, evaluated and revised in order to insure that students are being provided with appropriate information. Health knowledge and its impact on health decisions made by youth can then be investigated in order to draw conclusions about that particular programs' efficacy.

Possession of information by an individual does not mean that correct decisions will automatically be made. Student behaviors are effected by various psycho-social variables within their peer group. Generally accepted information espoused by the peer group, even if inaccurate, can influence decision making behaviors. Test instruments,

⁵ K. Howell, R. Frye and D. Bibeau, "Comments from the Field", Journal of School Health, October, 1985, Volume 55, Number 8, p. 354.

designed to evaluate individual student knowledge, can serve as a tool which monitors and manifests the quantity and quality of the general knowledge within student groups. This information can then be used as one of the evaluation techniques used to insure that the information within the existing program remains current.

Therefore, it is important to know where and how students acquire information. Davis & Harris⁶ surveyed two hundred eighty-eight students ranging in age from eleven to eighteen to determine the sources of a specific form of knowledge, sexual information. The data indicated that friends were the most frequently cited source of sexual information followed by the school.

Assuming other forms of health information are passed in a like manner, general student knowledge could be a determining factor in the student decision making process. If peers do convey important information to age mates in relation to other health knowledge areas, it becomes imperative to develop comprehensive curricula that will provide students with correct information. In this way students with proper information can have a positive role in influencing the behaviors of peers.

If the level of individual health knowledge can effect decision making when influenced by psychosocial

6 S.M. Davis and M.B. Harris, "Sexual Knowledge, Sexual Interests and Sources of Sexual Information of Rural and Urban Adolescents from Three Cultures", Adolescence, Volume 17, Summer 1982, p. 478.

interaction, a return to a curricular emphasis on knowledge, directed at risk taking behaviors, would be of value in the area of prevention. Such a curriculum would take advantage of the psychosocial influence of age mates within the peer group.

Statement of the Problem

The purpose of this study was to compare the level of Health knowledge of New York State students in grades four, seven and ten with that of Michigan students in grades four, seven and ten.

Hypotheses

No statistically significant difference exists between Health knowledge scores of fourth, seventh and tenth grade New York State students and those of Michigan students in the same grade levels.

Ho: $\mu_m 4 = \mu_{ny} 4$ $\mu_m 7 = \mu_{ny} 7$ $\mu_m 10 = \mu_{ny} 10$

Ha: $\mu_m 4 \neq \mu_{ny} 4$ $\mu_m 7 \neq \mu_{ny} 7$ $\mu_m 10 \neq \mu_{ny} 10$

Significance of the Study

An effective curriculum begins with the needs of the student and ends with a documentation of positive results.

"If Health Education is to be important in improving health behaviors it will be necessary to evaluate current knowledge status in order to improve existing curriculums. The testing of student knowledge may prove to be an effective form of program evaluation used by the health educator." ⁷

⁷ C.W. Higgins, J.O. Price, and J.D. Dunn, "A Survey of Health Education in Western Kentucky High Schools", Journal of School Health, Volume 52, Number 3, March, 1982, p. 162.

6

Continuous monitoring of student health knowledge levels in conjunction with an appraisal of health attitudes and practices is the basis for curriculum revision.

This evaluation process must be specific enough to detect the problems, needs and interests of the students serviced by the program. Being sensitive to the level of student knowledge can be a valuable tool in curriculum development. "An assessment of student knowledge, supported by local school districts and conducted by health educators can serve as a basis for the development of an effective Health Education Curriculum,"⁸

Besides influencing positive decision making behaviors within student peer groups, a documented knowledge gain in turn may foster a more positive community perception of the health education program in the school. Because knowledge gains reported by the SHEE "reached levels of effect sizes that are educationally significant by conventional standards of pedagogy,"⁹ cognitive knowledge may be the basis of effective health education programs.

By comparing New York State student Health Topic Attainment Rate percentages on the Michigan Educational

8. M.L. DuShaw and S. Hansen, , "Current Status of Statewide School Health Education Programs in Michigan, Journal of School Health, Volume 53, Number 8, October, 1983, p. 475.

9 L.W. Green, et al, op. cit., p. 300.

Assessment Programs test for Health Education with that of Michigan students, it is anticipated that this study will (1) determine the health knowledge of students in selected New York State schools (2) determine if there is a significant difference in student health knowledge in New York State and Michigan (3) provide a basis for future research in the area of student health knowledge in New York State.

Definition of Terms

A "Health Topic Attainment Rate"¹⁰ is a student percentage score on the MEAP test for Health education.

The Michigan Educational Assessment Program(MEAP) Test for Health Education "is an instrument developed by the Michigan Department of Education used to determine student health knowledge in grades four, seven and ten."¹¹

Health "is a dynamic status that results from an interaction between heredity potential, environmental circumstance and lifestyle selection."¹²

A Needs Assessment is a systemic process by which a Health Educator determines student, curricular and program goals.

10 Michigan Department of Education, "Health Education Interpretive Report", Lansing, Michigan, July, 1985, p. vi.

11 Ibid., p. 1.

12 G.F. Carter and S.B. Wilson, "My Health Status", Burgess Publishing Company, Minneapolis, Mn, 1982, p. 5.

Knowledge, involving the recall of specifics and universals, is a method or process by which patterns, structures and settings are created.

Education is the aggregate process by which students are influenced by a selected and controlled environment for the purpose of acquiring knowledge, developing abilities, attitudes and behaviors that are accepted and valued by society.

A Curriculum is a varied, sequential learning experience supervised and provided by the school for the purpose of educating children in ways of knowledge and behavior.

Evaluation is a judgemental assertion about the value of a program, curriculum or individual ability.

Delimitations of the Study

The investigation was carried out under the following conditions.

1. The subjects used in this study consisted of six hundred twelve students from grades four (N = 156), seven (N = 152), and ten (N = 304). It was not be possible to match New York State fourth, seventh and tenth graders with Michigan groups. Subjects were volunteered by district administrators from three Monroe County school districts; Churchville-Chili CSD, Hilton CSD and Spencerport CSD.

- 2. All classes were heterogeneously grouped without regard to racial, ethnic or socio-economic background.
- 3. All tests were administered in the Fall of the 1985-86 school year and were machine scored.
- 4. The only subjects to be compared were New York State students and Michigan students.

Limitations of the Study

This investigation was carried out under the following limitation.

- 1. No data was available concerning the make-up of the Michigan sample or the conditions under which the test was administered.

Basic Assumptions

Three assumptions are basic to this study.

- 1. It was assumed that all fourth, seventh and tenth grade students who take a Health Education course in New York and Michigan share certain general characteristics and therefore can be compared.
- 2. Based on the data provided by the Michigan Department of Education, the MEAP test is considered to be a valid and reliable test criterion for estimating student health knowledge of fourth, seventh and tenth grade students.
- 3. The HTAR of seventy-five percent, although an arbitrary number determined by the Michigan Department of Education, is an acceptable criterion for use with fourth, seventh and tenth grade students.

CHAPTER 11

REVIEW OF RELATED LITERATURE

Research concerned with health knowledge, its relationship to attitudes, behavior and the role Health Education plays in teaching cognitive understanding is incomplete. Health educators have always been concerned with factual knowledge. However, "modern" educational methods have at times required health education programs to reduce knowledge to a subordinate position.

As available technology accelerated past an individual's normal capacity to absorb information, education was challenged to provide ways to increase quantitative learning. Unfortunately, in an effort to increase the volume of information learned, many health education programs neglected to teach association, integration, correlation and structuring. The rapidity with which these changes occurred made the teaching of "wellness understandings" difficult. The "trivial pursuit" form of learning, where the end was more important than the means, damaged the success rate of many programs. "Overall curriculum improvement can not be achieved by the introduction of crash programs or a patchwork approach."¹

1 E.M. Sliepcévich; "Summary Report of a Nationwide Study of Health Instruction in the Public Schools"; School Health Education Study, Washington, D.C., 1964, p. 12.

Health Knowledge

The concept of knowledge is uniquely related to the educational process. "Comprehensive knowledge is a construct which gives meaning and structure to regularities in existence. The proper emphasis in education is this structure of knowledge and the relationship between its various factual elements that make one idea follow another."² The importance of factual knowledge pervades both the practical and theoretical realm of health education and is rooted in the very essence of education itself. "Knowledge in the informational sense is fundamental to human cognition and required for academic speculation and pragmatic investigation."³

Health education research concerned with program evaluation has sought to determine student health knowledge. The School Health Education Study (1961-65) described the status of health instruction in United States public schools and determined the health knowledge, health attitudes and health practices of various elementary and secondary school students. One hundred thirty-five (135) school districts from thirty eight (38) states, randomly selected three classes at grade levels six, nine and twelve for the purpose of creating a subject pool.

² J.S. Bruner, On knowing: Essays for the Left Hand; Belnap Press of Harvard University Press, Cambridge, Mass., 1962, p. 120.

³ K. Lehrer, Knowledge, Oxford University Press, London, England, 1974, p. 3.

Students responded to questions about thirty-two Health related topics on the "School Health Education Evaluation Study"⁴ Out of the 17,634 possible subject choices, two thousand (1,000 male and 1,000 female) were randomly chosen from each level. The discovery of widespread deficiencies in existing health education programs prompted the authors to call for action plans aimed at improvement of prevention curriculums. Realizing that knowledge about the status of existing conditions is fundamental to the success of any program, the study recommended that, "states and local school districts plan and carry out diagnostic evaluation studies of their health instruction programs in order to determine existing strengths and weaknesses."⁵

Health Knowledge and Related Variables

Studying relationships between knowledge and other variables found in wellness programs is a valuable educational tool. In 1970, Brayer studied drug use and its relation to knowledge in the Coronado Unified School District in Coronado, California. One hundred sixteen, eight grade and one hundred twenty-four eleventh grade student subjects responded to one hundred nine questions related to drug use.

4 E.M. Sliepcevich, op.cit., School Health Education Evaluative Study, 1954-59, Los Angeles, California, p. 72.

5 E.M. Sliepcevich, op.cit., p. 12.

Non-users of drugs in both grades scored seventeen percent higher on the test. "Analysis of results indicated that student users in both eighth and eleventh grades know less than non-users about drugs or drug-related information."⁶ In order for Health Education programs to function in a preventative sense Brayer concluded that, "new methods for presentation of cognitive data as well as a different philosophical viewpoint towards knowledge itself is needed."⁷

Measuring Health Knowledge

Measuring student knowledge gain is an important method used to evaluate health education programs. In 1973 Walbek⁸ found significant gains $p < .05$ in knowledge of general nutrition when he studied four different instructional/skill acquisition programs regarding changing the knowledge, attitudes and behaviors of fifty-seven (57) South American mothers. "Differences in the extent of acquired knowledge among different types of programs are minimal however, it seems possible to conclude that

⁶ H.I. Brayer, et al, "A Comparative Analysis of Drug Use and its Relationship to Certain Attitudes, Values and Cognitive Knowledge of Drugs between Eighth and Eleventh Grade Students in the Coronado Unified School District," Coronado Unified School District, Coronado, California, 1970, p. 55.

⁷ Ibid., p. 56.

⁸ W.H. Walbek, "Precepts, Paragons and Practice: The Effects of Various Methods of Nutrition Instruction on Attitudes, Knowledge and Behavior. In D.C. Iverson and B. Portnoy, "Reassessment of the Knowledge/Attitude/Behavior Triad", Health Education, Nov/Dec., 1977, p. 31.

educational programs generally have the effect of increasing knowledge." ⁹

Health Knowledge and Educational Programs

"Educators are sometimes lulled into the belief that imparting information can only result in desirable behavior changes. This trust in knowledge is partly responsible for the neglect of the evaluation of wellness programs and their impact upon knowledge, attitudes and behavior." ¹⁰

Fischman and et. al. ¹¹ assessed the knowledge, acceptance and use of contraceptive methods of two hundred postpartum women at the Harlem Hospital Center. After testing one hundred postpartum women who had attended a family planning class and one hundred who had not attended, the authors reported a significant difference: ($p < .001$) between the two groups. The before-class group answered fourteen of twenty-three questions or 61 percent correct compared to twenty of twenty-three questions or 87 percent correct for the after-class group."

Knowledge, however, is not always information which is understood or that which can be applied. Therefore, "factual knowledge must be associated with techniques that

⁹ D.C. Iverson and B. Portnoy, "Reassessment of the Knowledge/Attitude/Behavior Triad", Health Education Nov/Dec., 1977, p. 31.

¹⁰ S.H. Fischman, P. Collier, V. Stewart and D.P. Swartz. "The Impact of Family Planning Classes on Contraceptive Knowledge, Acceptance and Use", Health Education Monographs, 1974, Volume 2: p. 246.

¹¹ Ibid., p. 250.

teach understandings."¹² Health education programs should strive to teach structured knowledge. The authors supported this concept of teaching for understanding when they stated,

"One link between knowledge and contraceptive use was noted: the women who apparently understood the pill's mechanism of action were more consistent pill-users than their less informed counterparts for one year postpartum. Knowledge may not directly change behavior but the fact remains that increased knowledge is merely one component in the process of behavior change."¹³

Researchers have found a positive cause and effect relationship between educational programs and knowledge.

Rabinowitz and Zimmerli¹⁴ found a significant mean knowledge gain ($p < .001$) while studying the effects of health education programs on seven hundred eighty-five junior high students. Subjects from thirty-six randomly selected classes in six Niagara County (N.Y.) school districts responded to fifty-eight items concerned with knowledge and attitudes related to tobacco use.

¹² W.A. Brownell, "The Measurement of Understanding"; The 54th Yearbook of the National Society of Education; National Society for the Study of Education, Chicago, Ill., 1981, p. 8.

¹³ Fischman, op.cit., pp. 256-58.

¹⁴ H.S. Rabinowitz and W.H. Zimmerli, "Effects of a Health Education Program on Jr. High School Students' Knowledge, Attitudes and Behavior Concerning Tobacco Use", Journal of School Health, Volume 44, Number 6, June, 1974, pp. 324-30.

Alkhateeb, Lukeroth and Riggs¹⁵ found significant increases ($p < .001$) in mean knowledge after comparing educational techniques used in a venereal disease clinic at 'the Santa Clara', California Health Department by studying four hundred forty-three subjects. It was hoped, "that inappropriate behaviors would be modified by knowledge about why the behavior was inappropriate. Knowledgeable persons would then form appropriate attitudes about the behavior."¹⁶

Knowledge is the most common denominator of most educational learning theories but whichever program is discussed, knowledge gained is the basic factor associated with positive outcomes. Wellness programs must be directed to the needs of the individual and should be based on the need to gather pertinent information because the primary "role of educational programs in behavior change is to directly increase knowledge and indirectly initiate attitude and behavior changes,"¹⁷

15 W. Alkhateeb, C.J. Lukeroth and M. Riggs; "A Comparison of Three Educational Techniques Used in a Venereal Disease Clinic" Public Health Reports, Volume 90, 1975, pp. 159-164.

16 R.M. Nakamura and C.M. Lescault, "Health Behavior Survey of California School Health Educators", Journal of School Health, Volume 53, Number 9, November, 1983, p. 557.

17 D.C. Iverson and B. Portnoy, op.cit., p. 33.

The interrelationship between knowledge and behavior is crucial to effective wellness programs because it is associated with the applied process of decision making.

"How much information a person has, how accurate it is and how much value the person gives it is a complex process that interacts with other factors and has a direct impact on health decisions and resultant behaviors."¹⁸ "If students have knowledge and related understandings in a given health area and they learn how to evaluate the various alternatives; health-enhancing choices will result."¹⁹

Hansen and Evans²⁰ used feedback about carbon monoxide to test the efficiency of several programs attempting to deter experimentation with cigarettes. Four hundred five, sixth graders from fourteen elementary school classes in the Houston Independent School District participated in the study. The subjects were divided into five groups related to feedback: immediate feedback, delayed feedback and information-only feedback. "The information-only

18 J. Jacobs, "News from Health Research; Toward a Better Understanding", Journal of School Health, Volume 52, Number 12, December, 1982, pp. 614-618.

19 E.J. Duryea, "Decision Making and Health Education", Journal of School Health, Volume 53, Number 7, January, 1983, pp. 29-31.

20 W.B. Hansen, and R.I. Evans, "Feedback Versus Information Concerning Carbon Monoxide as an Early Instruction Strategy in Adolescent Smoking", Adolescence, Volume 17, Number 65, Spring, 1982, pp. 89-98.

group showed the only decrease in the number of reported smokers (-8.2%) which accounted for forty-four percent of the Chi square." ²¹

"Many health programs have behavior change as their goal. In general, these programs tend to focus on knowledge and attitudes in attempting to encourage students to change their behavior."²² Riggs and Noland²³ surveyed three hundred six female (aged seventeen to forty-nine) college students (freshman through graduate classes) to determine the relationship of health knowledge about Toxic Shock Syndrome (TSS) and health behavior. Subjects responded to an eighteen item multiple choice questionnaire, developed by the author, which was divided into three variables: awareness of TSS, knowledge about TSS and perceived risk of developing TSS. The authors found that, "twenty-one percent of the subjects in this study actually did change their behavior (by changing brands) due to a concern for TSS"²⁴ and therefore concluded that, "knowledge about TSS, both perceived and actual did appear to be related to behavior."²⁵

21 Ibid., p. 95.

22 R.S. Riggs, and M.P. Noland, "Awareness, Knowledge and Perceived Risk for Toxic Shock Syndrome in Relation to Health Behavior", Journal of School Health, Volume 53, Number 5, May, 1983, p. 37.

23 Ibid., pp. 303-307.

24 Ibid., p. 303.

25 Ibid., p. 305.

Knowledge based programs have shown positive outcomes in many areas of student behavior. Schinke and Gilchrist²⁶ compared fifty-six (thirty female and twenty-six male) sixth grade students from two Seattle schools. Subjects responded to a thirty-five item questionnaire on the effects of tobacco smoking. A Primary Prevention program concerning tobacco was a condition of Solomon four-square research design. The authors reported that, "Primary Prevention students had test scores that were higher ($t(54) = 3.562, p < .001$), noted more instances of refusal of all forms of tobacco ($t(49) = 2.720, p < .01$) and were better able to link problems with solutions ($t(49) = 2.011, p < .01$)."²⁷

Hodge²⁸ studied the effects of a contraceptive program on knowledge, attitudes and behavior of undergraduate students at the State University of New York,

26 S.P. Schinke and L.D. Gilchrist, Primary Prevention of Tobacco Smoking," Journal of School Health, Volume 53, Number 7, September, 1983, pp. 416-418.

27 Ibid., p. 418.

28 M.E. Hodge, "The Effects of a Contraceptive Program on Knowledge, Attitude and Behavior of Undergraduate College Students", Thesis for a Master of Science in Education, State University of New York, College at Brockport, 1983, pp. 1-108.

College at Brockport. Two hundred subjects ranging in age from eighteen to forty years were divided into seven groups. Four groups enrolled in a two-week Family Life Science instructional unit in Contraceptive Education and three did not. Three groups were pretested and all groups were posttested. A modified randomized Solomon four-group design was utilized. "The author concluded that contraceptive education does produce a significant increase in personal contraceptive knowledge ($F = 85.71825$; $p < 0.01$) while also producing a significant shift in contraceptive attitude ($F = 6.47308$; $p < 0.05$)."²⁹

A similar study by Andrews and Hearne³⁰ exposed six hundred students from two New York City school districts to a cognitive-affective program concerning smoking attitudes and behavior. The subjects were divided into a control group of three hundred sixteen students and an experimental group of two hundred eighty-four students. The study began in the kindergarten year and followed the same children through the first, second and third grades.

29 Ibid., p. 64.

30 R.L. Andrews, and J.T. Hearne, "Effects of Primary Grades Health Curriculum Project on Student and Parent Smoking Attitudes and Behavior," Journal of School Health, Volume 54, Number 1, January, 1984, pp. 18-20.

After the completion of the program, the experimental group students showed less willingness to become involved with tobacco ($p < .05$). After post-testing the authors found that, "the curriculum created positive results in student attitude and behavior while providing sufficient knowledge to influence their families to change behavior ($p < .0001$)."³¹

Recent research by Riggs and Noland³² determined that knowledge is related to locus of control and an increase in available knowledge enables an individual to internalize the locus of control; thereby positively effecting behavior. The authors studied health knowledge and behavior in relation to locus of control. An internal locus of control indicates an individual's belief that "they" control or do not control their own health and health behavior. An external locus of control refers to the individual who believes that his health status is caused by fate, luck or the intervention of other people.

One hundred eighteen black male and female youths, aged twelve to seventeen years, from the metropolitan Lexington, Kentucky area, were used as subjects for the locus of control study.

31 Ibid., p. 19.

32 R.S. Riggs, and M.D. Noland, "Factors Related to the Health Knowledge and Health Behavior of Disadvantaged Black Youth," Journal of School Health, Volume 54, Number 11, December, 1984, pp. 431-434.

Subjects responded to a fifty item multiple choice test developed by the authors for this study. Specifically, Riggs and Noland found that, "Internally-oriented students had higher knowledge scores ($X=30.30$) than did externally-oriented students."³³ If a student believes that he maintains control of his own health, knowledge would be an effective tool in creation of positive health attitudes and resulting health behaviors. "If health knowledge is associated with an internal locus of control the results suggest that Health Education programming might be modified to train students to be more internal."³⁴

In 1984 the MEAP³⁵ (Michigan Educational Assessment Program) tested the health knowledge of 6,386 (796 fourth graders, 1,792 seventh graders, 3,804 tenth graders) students in thirty-six randomly selected Michigan schools. Subjects responded to multiple choice questions (99 questions in fourth grade, 102 questions in seventh and tenth grades) related to ten topic areas basic to health education. Results from previous MEAP tests in 1974 and 1979 proved to be unsatisfactory. The investigators

33 Ibid., p. 433

34 Ibid., p. 434.

35 Michigan Department of Education, Michigan Educational Assessment Program, (for Health Education) Lansing, Michigan, 1984.

determined that, "The attainment rates by fourth, seventh and tenth graders were again unsatisfactory (less than 75%) for all ten topic areas tested with the exception of the satisfactory rates by fourth and seventh graders in the area of Family Health."³⁶ Fourth graders had unsatisfactory rates in nine areas tested with the exception of a satisfactory attainment rate of 77.8 percent in the area of Family Health. The unsatisfactory rates ranged from 49.6 to 73.7 percent with the lowest rates being in Nutrition and Community Health. Seventh graders had unsatisfactory rates for nine areas tested with the exception of the satisfactory attainment rate of 84.5 percent in the area of Family Health. Rates ranged from 50.3 to 72.9 percent with the lowest rates being in the areas of Nutrition and Community Health. No satisfactory attainment rates were achieved by tenth graders. The unsatisfactory rates ranged from 21.8 to 66.7 percent with the lowest rates being found in the areas of Nutrition and Disease Prevention and Control.

Because of the rapid change in health-related information the design, teaching and evaluation of health education curriculums may be the most difficult and demanding of all educational undertakings. "If Health

³⁶ Ibid., "Health Education Interpretive Report", July 3, 1985, p. vi.

Education is to promote protection and preventive health styles, health educators must provide structured information so individuals can make responsible decisions thereby determining health behaviors on informed choices."³⁷ The link between knowledge and behavior is an evaluation process which provides constant feedback to the educator.

"In order to determine if a Health education program can, in fact, operate as a preventive measure a longitudinal study carried on over a period of several years would be most effective."³⁸ Research studies of this type will enable health educators to meet the changing needs of the students by revising content, knowledge and the objectives of wellness programs.

37 J.K. O'Connell, and J.H. Price, "Ethical Theories for Promoting Health through Behavioral Change", Journal of School Health, Volume 53, Number 8, October, 1983, p. 479.

38 H.S. Rabinowitz, and W.H. Zimmerli, op.cit., p. 329.

Chapter III

Research Design and Methodology

Introduction

In the past decade the State of Michigan has shown an active leadership in the area of Health Education. The Michigan Department of Education budgets over five hundred thousand dollars a year for Health Education program development. This study used the assessment instrument developed by the State of Michigan. Students in grades four, seven and ten from three Western Monroe County districts, Churchville-Chili, Hilton and Spencerport were given the Michigan Educational Assessment Program test for Health Education in order to determine their level of health knowledge.

Subjects

Heterogeneously grouped volunteered classes and/or groups were randomly selected by each district according to convenience. Building principals enlisted the cooperation of teachers interested in participating in the research project or at the very least, willing to surrender class time for the purpose of testing. A total of six hundred twelve students, male and female ranging in age from eight to sixteen, responded to multiple choice questions about health related topics.

Instrument

The Michigan Educational Assessment Program (MEAP) test for Health Education is an instrument for measuring health knowledge. It was developed by the Michigan Department of Education in the 1974-75 school year and was given to a statewide sample of fourth and seventh grade students in the fall of 1975.

The MEAP test was reviewed by a group of Michigan health educators. Test items were revised and re-administered in the fall of 1979 to fourth, seventh and for the first time, tenth grade students. Test items were again screened, re-evaluated and re-written by a second group of Michigan health educators. This revised edition was administered in the fall of 1984. This process, which substitutes for a calculated form of validity, represents a concurrent-content¹ form of validity for the MEAP test. A summary of the Cronbach alpha² reliability coefficients for each three-item set in each test, for grades four, seven and ten can be found in Appendix D.

Fourth graders responded to ninety-nine multiple choice questions, seventh graders responded to one hundred two multiple choice questions as did tenth grade students.

1 B.W. Tuckman, Conducting Educational Research, Harcourt Brace Jovanovich Inc., New York, 1972, pp. 140-141.

2 L.J. Cronbach, Essentials of Psychological Testing, Harper and Row, New York, 1970, pp. 156-161.

The topic areas were the same for grades four, seven and ten. However, the specific performance objectives contained within a topic area differ from grade to grade (See appendix B). Within each level, objectives were grouped according to the health topic to which they belong. There were ten topic areas within the general area of health education (Table 1).

The MEAP test for health education was selected because it provided Health Topic Attainment Rates (HTAR) used in a comparative analysis with New York State students. A student HTAR of 75 percent or better on the MEAP test is an arbitrary value considered to be satisfactory by the Michigan Department of Education. Test items are grouped in sets of three according to topic areas. A student response of at least two correct items, out of the possible three in each set, is considered to represent attainment of that particular objective set. Michigan student attainment rates can be found in Table 2.

Procedure

Each superintendent and/or district office was contacted in order to explain the purpose of the research project. Thereafter, meetings were scheduled with individual school principals to discuss the research project.

TABLE 1
1984-85 MEAP*
DISTRIBUTION OF OBJECTIVE ATTAINMENT RATES
BY TOPIC AREA AND GRADE

%	NUMBER OF OBJECTIVES BY TOPIC AREA																											%										
	DISEASE PREVENTION CONTROL			PERSONAL HEALTH PRACTICES			NUTRITION			GROWTH & DEVELOPMENT			FAMILY HEALTH			EMOTIONAL & MENTAL HEALTH			SUBSTANCE USE & ABUSE			CONSUMER HEALTH			SAFETY & FIRST AID EDUCATION				COMMUNITY HEALTH									
	4	7	10	4	7	10	4	7	10	4	7	10	4	7	10	4	7	10	4	7	10	4	7	10	4	7	10		4	7	10	4	7	10	4	7	10	4
90-100																																					90-100	
80-89		1			1	1					1	1	1	2	2	1					1	1	1													80-89		
70-79	1	1	1	2	2			1								1	2	1	3				1	1			2									70-79		
60-69	1			2	1						2	2		1				1	1	2			1	2	1		1		1	1	1				60-69			
50-59		1	1		1			1			1	1	1			2	3		2	1	2				2	1		1							50-59			
40-49	1	1	1								1			1		1			1				1			1										40-49		
30-39							1						1														1									30-39		
20-29			2		1					2																											20-29	
10-19									1																												10-19	
0-9																																					0-9	
TOTAL OBJECTIVES	3	4	5	4	6	2	2	2	3	3	4	4	3	2	4	4	4	4	4	4	3	2	2	3	4	3	3	2	2	3				TOTAL OBJECTIVES				

*Michigan School Health Association, Michigan Educational Assessment Program, Health Education Interpretive Report, Health Topic Area Attainment Rates by Grade, 1984-85, p.78.

TABLE 2
1984-85 Michigan Student
HEALTH TOPIC AREA ATTAINMENT RATES*
BY GRADES

Topic Area	Grade 4	Grade 7	Grade 10
Disease Prevention & Control	60.0	65.6	47.3
Personal Health Practices	70.5	63.5	52.2
Nutrition	49.6	50.3	21.8
Growth & Development	64.2	66.3	63.3
Family Health	77.8	84.5	60.1
Emotional & Mental Health	61.3	67.7	63.4
Substance use & Abuse	64.6	72.9	66.7
Consumer Health	73.7	64.1	63.1
Safety Education	69.7	53.8	64.6
Community Health	61.1	51.7	49.0

*Michigan School Health Association, Michigan Educational Assessment Program, Health Education Interpretive Report, Health Topic Area Attainment Rates by Grade, 1984-85, p. 79.

Subsequently, permission to test students in each school was obtained from the building principal and a formal letter of agreement was sent to each principal (See Appendix A). Thereafter, individual teachers were contacted in order to determine the most convenient date and time for student testing. The participating school districts were chosen for convenience and because their respective health education programs closely resemble the effective program model set forth in the SHEE study.

Testing

Fourth Grade.

Each fourth grade class was tested during its normally scheduled health education time frame by this investigator, whenever and wherever possible. Convenience testing (grouping of classes) was done to meet the scheduling needs of teachers in team teaching situations. The classroom teacher was present in the room during the test. In order to avoid complications associated with varying levels of reading skill, the fourth grade test was read to all participating fourth grade classes by this investigator. There is no time limit for the fourth grade test. Fourth graders were given a five minute break after completion of question number fifty.

Seventh Grade

Each seventh grade class was tested during its normally scheduled health education time frame by this investigator, whenever and wherever possible. Convenience testing (grouping of classes) was done to meet the needs of individual teachers or at the request of the building principal. The classroom teacher was present in the room during the test. Directions for the test are contained in the test booklet for the seventh grade and were read to the subjects prior to the administration of the test (Appendix C). In districts without Health Education scheduled in seventh grade, testing was done during a study hall period or in some other room and time frame of convenience. There was no time limit on the seventh grade test. Whenever and wherever necessary, two consecutive health education class periods were used to complete the test.

Tenth Grade

Each tenth grade class was tested during its normally scheduled health education time frame by this investigator, whenever and wherever possible. Convenience testing (grouping of classes) was done to meet the needs of individual teachers or the the request of the building principal. The classroom teacher was present

in the room during the test. Directions for the test are contained in the test booklet for the tenth grade and were read to the subjects prior to the administration of the test (Appendix C). In districts without Health Education scheduled in tenth grade testing was done during a study hall period or in some other room and time frame of convenience. There was no time limit on the tenth grade test. Whenever and wherever necessary, two consecutive health education class periods were used to complete the test.

Statistical Analysis

A calculation of Power in a Case II, one-tailed research study, a one-way analysis of variance (a priori) and Tukey's HSD³ was used to compare New York State and Michigan Health Topic Attainment Rates.

The power of a statistical test represents the probability of correctly rejecting a false null hypothesis ($H_0: \mu_{ny} - \mu_m = 0$, $H_a: \mu_{ny} - \mu_m > 0$) based on the difference between means in Michigan and New York State.

The anova and a priori comparison was conducted to test the stated hypothesis. The anova focuses on a comparison of the variability between groups and within groups. "If the variability between group means is much

³ R.J. Shavelson, Statistical Reasoning for the Behavioral Sciences, Allyn and Bacon Inc., Boston, 1981, pp. 430-479.

greater than the variability within groups the anova will lead to a decision to reject the null hypothesis." ⁴

Tukey's HSD (Honestly Significant Difference) is designed for the purpose of comparing pairs of means or complex combinations of means. This Post Hoc comparison was undertaken to determine where significant differences occurred among the mean scores within the two groups. The stated null and alternative hypotheses was represented as follows : $H_0: C = 0, C \neq 0$. The specified α was equal to .01.

⁴ Ibid., p. 444.

CHAPTER IV

RESULTS -

Results, of the investigation carried out within the context of the research project, are presented in this chapter. Data from Michigan and New York State were treated with various forms of statistical analyses in order to determine if a significant difference existed between the New York State and Michigan test scores. A significant difference did exist between reliability coefficients of the New York test (4th = .88, 7th = .84, 10th = .87) and the Michigan test (4th = .35, 7th = .36, 10th = .34). Baseline statistical data from New York and Michigan, in addition to calculations which pertain to the statistical analyses, can be found in Appendix E.

The purpose of this study was twofold: first, to determine the Health Knowledge levels of a selected sample of New York State students in grades four, seven and ten. Second, to compare these knowledge levels, represented by student test scores on the standardized MEAP test for health education, with scores of Michigan students on the same test. Preliminary results, obtained from the testing of New York State subjects, is presented first. Comparisons of New York and Michigan State results are to be found in following sections. Students responded to test items (92 questions on the fourth grade test and 102 questions on the seventh and tenth grade tests) related to ten health topic areas (refer to page 28). Test items were scored in groups

of three. A student correctly answering two out of three in each item set was considered to have attained the particular objective represented by that set of three questions.

New York State student Health Topic Attainment Rates are presented in Table 3.

TABLE 3
1985-86 NEW YORK STATE
HEALTH TOPIC AREA ATTAINMENT RATES*
BY GRADES

Topic Area	Grade 4	Grade 7	Grade 10
DISEASE PREVENTION & CONTROL	59.0	72.7	54.8
PERSONAL HEALTH PRACTICES	70.8	67.3	58.0
NUTRITION	51.2	58.5	35.1
GROWTH & DEVELOPMENT	66.8	<u>75.1</u>	74.2
FAMILY HEALTH	74.9	<u>87.7</u>	65.1
EMOTIONAL & MENTAL HEALTH	62.4	74.5	<u>76.1</u>
SUBSTANCE USE & ABUSE	68.9	<u>78.3</u>	74.9
CONSUMER HEALTH	<u>81.3</u>	62.4	<u>75.4</u>
SAFETY EDUCATION	72.5	70.8	<u>78.8</u>
COMMUNITY HEALTH	64.1	62.3	62.4

* acceptable HTAR (75% or better)

New York students attained the acceptable HTAR of 75 percent in seven topic areas as compared to two for Michigan students. New York students attained higher HTAR

in all topic areas and at all grade levels than did Michigan students with three exceptions. Michigan students attained higher HTAR in the topic areas of Family health at the fourth grade level (M = 77.8, NY = 74.9), Disease Prevention & Control at the fourth grade level (M = 60.0, NY = 59.0) and Consumer health at the seventh grade level (M = 64.1, NY = 62.4). A comparison of the fourth grade level in New York and Michigan state is presented in Table 4.

TABLE 4
NEW YORK STATE-MICHIGAN
STUDENT HEALTH TOPIC ATTAINMENT RATES GRADE FOUR

Topic Area	Grade 4 NY	Grade 4 M	D
Disease Prevention & Control	59.0	60.0	-1.0
Personal Health Practices	70.8	70.5	+0.3
Nutrition	51.2	49.6	+1.6
Growth & Development	66.8	64.2	+2.6
Family Health	74.9	<u>77.8</u>	-2.9
Emotional & Mental Health	62.4	61.3	+1.1
Substance Use & Abuse	68.9	64.6	+4.3
Consumer Health	<u>81.3</u>	73.7	+7.6
Safety, Education	72.5	69.7	+2.8
Community Health	64.1	61.1	+3.0
			$\Sigma D = +19.4$

* acceptable HTAR (75% or better)

New York students attained one acceptable HTAR of 81.3 in Consumer health while Michigan students also attained one acceptable HTAR of 77.8 in Family health.

New York State students in grade seven (Table 5) attained three acceptable HTAR in the topic areas of Growth & Development (75.1), Substance Use & Abuse (78.3 and Family Health (87.7) while Michigan students attained one acceptable HTAR of 84.5 in Family Health.

TABLE 5
NEW YORK STATE-MICHIGAN
STUDENT HEALTH TOPIC ATTAINMENT RATES GRADE SEVEN

Topic Area	Grade 7 NY	Grade 7 M	D
Disease Prevention & Control	72.7	65.6	+7.1
Personal Health Practices	67.3	63.5	+3.8
Nutrition	58.5	50.3	+8.2
Growth & Development	<u>75.1</u>	66.3	+8.8
Family Health	<u>87.7</u>	<u>84.5</u>	+3.2
Emotional & Mental Health	74.5	67.7	+6.8
Substance Use & Abuse	<u>78.3</u>	72.9	+5.4
Consumer Health	62.4	64.1	-1.7
Safety Education	70.8	53.8	+17.0
Community Health	62.3	51.7	+10.6
			Σ D = 69.2

* acceptable HTAR (75% or better)

New York students in grade ten (Table 6) also attained three acceptable HTAR in the topic areas of Consumer Health (75.4), Emotional & Mental Health (76.1) and Safety Education (78.8) while Michigan students did not achieve any HTAR above 75 percent.

TABLE 6
NEW YORK STATE-MICHIGAN
STUDENT HEALTH TOPIC ATTAINMENT RATES GRADE TEN

Topic Area	Grade 10 NY	Grade 10 M	D.
Disease Prevention & Control	54.8	47.3	+7.5
Personal Health Practices	58.0	52.2	+5.8
Nutrition	35.1	21.8	+13.3
Growth & Development	74.2	63.3	+10.9
Family Health	65.1	60.1	+5.0
Emotional & Mental Health	<u>76.1</u>	63.4	+12.7
Substance Use & Abuse	74.9	66.7	+8.2
Consumer Health	<u>75.4</u>	63.1	+12.3
Safety Education	78.8	64.6	+14.2
Community Health	62.4	49.0	+13.4
			$\Sigma D = 103.4$

* acceptable HTAR (75% or better)

The HTAR of 87.7 in the topic area of Family Health achieved by the New York State seventh grade was the highest of any group from either state. In addition, a significantly low HTAR in the Nutrition topic area

([average] NY = 48.2, M = 40.6) was recorded by students from both states. Even though New York State students attained only seven acceptable HTAR, comparison of the sums of the HTAR differences from New York and Michigan at all levels resulted in a substantial plus total for New York State scores.

This preliminary data was treated with various forms of statistical analyses. These analyses are presented in the three sections which follow. The first section will contain results of a Calculation of Power in a Case II, one tailed research study. Section two contains data using a one-way analysis of variance (a priori). The remaining section will contain a post hoc comparison to test the significance between New York and Michigan State means by making all possible pair wise comparisons at an overall level of significance α (.01). Tukey's HSD was used for this purpose.

SECTION ONE

A Calculation of Power

In this calculation of Power (See Appendix E) null and alternative hypotheses ($H_0: \mu_{ny} - \mu_m = 0$, $H_a: \mu_{ny} - \mu_m > 0$) were established based on the expected differences between means in Michigan and New York State. Graph 1. (a-c) represents sampling distributions specified in the null and alternative hypotheses at the fourth, seventh and tenth grade levels (level of significance $\alpha = .01$, one tailed,

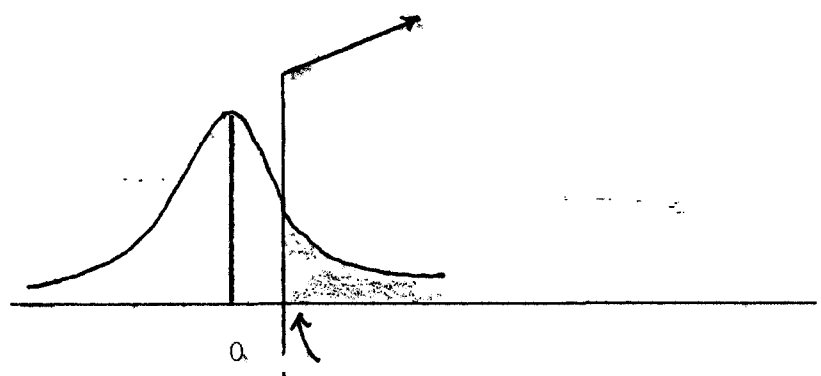
GRAPH 1a

SAMPLING DISTRIBUTIONS SPECIFIED
IN THE NULL AND ALTERNATE HYPOTHESE

CALCULATION OF POWER

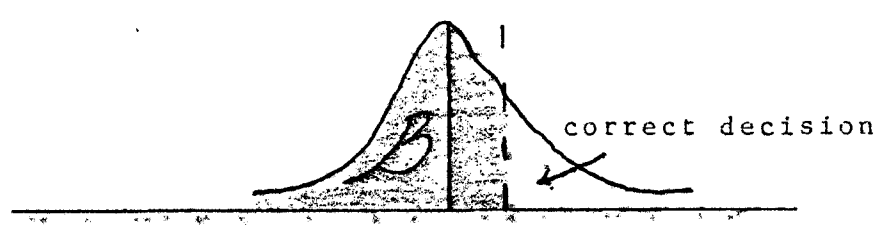
NEW YORK STATE AND MICHIGAN GRADE 4

$$Z \bar{X}_{ny} - \bar{X}_m (\text{crit.}) = .961.$$



$$(\bar{X}_{ny} - \bar{X}_m)_{\text{crit.}} =$$

$$2.239.$$



$$Z \bar{X}_{ny} - \bar{X}_m = 6.158.$$

$$\bar{X}_{ny} - \bar{X}_m = 2.33.$$

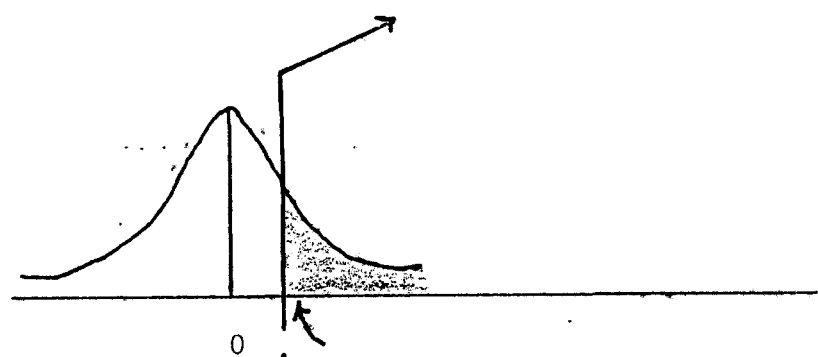
GRAPH 1b

SAMPLING DISTRIBUTIONS SPECIFIED
IN THE NULL AND ALTERNATE HYPOTHESE

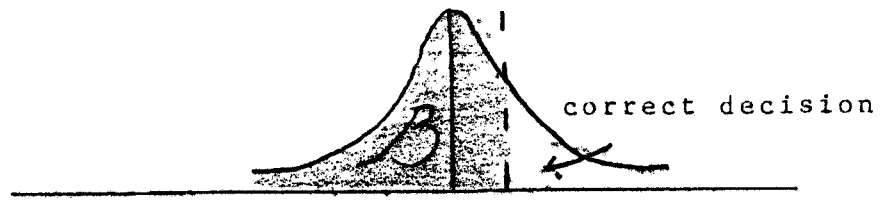
CALCULATION OF POWER

NEW YORK STATE AND MICHIGAN GRADE 7

$$Z \bar{X}_{ny} - \bar{X}_m \text{ (crit.)} = .979.$$



$$(\bar{X}_{ny} - \bar{X}_m)_{crit.} = 2.281.$$

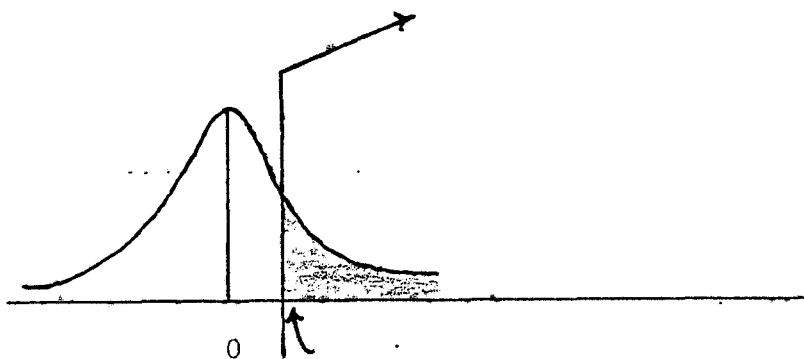


$$Z \bar{X}_{ny} - \bar{X}_m = 10.417.$$

$$\bar{X}_{ny} - \bar{X}_m = 2.33.$$

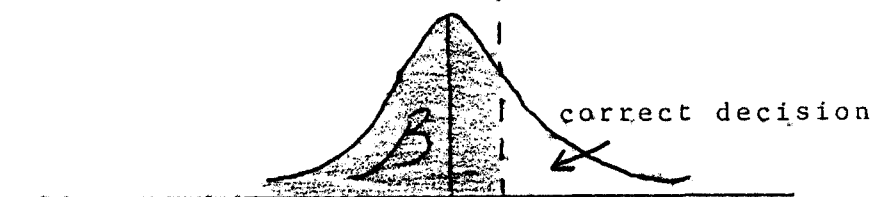
GRAPH 1c
 SAMPLING DISTRIBUTIONS SPECIFIED
 IN THE NULL AND ALTERNATE HYPOTHESE
 CALCULATION OF POWER
 NEW YORK STATE AND MICHIGAN GRADE 10

$$Z \bar{X}_{ny} - X_m (\text{crit.}) = .677.$$



$$(\bar{X}_{ny} - X_m)_{\text{crit.}} =$$

$$1.577.$$



$$Z \bar{X}_{ny} - X_m = 11.260.$$

$$\bar{X}_{ny} - X_m = 2.33.$$

t (crit.) = 2.33). New York State means were significantly greater ($\alpha = .01$) at all levels (4th = 3.078, 7th = 7.135, 10th = 13.30). From the data culled, this author concludes that a significant difference exists between Michigan and New York State means and therefore the data can be statistically compared in order to arrive at a conclusion about the two groups.

SECTION TWO

An Analysis of Variance

An analysis of variance was used to treat the data at the fourth, seventh and tenth grade levels. Fourth grade New York State students showed a significantly higher knowledge score ($F = 1339.0645$; $P < .01$) than did Michigan students (Table 7).

TABLE 7

ANALYSIS OF VARIANCE BETWEEN GROUPS (4th GRADE NEW YORK STATE AND 4th GRADE MICHIGAN)

Source of Variation	Sum of Squares	df	Mean Squares	F
Between groups	87654.365	1	87654.365	1339.0645 ^a
Within groups	1178.27	18	65.4594	
Total	88832.61	19		

F (crit.) = 8.28

^a $P < .01$

Seventh grade New York State students also showed a significantly higher knowledge score ($F = 944.594$; $P < .01$)

than did Michigan students (Table 8).

TABLE 8
ANALYSIS OF VARIANCE BETWEEN GROUPS (7th GRADE
NEW YORK STATE AND 7th GRADE MICHIGAN)

Source of Variation	Sum of Squares	df	Mean Squares	F
Between groups	91,226.022	1	91,226.022	944.594 ^a
Within groups	1738.393	18	96.577	
Total	92,964.415	19		

F (crit.) = 8.28 ^a P < .01

Finally, New York State students at the tenth grade level (Table 9) also showed knowledge scores which were significantly higher ($F = 394.512$; $P < .01$) than Michigan students.

TABLE 9
ANALYSIS OF VARIANCE BETWEEN GROUPS (10th
GRADE NEW YORK AND 10th GRADE MICHIGAN)

Source of Variation	Sum of Squares	df	Mean Squares	F
Between groups	73,231.214	1	73,231.214	394.512 ^a
Within groups	3341.241	18	185.625	
Total	76,572.405	19		

F (crit.) = 8.28 ^a P < .01

The one-way anova was used to compare the means of Michigan and New York State in order to determine whether the observed differences between them represent a chance

occurrence or a treatment effect. Differences in treatment groups, which account for variances in scores, is represented by the strength of that treatment as determined by the Omega Square (w^2). That is to say, the higher the New York State HTAR may be the result of a treatment effect. Data presented in Table 10 represents the association between the independent variable (New York treatment) and the dependent variable (New York HTAR).

TABLE 10

Omega Square (w^2)*

STRENGTH OF ASSOCIATION BETWEEN TREATMENT HTAR

New York State		Omega Square
Grade Level	4th	.98
	7th	.97
	10th	.95

Note that the Omega Square from the New York fourth grade $w^2 = 98\%$, the seventh grade $w^2 = 97\%$ and the tenth grade $w^2 = 95\%$. From this data, the author concludes that conditions in the treatment method in New York State accounted for a large percentage of the variability of the distance measure. Comparisons of data at the fourth,

* Shavelson, op. cit., p. 457.

seventh and tenth grade levels are presented in Table 11. In all cases, the contrast resulted in a rejection of the null hypothesis leading to the conclusion that μ_{ny} is significantly different than μ_m and that the treatment effect was not caused by chance.

TABLE 11
ANOVA COMPARISONS OF MEAN DATA
FROM NEW YORK STATE AND MICHIGAN

Grade Level	t observed	t critical	Action
Grade Four	14.345 >	2.552	Reject Ho.
Grade Seven	13.26 >	2.552	Reject Ho.
Grade Ten	9.0829 >	2.552	Reject Ho.

SECTION THREE

Tukey's HSD

Pair wise comparisons of data from Michigan and New York State are presented in Table 12.

TABLE 12
TUKEY'S POST HOC COMPARISONS OF
NEW YORK STATE AND MICHIGAN DATA

	Grade Level	HSD
	4th	5.373
Ho: C = 0	7th	6.52
Ha: C \neq 0	10th	9.048

$C = \mu_{ny} - \mu_m$ for all pairs.

$P < .01$

Calculations resulted in a rejection of the null

hypothesis at all grade levels. This author concludes therefore, that the means are significantly different, indicating that the New York treatment produced greater effects.

All pair wise comparisons, using New York and Michigan HTAR means, were calculated to determine where the significant differences actually occurred. Data presented in Table 13 represents pair wise calculations done on the fourth grade level. Comparisons of New York State and Michigan mean differences are presented in Table 14. Upon examination of the results this author concludes that significant differences occurred between the mean of 81.3 in Consumer health and all other topic areas with the exception of Substance Use & Abuse. Data from grade seven is presented in Table 15. Significant differences occurred in relation to the 62.3 Community health mean and all other topic areas. Comparisons of grade seven New York State and Michigan mean differences are presented in Table 16. Significant differences also occurred in the topic areas of Safety, Nutrition, Growth & Development, Disease Prevention & Control and Emotional & Mental health. Grade Ten data is presented in Table 17. Significant differences occurred in the topic areas of Nutrition, Safety, Consumer health, Community health, Growth & Development and Emotional & Mental health. Tenth grade mean differences are presented in Table 18.

TABLE 13

TUKEY'S HSD*
 NEW YORK STATE AND MICHIGAN HTAR MEANS
 PAIR WISE COMPARISONS GRADE FOUR

	New York	Michigan	Difference	Rank	Consumer Health
Family Health	74.9	77.8	-2.9	1	SD
Disease Prevention & Control	59.0	60.0	-1.0	2	SD
Personal Health Practices	70.8	70.5	.3	3	SD
Emotional & Mental Health	62.4	61.3	1.1	4	SD
Nutrition	51.2	49.6	1.6	5	SD
Growth & Development	66.8	64.2	2.6	6	SD
Safety Education	72.5	69.7	2.8	7	SD
Community Health	64.1	61.1	3.0	8	SD
Substance Use & Abuse	68.9	64.6	4.3	9	NSD
Consumer Health	81.3	73.7	7.6	10	NSD

$$\begin{aligned}
 \text{HSD} &= q (\alpha, dfw, k) \quad \frac{MS}{n} \\
 &= .01, 18, 10 \quad \frac{65.4594}{156} \\
 &= 6.20 \quad .4196115 \\
 &= (6.20) \quad (.6477742) \\
 &= 4.0162
 \end{aligned}$$

CH Consumer Health

* Shavelson, op. cit., p. 474

TABLE 14

COMPARISON OF NEW YORK STATE-MICHIGAN
PAIR WISE MEAN DIFFERENCES. GRADE FOUR

	FH	DPC	PHP	EMH	N	GD	SE	CMH	SUA	CH	
	-2.9	-1.0	.3	1.1	1.6	2.6	2.8	3.0	4.3	7.6	
Family Health	-2.9	-	1.9	-2.6	-1.8	-1.3	-.3	-.1	.1	1.4	4.7
Disease Prevention & Control	-1.0	-	-	-.7	.1	.6	1.6	1.8	2.0	3.3	6.6
Personal Health Practices	.3		-	.8	-1.3	2.3	2.5	2.7	4.0	7.3	
Emotional & Mental Health	1.1			-	.5	1.5	1.7	1.9	3.2	6.5	
Nutrition	1.6				-	1.0	1.2	1.4	2.7	6.0	
Growth & Development	2.6					-	.2	.4	1.7	5.0	
Safety Education	2.8						-	.2	1.5	4.8	
Community Health	3.0							-	1.3	4.6	
Substance Use & Abuse	4.3								-	3.3	
Consumer Health	7.6									-	

TABLE 15
 TUKEY'S HSD
 NEW YORK AND MICHIGAN HTAR MEANS
 ALL PAIR WISE COMPARISONS GRADE SEVEN

	New York	Michigan	Difference	Rank	Emotional & Mental Health	Disease Prevention & Control	Nutrition	Growth & Development	Community Health	Safety Education
Consumer Health	62.4	64.1	-1.7	1	SD	SD	SD	SD	SD	SD
Family Health	87.7	84.5	3.2	2			SD	SD	SD	SD
Personal Health Practices	67.3	63.5	3.8	3				SD	SD	SD
Substance Use & Abuse	78.3	72.9	5.4	4					SD	SD
Emotional & Mental Health	74.5	67.7	6.8	5						SD
Disease Prevention & Control	72.7	65.6	7.1	6						SD
Nutrition	58.5	50.3	8.2	7						SD
Growth & Development	75.1	66.3	8.8	8						SD
Community Health	62.3	51.7	10.6	9						SD
Safety Education	70.8	53.8	17.0	10						SD

$$\begin{aligned}
 \text{HSD} &= q(\alpha, dfw, k) \sqrt{\frac{MS}{n}} \\
 &= .01, 18, 10 \sqrt{\frac{96.557}{152}} \\
 &= 6.20 \\
 &= (6.20) \\
 &= 4.94
 \end{aligned}$$

TABLE 16

COMPARISON OF NEW YORK STATE-MICHIGAN
PAIR WISE MEAN DIFFERENCES GRADE SEVEN

	CH	FH	PHP	SUA	EMH	DPC	N	GD	CMH	SE
Consumer Health	-1.7	3.2	3.8	5.4	6.8	7.1	8.2	8.8	10.6	17.0
Family Health	-1.7	1.5	2.1	3.7	5.1	5.4	6.5	7.1	8.9	15.3
Personal Health Practices	3.2	-	.6	2.2	3.6	3.9	5.0	5.6	7.4	13.8
Substance Use & Abuse	3.8		-	1.6	3.0	3.3	4.4	5.0	6.8	13.2
Emotional & Mental Health	5.4			-	1.4	1.7	2.8	3.4	5.2	11.6
Disease Prevention & Control	6.8				-	.3	1.4	2.0	3.8	10.2
Nutrition	7.1					-	1.1	1.7	3.5	9.9
Growth & Development	8.2						-	.6	2.4	8.8
Community Health	8.8							-	1.8	8.2
Safety Education	10.6								-	6.4
	17.0									-

TABLE 17-

TUKEY'S HSD
 NEW YORK STATE AND MICHIGAN HTAR MEANS
 PAIR WISE COMPARISONS, GRADE TEN

	New York	Michigan	Difference	Rank	Growth & Development	Consumer Health	Emotional & Mental Health	Nutrition	Community Health	Safety Education
Family Health	65.1	60.1	5.0	1	SD	SD	SD	SD	SD	SD
Personal Health Practices	58.0	52.2	5.8	2	SD	SD	SD	SD	SD	SD
Disease Prevention & Control	54.8	47.3	7.5	3			SD	SD	SD	SD
Substance Use & Abuse	74.9	66.7	8.2	4				SD	SD	SD
Growth & Development	74.2	63.3	10.9	5						
Consumer Health	75.4	63.1	12.3	6						
Emotional & Mental Health	76.1	63.4	12.7	7						
Nutrition	35.1	21.8	13.3	8						
Community Health	62.4	49.0	13.4	9						
Safety Education	78.8	64.6	14.2	10						

HSD = $q(\alpha, dfw, k)$

$\frac{MS}{n}$

= .01, 18, 10

$\frac{185.625}{304}$

= 6.20

.6106085

= (6.20)

(.7814144)

= 4.84

TABLE 18.

COMPARISON OF NEW YORK STATE-MICHIGAN
PAIR WISE MEAN DIFFERENCES GRADE TEN

	FH	EHP	DPC	SUA	GD	CH	EMH	N	CMH	SE	
Family Health	5.0	5.8	7.5	8.2	10.9	12.3	12.7	13.3	13.4	14.2	
Personal Health Practices	5.0	-	.8	2.5	3.2	5.9	7.3	7.7	8.3	8.4	9.2
Disease Prevention & Control	5.8	-	-	1.7	2.4	5.1	6.5	6.9	7.5	7.6	8.4
Substance Use & Abuse	7.5		-	-	.7	3.4	4.8	5.2	5.8	5.9	6.7
Growth & Development	8.2			-	-	2.7	4.1	4.5	5.1	5.2	6.0
Consumer Health	10.9				-	-	1.4	1.8	2.4	2.5	3.3
Emotional & Mental Health	12.3					-	-	.4	1.0	1.1	1.9
Nutrition	12.7						-	-	.6	.7	1.5
Community Health	13.3							-	-	.1	.9
Safety Education	13.4								-	-	.8
	14.2										-

Average New York State and Michigan HTAR comparisons are presented in Table 19.

TABLE 19
AVERAGE NEW YORK STATE AND MICHIGAN HTAR
GRADES FOUR, SEVEN AND TEN

Topic Area	New York	Michigan	Difference
Disease Prevention & Control	62.1	57.6	+4.5
Personal Health Practices	65.3	62.0	+3.3
Nutrition	48.2	40.6	+7.6
Growth & Development	72.0	64.6	+7.4
Family Health	<u>75.0</u>	74.0	+1.0
Emotional & Mental Health	71.0	64.0	+7.0
Substance Use & Abuse	74.0	68.1	+5.9
Consumer Health	73.0	67.0	+6.0
Safety Education	73.8	62.7	+11.1
Community Health	62.7	53.9	+8.8
			$\Sigma D = +62.6$

* acceptable HTAR (75% or better)

New York subjects, as a group, scored higher than Michigan students in all topic areas but attained only one acceptable HTAR of 75.0 in the topic area of Family health. Although New York State student HTAR were significantly higher than Michigan HTAR, attainment rates at or above the acceptable 75 percent level were achieved in only seven out of a possible thirty topic areas at the fourth, seventh and tenth grade levels.

CHAPTER V

DISCUSSION OF RESULTS

The results presented in Chapter IV indicate that a significant difference in the levels of health knowledge existed when student groups from Michigan and New York State were compared. The significant difference in the scores between Michigan and New York State students may be attributable to the fact that New York State has been committed to Health education program promotion for a longer period of time. The three New York State districts tested have a long history of effective work in the area of health education and a commitment to the future development of the program. The New York programs tested, showed a marked similarity to the optimal program mentioned in the SHEE study.¹ That is, all classes tested were taught by a professional health educator or an elementary teacher who had received in-service training and/or was active in the on-going development of the district wide health education program.

The findings compared favorably with research data from the SHEE 1a study and the research efforts of Rabinowitz and Zimmerli² and Fischman.³ These authors concluded that knowledge based programs significantly effected student test scores and positively influenced attitudes and

1 Connell, Turner and Mason, op. cit., 1985, pp. 316-321.
1a Ibid., pp. 316-321.

2 Rabinowitz and Zimmerli, op. cit., 1974, pp. 324-330.

3 Fischman, op. cit., 1974, pp. 246-259.

behaviors.

The authors of the SHEE study Christenson, Gold, Katz, Kreuter, et. al., discovered that the following variables are determining factors in successful health education programs:

"a stringently selected number of topics based in cognitive knowledge continuously presented and reviewed over an extended period of time, subject matter taught by a professional health educator and a program which had broadbased support from the administration and in the community."⁴

Diagnostic evaluation of this type provides the evidence of outcome achievements required to generate needed administrative and community support for health education programs. This comprehensive form of evaluation can also function as a resource and time saving device.

"Educational diagnoses culled from aggregate data can assure as much validity in designing a health education program for students as a diagnosis from individually tailored interventions."⁵

Descriptive, diagnostic studies like the SHEE and other individual research efforts (Brayer)⁶ contribute to the health related body of knowledge while providing clues to the relationship these research variables have with health beliefs, attitudes, values and behaviors.

⁴ Connell, Turner and Mason, op. cit., 1985, pp. 316-321.
⁵ L.W. Green and F.M. Lewis, Measurement and Evaluation in Health Education and Health Promotion, Mayfield Publishing Company, Palo Alto, California, 1986, p. 80.
⁶ Brayer, op. cit., 1970, p. 55.

The SHEE study, and to a lesser extent this research project, emphasizes the comprehensive value of diagnostic evaluation in health education. Health education operates on the premise that students will modify their attitudes and behaviors as a result of their participation in the program. Measuring the variant differences observed in student subjects can effectively translate the results of evaluation research into baseline data used to guide future efforts in health education program development.

Testing subject application of acquired knowledge is made possible through environmental manipulation within the design of research evaluation. Recent research has successfully documented the impact of treatment effect upon health behaviors. ⁷⁻⁸ Formal evaluation of program effect and outcome achievement, can demonstrate the potential benefits of knowledge based health education programs in prevention and reduction of selected student health problems.

7 R.I. Evans and B.E. Raines, "Control and Prevention of Smoking in Adolescents: A Psycho-Social Perspective." In T.J. Coates, A.C. Petersen and C. Perry (Eds.), Promoting Adolescent Health: A Dialog on Research and Practice. Academic Press, New York, 1982.

8 R.I. Evans, P.C. Hill, B.E. Raines and A.H. Henderson, "Current Behavioral, Social and Emotional Programs in Control of Smoking: A Selective, Critical Review." In S. Weiss, A. Herd and B. Fox (Eds.), Perspectives on Behavioral Medicine, Academic Press, New York, 1981.

CHAPTER VI

Summary

This investigator attempted to determine the health knowledge levels of six hundred twelve students (156 fourth graders, 152 seventh graders and 304 tenth graders) from three selected New York State school districts. Subjects responded to multiple choice questions (99 questions in fourth grade, 102 questions in seventh and tenth grades) related to ten topic areas on the Michigan Educational Assessment Program test for Health education. A Health Topic Attainment Rate (HTAR) of 75 percent is considered to be a satisfactory level of mastery in each of the ten topic areas.

New York State student scores were compared with scores of Michigan students on the same test. New York State students achieved a satisfactory HTAR in seven topic areas out of a possible thirty at the fourth, seventh and tenth grade levels in comparison to only two for Michigan students at the same grade levels. Satisfactory New York State student HTAR and topic areas are presented in Table 20.

TABLE 20
SATISFACTORY NEW YORK STATE AND MICHIGAN
STUDENT HTAR

<u>Grade Four</u>	New York	Michigan
Consumer Health	81.3	
Family Health		77.8
<u>Grade Seven</u>		
Family Health	87.7	84.5
Substance Use & Abuse	78.3	
Growth & Development	75.1	
<u>Grade Ten</u>		
Safety Education	78.8	
Emotional & Mental Health	76.1	
Consumer Health	75.4	

Fourth graders had unsatisfactory rates in nine areas tested with the exception of a satisfactory attainment rate of 81.3 percent in the area of Consumer health. The unsatisfactory rates ranged from a low score of 51.2 percent in the area of Nutrition to 74.9 percent in the area of Family health. Seventh graders achieved unsatisfactory rates in seven areas tested with the exception of the satisfactory HTAR of 75.1 in Growth & Development, 78.3 in Substance Use & Abuse and 87.7 in the topic area of Family health. This was the highest attainment rate achieved in any topic area at any grade

level by students from either state. Unsatisfactory rates ranged from 58.5 percent in the area of Nutrition to 74.5 percent in the area of Emotional & Mental health. Tenth graders also achieved unsatisfactory rates in seven topic areas with the exception of the satisfactory rates of 75.4 in Consumer health, 76.1 in Emotional & Mental health and 78.8 in Safety Education. Unsatisfactory rates ranged from 35.1 percent in the area of Nutrition to 74.9 percent in the area of Substance Use & Abuse.

New York State student HTAR were significantly higher than Michigan HTAR. However, because New York State attainment rates at or above the acceptable 75 percent level were achieved in only seven out of a possible thirty topic areas, it would appear that this level of attainment achieved by the selected New York State students at the fourth, seventh and tenth grade levels was not satisfactory.

CHAPTER VII

CONCLUSIONS, THEORETICAL ASSUMPTIONS and RECOMMENDATIONS

This investigator attempted to determine the health knowledge levels of selected New York State students in grades four, seven and ten. The subsequent comparison with levels of student health knowledge in Michigan revealed a significant difference in those levels of health knowledge. The conclusions reached by the authors of the SHEE study ¹, in addition to the data obtained from this research project and other related investigations (Walbek) ² appears to support the contention that diagnostic evaluation can be used as a effective tool when modeling effective health education programs. Although New York State scores were significantly higher than Michigan scores, more evaluative research needs to be conducted in order to continue to improve upon the limited success reported in this study.

The emphasis of health education in years to come will be focused on the educational diagnoses used in the program planning, implementation and evaluation process. In addition, achievement of the program objectives is always of primary importance. Consequently, program evaluation and evaluation research may prove to be the most effective

1 Connell, Turner and Mason, op. cit., 1985, pp. 316-321.
2 Walbek, op. cit., 1973, pp. 197-205.

means of achieving these objectives while increasing the body of health related knowledge.

All successful educational programs have the support of an aware, involved community. Positive public relations can effectively supplement health education programs. However, when these programs do not produce the desired results, increased fiscal pressure brought to bear by the community, places school administrators at a disadvantage. In recent years, more school administrators are using formal diagnostic evaluations as the principal method for decision making processes related to program accountability.

Evaluation is a vitally important mediator in the educational process. Comprehensive evaluations can stimulate creativity and foster innovative activities. These evaluative activities provide important opportunities not only for educational growth but can also serve to stimulate personal and professional growth as well.

Conclusions

The results of this research project led to the following conclusions:

1. Students from selected New York State schools, in grades four, seven and ten, achieved satisfactory HTAR in seven out of a possible thirty health topic areas.
2. A significant difference existed between the health MEAP test scores of students in New York and Michigan.

THEORETICAL ASSUMPTIONS

Research investigators have discovered that a long term, comprehensive health education program based in cognitive knowledge can improve test scores and may positively effect the development of healthy student attitudes and behaviors. The school health education programs tested by this investigator appear to closely resemble the optimal program model reviewed by the SHEE study.³ The authors of the SHEE study found a significant gain in student knowledge was associated with this concept of a knowledge based health education program. As a result, this author makes the following assumptions:

1. Statistically significant New York State scores may have been due in part to the similarity of those programs tested and the model program discussed in the SHEE study.⁴
2. Statistically significant New York State scores in all topic areas which improve from the fourth grade level through the seventh grade level may indicate that strong and continuous elementary and junior high school programs exist in the selected New York State school districts.
3. Statistically significant seventh and tenth grade New York State scores may indicate that continuous instruction throughout junior and senior high school, provided by professional health educators, can be a positive variable

3 Connell, Turner and Mason, op. cit., 1985, pp. 316-321.

4 Ibid., 1985, pp. 316-321.

in the area of cognitive knowledge gain.

4. Statistically significant New York State scores may be due, in part, to the fact that New York State has been involved in health education for a longer period of time. Although New York State student HTAR were significantly higher than Michigan HTAR, attainment rates at or above the acceptable 75 percent level were achieved in only seven out of a possible thirty topic areas at the fourth, seventh and tenth grade levels. It appears that this level of achievement is unacceptable and renewed emphasis needs to be placed upon the comprehensive (K-12) Health education program in New York State.

Recommendations for Further Study

The findings of this study in addition to the conclusions summerized by the SHEE study have led this investigator to make the following recommendations:

1. It is recommended that a comprehensive evaluation, utilizing the MEAP test as the criterion measure and a random sampling of fourth, seventh and tenth grade students throughout New York State, be conducted to determine statewide norms for health knowledge.
2. It is recommended that a similar study be undertaken to compare health education programs that follow the criteria of the model mentioned in the SHEE study with those that do not.
3. It is recommended that school districts provide more

in-service workshops, designed and implemented by the district health education coordinator and health education staff, to aid and support the elementary teachers in their health education curricular activities. It is felt that this strategy will help to improve the HTAR scores and bring them to a level at or above the mastery level of 75 percent.

4. It is recommended that, in order to strengthen the elementary health education program in New York State, school districts should create a full-time, certified professional health education position in each elementary building.

5. It is recommended that in order to insure health education program continuity and to make these programs truly comprehensive, school districts should increase offerings of elective health courses in the secondary school curriculum (grades nine, eleven and twelve). These courses should be taught by certified professional health educators.

Bibliography

- Alkhateeb, W.; Lukeroth, C.J.; and Riggs, M., "A Comparison of Three Educational Techniques Used in a Venereal Disease Clinic", Public Health Reports, Volume 90, 1975, pp. 159-164.
- Andrews, Richard L. and Hearne, Jill T., "Effects of Primary Grades Health Curriculum Project on Student and Parent Smoking Attitudes and Behavior", Journal of School Health, Volume 54, Number 1, January, 1984, pp. 18-20.
- Bloom, Benjamin, Taxonomy of Educational Objectives: Handbook I Cognitive Domain, David McKay Company, New York, 1956.
- Brayer, Herbert O.; et al, "A Comparative Analysis of Drug Use and its Relationship to Certain Attitudes, Values and Cognitive Knowledge of Drugs Between Eighth and Eleventh grade Students in the Coronado Unified School District", Coronado Unified School District, Coronado, California, 1970.
- Brownell, William A., "The Measurement of Understanding", The 54th Yearbook of the National Society for the Study of Education, Part 1, National Society for the Study of Education, Chicago, Illinois, 1981.
- Bruner, Jerome S., On Knowing: Essays for the Left Hand, Belnap Press of Harvard University Press, Cambridge, Mass., 1962.
- Carter, G.F. and Wilson, S.B., My Health Status, Burgess Publishing Company, Minneapolis, Minn, 1982.
- Connell, D.B., Olsen, L.K., Turner, R.R., and Simon, R. "School Health Education Evaluation, Final Report", Cambridge, Mass., Abt Associates, Inc., 1985. ✓
- Connell, D.B., Turner, R.R., and Mason, E.F., "Summary of Findings of the School Health Education Evaluation, Health Promotion Effectiveness, Implementation, and Costs", Journal of School Health, October, 1985, Volume 55, Number 8, p. 316-321. ✓
- Cook, T.D. and Walberg, H.J., "Methodological and Substantive Significance", Journal of School Health, October, 1985, Volume 55, Number 8, p. 342.
- Cronbach, Lee J., Essentials of Psychological Testing, Harper and Row, New York, 1970.

- Davis, S.M. and Harris, M.B., "Sexual Knowledge, Sexual Interests and Sources of Sexual Information of Rural and Urban Adolescents from Three Cultures", Adolescence, Volume 17, Summer 1982, p. 478.
- Duryea, Elias J., "Decision Making and Health Education", Journal of School Health, Volume 53, Number 1, January, 1983, pp. 29-31.
- Dushaw, Martha L. and Hansen, Stella, "Current Status of Statewide School Health Education Programs in Michigan", Journal of School Health, Volume 53, Number 8, October, 1983, pp. 472-475.
- Evans, R.I., Hill, P.C., Raines, B.E. and Henderson A.H., "Current Behavioral, Social and Emotional Programs in Control of Smoking: A selective, Critical Review" In S. Weiss, A. Herd and B. Fox (EDS), Perspectives on Behavioral Medicine, Academic Press, New York, 1981.
- Evans, R.I. and Raines, B.E., "Control and Prevention of Smoking in Adolescents: A Psycho-Social Perspective" In T.J. Coates, A.C. Petersen and C. Perry (EDS.), Promoting Adolescent Health: A Dialog on Research and Practice. Academic Press, New York, 1982.
- Fischman, S.H., Gollier, P., Stewart, V., and Swartz, D.P., "The Impact of Family Planning Classes on Contraceptive Knowledge, Acceptance and Use", Health Education Monographs, Volume 2, 1974, pp. 246-259.
- Green, L.W., Cook, T., Doster, M.E., Fors, S.W., Hambleton, R., Smith, and A. Walberg, H.J., "Thoughts From The School Health Education Evaluation Advisory Panel", Journal of School Health, October, 1985, Volume 55, Number 8, p. 300.
- Green, L.W., Heit, P., Iverson, D.C., Kolber, L.J. and Kreuter, M. W., "The School Health Curriculum Project: Its Theory, Practice, and Measurement Experience", Health Education Quarterly, Volume 7, Number 1, Spring 1980, pp. 14-34.
- Green, L.W. and Lewis, F.M., Measurement and Evaluation in Health Education and Health Promotion, Mayfield Publishing Company, Palo Alto, California, 1986.

- Hansen, W.B. and Evans, R.I., "Feedback Versus Information Concerning Carbon Monoxide as an Early Intervention Strategy in Adolescent Smoking", Adolescence, Volume 17, Number 65, Spring, 1982, pp. 89-98.
- Hamrick, Michael H., Anspaugh, D.J. and Smith, Dennie L., "Decision Making and the Behavior Gap", Journal of School Health, Volume 50, Number 8, October, 1980, pp. 455-458.
- Higgins, C.W., Price, J.O. and Dunn, J.D., "A Survey of Health Education in Western Kentucky High Schools", Journal of School Health, Volume 52, Number 3, March, 1982, pp. 162-167.
- Hodge, Marcy E., "The Effects of a Contraceptive Program on Knowledge, Attitude and Behavior of Undergraduate College Students:", Thesis for a Master of Science in Education, State University of New York, College at Brockport, 1983.
- Howell, K., Frye, R. and Bibeau, D., "Comments from the Field", Journal of School Health, October, 1985, Volume 55, Number 8, p. 354.
- Iverson, Donald C. and Portnoy, Barry, "Reassessment of the Knowledge/Attitude/Behavior Triad", Health Education, November/December, 1977, pp. 31-34.
- Jacobs, Jane, "News from Health Research: Toward a Better Understanding", Journal of School Health, Volume 52, Number 12, December, 1982, pp. 614-618.
- Lehrer, Keith, Knowledge, Clarendon Press, Oxford University Press, London, England, 1974.
- Nakamura, Raymond M. and Lescault, Charleen M., "Health Behavior Survey of California School Health Educators", Journal of School Health, Volume 53, Number 9, November, 1983, pp. 557-560.
- O'Connell, Janelle K. and Price, James H., "Ethical Theories for Promoting Health Through Behavioral Change", Journal of School Health, Volume 53, Number 8, October, 1983, pp. 476-779.
- Parcel, Guy S., "Skills Approach to Health Education; A Framework for Integrating Cognitive and Affective Learning", Journal of School Health, Volume 56, Number 7, September, 1976, pp. 403-406.

- Rabinowitz, H.S. and Zimmerli, William H., "Effects of A Health Education Program on Jr. High School Students' Knowledge, Attitudes and Behavior Concerning Tobacco Use", Journal of School Health, Volume 44, Number 6, June, 1974, pp. 324-330.
- Riggs, Richard S. and Noland, Melody Powers, "Awareness, Knowledge and Perceived Risk for Toxic Shock Syndrome in Relation to Health Behavior", Journal of School Health, Volume 53, Number 5, May, 1983, pp. 303-307.
- Riggs, Richard S. and Noland, Melody Powers, "Factors Related to the Health Knowledge and Health Behavior of Disadvantaged Black Youth", Journal of School Health, Volume 54, Number 11, December, 1984, pp. 431-434.
- Schinke, Steven Paul and Gilchrist, Lewayne D., "Primary Prevention of Tobacco Smoking", Journal of School Health, Volume 53, Number 7, September, 1983, pp. 416-418.
- Shavelson, Richard J., Statistical Reasoning for the Behavioral Sciences, Allyn and Bacon, Inc., Boston, 1981.
- Tuckman, Bruce W., Conducting Educational Research, Harcourt Brace Jovanovich Inc., New York, 1972.
- Walbeck, W.H., "Percepts, Paragons and Practice: The Effects of Various Methods of Nutrition Instruction on Attitudes, Knowledge and Behavior", Journal of School Psychology, Volume 91, 1973, pp. 197-205.
- Windsor, R.A., Baranowski, T., Clark, N. and Cutter, G.,; Evaluations of Health Promotion and Education Programs, Mayfield Publishing Company, Palo Alto, California, 1984, p. 2.
- Yarber, William L., "Accounting for Health Instruction, Health Education, Volume 8, Number 2, March/April, 1977.

APPENDIX A

CORRESPONDENCE

CORRESPONDENCE
MICHIGAN DEPARTMENT OF EDUCATION

158 Norwich Drive
Rochester, New York 14624

716-594-1655

July 14, 1985

Dr. Wanda Jubb
Michigan Department of Education
P.O. Box 30008
Lansing, Michigan 48909

Dear Dr. Jubb,

In regard to our telephone conversation of July 12, 1985, this letter is to confirm your permission to use the Health Education MEAP test as an instrument for my Masters Thesis in Health Science.

In addition, Dr. Roeber has agreed to provide a copy of the test, mean scores of Michigan students and information concerning the validity and reliability of the test instruments.

I shall credit my sources whenever and wherever necessary. I will send copies of the data obtained by the test as soon as it becomes available.

Please accept my sincere thanks for your help and cooperation.

Yours truly,

Grey Wojtowicz

158 Norwich Drive
Rochester, New York 14624

716-594-1655

July 14, 1985

Dr. Edward Roeber
Michigan Department of Education
P.O. Box 30008
Lansing, Michigan 48999

Dear Dr. Roeber,

In regard to our telephone conversation of 13 July, 1985, this letter is to confirm Dr. Jubbs' permission to use the Health Education MEAP test as an instrument for my Masters Thesis in Health Science.

In addition, you have agreed to provide a copy of the test, mean test scores of Michigan students and information concerning the validity and reliability of the test instrument.

I shall credit my sources whenever and wherever necessary. I will send copies of the data obtained by the test as soon as it becomes available.

Please accept my sincere thanks for your help and cooperation.

Yours truly,

Greg Wojtowicz

158 Norwich Drive
Rochester, New York 14624

716-594-1655

August 1, 1985

Dr. Edward Roeber
Michigan Department of Education
P.O. Box 30008
Lansing, Michigan 48009

Dear Dr. Roeber,

Thank you for sending me a copy of the MEAP test and answer sheets for Health Education, the Essential Performance Objectives for Health Education and the MEAP Interpretive Report. The impressive content, format and structure of the test instrument has proven to be most helpful for my Thesis proposal.

At this point in time, I am putting the finishing touches on my Thesis proposal. I would appreciate, if available, receiving validity and reliability coefficients for the MEAP test.

Currently, my research design calls for testing approximately two hundred fifty students. Therefore, it will be necessary to obtain additional copies of the test; approximately forty copies per grade level. I am prepared to purchase the additional copies from you if necessary. However, with your permission, I could have my copy of the test reproduced by my school district. Please be assured that any copies would remain in my possession, be given proper credit and all copies would be destroyed upon completion of the study. Please advise me as to which alternative is the most acceptable.

Thank you again for your time, cooperation and assistance.

Yours truly,

Greg Wojtowicz

158 Norwich Drive
Rochester, New York 14624

716-594-1655

September 10, 1985

Dr. Edward Roeber
Michigan Department of Education
P.O. Box 30008
Lansing, Michigan 48009

Dear Dr. Roeber,

Please accept my thanks and deepest appreciation for your assistance in the development and design of my research project.

The Cronbach Alpha Reliability Coefficients, the forty copies of the MEAP test for Health Education and the numerous long distance phone calls, in which you answered my numerous questions, proved to be invaluable to my thesis work.

I am currently testing New York State students and I will send you the results as soon as possible.

Thank you again for your cooperation and assistance.

Yours truly,

Greg Wojtowicz

CORRESPONDENCE

CHURCHVILLE-CHILI CENTRAL SCHOOL DISTRICT

158 Norwich Drive
Rochester, New York 14624

716-594-1655

October 3, 1985

Mr. Richard Couture
Principal, Churchville High School
5786 Buffalo Road
Churchville, New York 14428

Dear Mr. Couture:

This formal letter of agreement is a follow-up to discussions with Mr. Harold Hefke. During these discussions I described the specifics of a research project I am conducting. I requested permission to test tenth grade students.

Permission was granted, contingent upon a discussion with and agreement by Mr. Jack Milner. Mr. Milner has enlisted the aid of teachers who will allow me to test tenth grade students on Thursday and Friday, October 3 & 4, 1985.

Thank you for your help, cooperation and participation in my research project.

Yours truly,

Greg Wojtowicz

158 Norwich Drive
Rochester, New York 14624

716-594-1655

October 4, 1985

Mr. George Wright
Principal, Churchville Elementary
36 West Buffalo Road
Churchville, New York 14428

Dear Mr. Wright:

This formal letter of agreement is a follow-up to our meeting of September 30, 1985. In this meeting I described the specifics of my research project and requested permission to test fourth grade Churchville students.

After a discussion with and agreement by Mr. Tom Morrow, permission was granted to test students on Friday, October 4, 1985.

Thank you for your help, cooperation and participation in my research project.

Yours truly,

Greg Wojtowicz

158 Norwich Drive
Rochester, New York 14624

716-594-1655

October 21, 1985

Mr. Joseph Hoff
Principal, Churchville Junior High School
Fairbanks Road
Churchville, New York 14428

Dear Mr. Hoff,

This formal letter of agreement is a follow-up to discussions with Mr. Harold Hefke. During these discussions I described the specifics of a research project I am conducting. I requested permission to test seventh grade students.

Permission was granted, contingent upon discussion with and agreement by Mr. Bob Bonnes. Mr. Bonnes will allow me to test seventh grade students on Monday and Wednesday, October 21 & 23, 1985.

Thank you for your help, cooperation and participation in my research project.

Yours truly,

Grey Wojtowicz

CORRESPONDENCE
HILTON CENTRAL SCHOOL DISTRICT

158 Norwich Drive
Rochester, New York 14624

716-594-1655

October 14, 1985

Mr. Norman Warren
Principal, Merton Williams Middle School
Hilton Central School, 200 School Lane
Hilton, New York 14468

Dear Mr. Warren:

This formal letter of agreement is a follow-up to discussions with Dr. Art Herd. During these discussions I described the specifics of a research project I am conducting. I requested permission to test seventh grade students in the Merton Williams school.

Permission was granted, contingent upon a discussion with and agreement by Mr. Don Dickinson. Mr. Dickinson has enlisted the aid of Mrs. Carleen Gay who will allow me to test seventh grade students on Tuesday and Wednesday, October 15 & 16, 1985.

Thank you for your help, cooperation and participation in my research project.

Yours truly,

Greg Wojtowicz

158 Norwich Drive
Rochester, New York 14624

716-594-1655

October 20, 1985

Mr. Harold Garno
Principal, Hilton Senior High School
Hilton Central School
400 East Avenue
Hilton, New York 14468

Dear Mr. Garno:

This formal letter of agreement is a follow-up to discussions with Dr. Art Herd. During these discussions I described the specifics of a research project I am conducting. I requested permission to test tenth grade students in the high school.

Permission was granted, contingent upon enlisting the aid of a tenth grade teacher. Dr. Herd has obtained the cooperation of Mr. Dane Emens who will allow me to test tenth grade students on Monday and Tuesday, October 21 & 22, 1985.

Thank you for your help, cooperation and participation in my research project.

Yours truly,

Greg Wojtowicz

158 Norwich Drive
Rochester, New York 14624

716-594-1655

October 20, 1985

Mr. Ed Mascadri
Principal, Hilton Elementary School
West Avenue
Hilton, New York 14468

Dear Mr. Mascadri,

This formal letter of agreement is a follow-up to discussions with Dr. Art Herd. During these discussions I described the specifics of a research project I am conducting. I requested permission to test fourth grade students.

Permission was granted, contingent upon enlisting the aid of a fourth grade teacher. Dr. Herd has obtained the cooperation of Mrs. Joan Hilton who will allow me to test fourth grade students on Wednesday and Thursday, October 23 & 24, 1985.

Thank you for your help, cooperation and participation in my research project.

Yours truly,

Greg Wojtowicz

CORRESPONDENCE

SPENCERPORT CENTRAL SCHOOL DISTRICT

158 Norwich Drive
Rochester, New York 14624

716-594-1655

September 4, 1985

Mr. Manuel Panarites
Principal, Cosgrove Jr. High
Lyell-Spencerport Ave.
Spencerport, New York 14559

Dear Mr. Panarites,

This formal letter of agreement is a follow-up to our meeting of August 26, 1985. In this meeting I described the specifics of my research project and requested permission to test seventh grade Cosgrove students.

Permission was granted, contingent upon a discussion with and agreement by Mr. Archie Davis the Health Education teacher.

Mr. Davis agreed to allow me to test his first and second period classes on September 5, 1985.

Thank you for your help, cooperation and participation in my research project.

Yours truly,

Greg Wojtowicz

158 Norwich Drive
Rochester, New York 14624

716-594-1655

September 4, 1985

Mr. Edward Groszewski
Acting Principal, Wilson High School
Lyell-Spencerport Ave.
Spencerport, New York 14559

Dear Mr. Groszewski,

This formal letter of agreement is a follow-up to our meeting of August 26, 1985. In this meeting I described the specifics of my research project and requested permission to test tenth grade Wilson students.

Permission was granted, contingent upon a discussion with and agreement by Mr. Dave Scheer the Health Education teacher.

Mr. Scheer has agreed to allow me to test his classes on Friday, September 6, and Tuesday, September 10, 1985.

Thank you for your help, cooperation and participation in my research project.

Yours truly,

Greg Wojtowicz

158 Norwich Drive
Rochester, New York 14624

716-594-1655

September 16, 1985

Mr. Matthew Natalie
Principal, Wm. C. Munn School
Manitou Road
Spencerport, New York 14559

Dear Mr. Natalie,

This formal letter of agreement is a follow-up to our meeting of September 5, 1985. In this meeting I described the specifics of my research project and requested permission to test fourth grade Munn students.

Permission was granted, contingent upon a discussion with and agreement by Mr. Terry Dingee the Munn school representative on the district Health Education Committee.

Mr. Dingee and his teaching associates allowed me to test their respective classes on Tuesday, September 10, and Thursday, September 12, 1985.

Thank you for your help, cooperation and participation in my research project.

Yours truly,

Greg Wojtowicz

158 Norwich Drive
Rochester, New York 14624

716-594-1655

September 16, 1985

Mr. Milton Ryan
Principal, Town Line School
399 Ogden Parma TL Rd.
Spencerport, New York 14559

Dear Mr. Ryan:

This formal letter of agreement is a follow-up to our meeting of September 5, 1985. In this meeting I described the specifics of my research project and requested permission to test fourth grade Town Line students.

Permission was granted, contingent upon a discussion with and agreement by Mr. Douglas Unell, the Town Line school representative on the district Health Education Committee.

Mr. Unell enlisted the cooperation of Mrs. Carole Jinks, who will allow me to test her class on Tuesday, September 17, 1985.

Thank you for your help, cooperation and participation in my research project.

Yours truly,

Greg Wojtowicz

APPENDIX B

MEAP Health Topic Area

Attainment Rate

Essential Objective Summary

MEAP*

HEALTH TOPIC AREA ATTAINMENT RATE

ESSENTIAL OBJECTIVE SUMMARY

Grade 4Topic Areas

Fourth graders had a satisfactory attainment rate of 77.8 percent in the area of Family Health and unsatisfactory rates in the other nine areas tested. The unsatisfactory rates being in Nutrition and Community Health.

Essential Objectives

They achieved satisfactory attainment rates of 75.9 to 87.4 percent for the following nine of the 33 objectives tested.

- demonstrate knowledge of how sleep and rest promote good health
- demonstrate knowledge of how regular physical activity promotes good health
- identify the different ways of living things reproduce themselves
- demonstrate knowledge of the roles within a family
- demonstrate knowledge of the support roles of various family members.
- accept the fact that it is natural to have a variety of feelings

*Michigan Department of Education, "Health Education Interpretive Report", Lansing, Michigan, July, 1985, pp. 71-77.

-demonstrate knowledge of the uses of drugs and medicines

-identify those health workers whose services they might expect to receive

-demonstrate knowledge of recreation safety practices

For the following 24 of the 33 objectives tested, fourth graders achieved unsatisfactory attainment rates of 30.7 to 73.4 percent.

-identify the signs and symptoms of possible illness that should be reported to an adult

-describe signs and symptoms of common childhood diseases/conditions

-exhibit knowledge of ways which prevent diseases from developing

-demonstrate knowledge of how foods affect the health of teeth and contribute to the formation of plaque

-apply dental health methods and utensils to the care of their teeth.

-identify a variety of foods taken from the "Daily Food Guide"

-recognize the major nutrients

-identify the common body parts by correct name

-identify simple functions of common body parts

-identify the major factors which affect physical and social growth

-demonstrate knowledge and acceptance of the different ways a child grows to become unique

-demonstrate knowledge of types of families

-identify acceptable coping behaviors for a variety of emotions, including the sad feelings that accompany separation/loss

-identify possible ways that a person can overcome grief caused by death

- identify personal characteristics and behaviors which generally help people develop friendship
- demonstrate knowledge of factors important to the prevention of poisoning
- identify the effects of smoking
- demonstrate knowledge of the consequences of inappropriate use of drugs and medicines
- identify factors influencing the purchase of health products
- demonstrate knowledge of traffic safety practices
- demonstrate that they can get appropriate help to deal with emergency situations in home, school and community
- demonstrate awareness of basic first-aid procedures used in emergency situations
- identify community workers who have responsibility for the public's health
- demonstrate awareness of causes and controls of pollution of air, water and ground

Grade 7

Topic Areas

Except for the satisfactory attainment rate of 84.5 percent in the area of Family Health, seventh graders had unsatisfactory rates for all other nine areas tested. These ranged from 50.3 to 72.9 percent with the lowest rates being in the areas of Nutrition and Community Health.

Essential Objectives

They achieved satisfactory attainment rates of 76.9 to 86.1 percent for the following nine of the 34 objectives tested.

- demonstrate knowledge of how communicable diseases might be transmitted
- identify personal health care activities for which they should be responsible.
- identify major factors which influence physical and emotional growth throughout the life cycle
- demonstrate knowledge of personal responsibilities that contribute to the health of various family members
- demonstrate knowledge of how age differences relate to family roles and responsibilities
- identify situations that are stress-producing
- demonstrate comprehension of the psychological reasons people begin smoking
- demonstrate psychological reasons people begin abusing alcohol and other drugs
- identify socially acceptable alternatives to alcohol and other mood-modifying substances

For the following 25 of the 34 objectives tested, seventh graders achieve unsatisfactory attainment rates of 25.7 to 74.7 percent.

- exhibit knowledge of ways which prevent communicable and non-communicable disease from developing
- describe the relationship between personal life style and the prevention and control of disease

-able to evaluate their personal practices and identify those factors which put them at risk for disease

-demonstrate plaque control techniques used in their personal dental care program

-demonstrates knowledge of orthodontic and other specialized dental service

-identify benefits and methods of maintaining fitness through regular physical activity

-demonstrate knowledge of the benefits of sleep and rest

-demonstrate knowledge of factors important to healthy vision and hearing

-identify and apply the concept of a balanced nutrient intake to the selection of foods to promote health

-recognize that diverse food choices and eating habits can supply essential nutrients

-identify the general nutrient value of each food group

-demonstrate comprehension of how body systems work closely together to perform common functions

identify the changes which occur as they approach puberty

-identify changes in feelings and emotions which occur during adolescence

-demonstrate use of problem-solving sequence that includes alternatives, consequences, and optimal solutions

-understand the relationship between physical and mental health and the ability to use a variety of coping alternatives

identify the roles other people play in providing emotional/social support system to the individuals

-identify physical and sociological effects of smoking

-comprehend the role of health agencies in providing health services

-identify methods used by advertisers in promoting the sale of health products

-apply knowledge of traffic safety practices

-identify first-aid procedures appropriate to common emergencies in the home, school, and community

-apply basic first-aid techniques

-demonstrate knowledge of the relationship between environment and health .

-identify sources and causes of pollution .

Grade 10

Topic Areas

No satisfactory attainment rates were achieved by tenth graders in any of the ten areas tested. The unsatisfactory rates ranged from 21.8 to 66.7 percent with the lowest rates being found in areas of Nutrition and Disease Prevention and Control.

Essential Objectives

They achieved satisfactory attainment rates of 75.5 to 88.6 for the following nine of the 34 objectives tested.

- identify their responsibility as active participants in the treatment and rehabilitative processes of disease and disability
- demonstrate knowledge and mechanical skills to prevent tooth decay and periodontal disease
- express knowledge of possible sexual concern which will involve personal decisions on their part
- demonstrate knowledge about health problems which may occur in the adolescent growth period
- demonstrate knowledge of how parental behavior relates to child health
- develop the ability to recognize and meet the needs of others
- demonstrate knowledge of viable alternatives to inappropriate use of substances
- identify potential accidents/hazards commonly encountered by junior and senior high school students
- apply procedures/methods (both individual and community) by which accidents can be prevented

For the following 25 of the 34 objectives tested tenth graders achieved unsatisfactory attainment rates of 14.4 to 70.0 percent.

- identify circumstances under which disease susceptibility may vary according to the effect of heredity, environment, and individual life style

- identify ways of intervening in the disease process by modifying the environment and/or the health practices of the individual
- identify methods of early recognition of health problems and establish criteria for determining the severity of the problem
- appraise individual health practices, prioritize their health risks and identify personal interventions that can be used to prevent premature disease and disability
- describe a physical activity program to improve muscular and cardiovascular fitness status
- demonstrate knowledge of the functions of the basic nutrients within the human body
- evaluate factors related to food fads and fallacies
- demonstrate comprehension of the effects of nutrient excesses and deficiencies on the human body
- identify the function of the reproductive system of the male and female throughout the life cycle
- identify specific biological, psychological and social development changes which occur at adolescence
- identify areas of adjustment that need to be considered in preparation for assuming multiple adult roles
- demonstrate knowledge of rights and responsibilities associated with various expression of sexuality
- demonstrate knowledge of the factors which can influence the health of the mother and child
- identify stress management techniques
- understand the grief process and positive/negative ways to handle separation/loss
- describe the positive value of "solitude" for individuals
- demonstrate knowledge of the effects of smoking, alcohol, and other drugs on physical, psychological and social functioning

- demonstrate knowledge of the possible contributing causes to alcohol and other drug dependency
- identify services provided by a variety of qualified health care personnel
- evaluate produce claims and make use of consumer information
- demonstrate knowledge of the benefits of basic self care
- demonstrate the ability to prioritize the need for immediate treatment in medical emergencies
- identify the impact of technological advances on the environment and human health
- identify environmental health problems and evaluate possible solutions
- demonstrate knowledge of career opportunities in the health field

APPENDIX C
MICHIGAN EDUCATIONAL ASSESSMENT PROGRAM
HEALTH EDUCATION TEST
GRADES FOUR, SEVEN AND TEN

meap

Michigan Educational Assessment Program

STUDENT ASSESSMENT BOOKLET

**GRADE 4
HEALTH
EDUCATION
FORM 40**



Michigan State Board of Education

D I R E C T I O N S

In this test you will show how you are doing in some skills important in health education.

Be sure you understand all the directions before you begin. You will have as much time as you need to finish the test. If you are not sure about the answer to a question, do your best.

You will be marking your answers on the answer sheet. Mark only one answer for each item. If you change an answer, be sure to erase the first mark completely. Now look at the sample item below:

SAMPLE: Which of the following organs pumps blood to every part of the body?

- A. liver B. stomach
C. heart D. lungs

Answer

Sample Item: A B D

Since the heart pumps blood to all parts of the body, you would fill in space "C" because "C" is in front of heart, which is the correct answer.

Remember, only one answer should be marked for each question. If you change your answer, erase your first answer completely. Make a dark mark that fills the space. Use a pencil, do not use a ballpoint pen.

When you are sure that you understand the directions, you may begin the test. Your teacher will collect the test when you are finished.

GO ON TO THE NEXT PAGE

DIRECTIONS: Read each question. Mark the best answer for each question on your answer sheet.

OBJECTIVE CODE: DPC-CD 2

1. While you are having breakfast your tooth starts hurting and doesn't stop. The best thing to do is:
A. brush your teeth. B. get a drink of water.
C. tell your mother or father. D. stop eating.
2. While playing, Johnny has sand thrown in his eyes and he can't see well. The best thing to do is:
A. help him get the sand out. B. tell an adult.
C. tell him not to worry. D. have him rub his eyes.
3. Sandy falls and cuts her knee on the playground. The best thing to do is:
A. wrap it up. B. have her exercise her knee.
C. tell her not to cry. D. tell the teacher.

OBJECTIVE CODE: DPC-CD 3

4. If your throat hurts, would that tell you that you might be getting sick?
A. Yes B. No
5. If you get a red rash, would that tell you that you might be getting sick?
A. Yes B. No
6. If your head hurts all day, would that tell you that you might be getting sick?
A. Yes B. No

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

OBJECTIVE CODE: DPC-DPC 1

7. What is one disease the doctor can not protect you from by giving you a shot?

- A. Whooping cough. B. Cancer.
C. Measles. D. Mumps.

8. You will not get lockjaw if you:

- A. wash a wound with soap and water. B. kill the tetanus germ with a spray.
C. put a band-aid on a wound. D. get a tetanus shot.

9. Immunization will prevent which of the following diseases?

- A. Chickenpox: B. Polio.
C. Asthma: D. Heart disease.

OBJECTIVE CODE: PHP-DH 2

10. Which of the following will help bacteria form acid that decays teeth?

- A. Eating peanuts between meals. B. Brushing teeth.
C. Eating cookies between meals. D. Drinking water too often.

11. Which is more likely to help cause tooth decay?

- A. Drinking orange juice every day. B. Eating vegetables very slowly.
C. Eating your meals slowly. D. Holding sweet foods in your mouth.

12. Plaque is formed by:-

- A. bacteria acting on protein. B. chewing gum regularly.
C. toothpaste on the gums. D. bacteria acting on sugar.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

OBJECTIVE CODE: PHR-DH 3

13. Which of the following are best to use to clean your teeth?
- A. Toothbrush and dental floss. B. Breath mints and toothbrush.
C. Dental floss and chewing gum. D. Toothbrush and mouthwash.
14. Which of the following is the best rule for brushing your teeth?
- A. When your teeth feel dirty? B. Once a day, before bedtime.
C. After eating snacks. D. After each meal and at bedtime.
15. Which of the following is necessary in order to remove plaque from teeth?
- A. Toothbrush. B. Mouthwash.
C. Toothpaste. D. Baking soda.

OBJECTIVE CODE: PHP-PC 3

16. If you do not get enough rest you feel:
- A. thirsty. B. hungry.
C. tired. D. happy.
17. What part of your body gets the most help from sleep?
- A. Teeth and gums. B. Legs and feet.
C. Eyes and ears. D. Muscles and brain.
18. How much sleep does a nine year-old child need?
- A. About 12 hours per night. B. About 10 hours per night.
C. 6-8 hours per night. D. Until you wake up.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

OBJECTIVE CODE: PHP-PC 4

19. What part of the body does regular exercise help the most?
- A. Liver and kidneys. B. Eyes and ears.
C. Brain nerves. D. Heart and muscles.
20. To be healthy, one should exercise:
- A. every day. B. once a week.
C. after a big meal. D. before bed.
21. What body parts should be exercised to bend your body easily?
- A. Blood vessels. B. Elbow.
C. Joints. D. Heart.

OBJECTIVE CODE: N-FFG 1

22. To what food group do eggs belong?
- A. Milk and cheese group. B. Vegetable and fruit group.
C. Fats and sweets group. D. Meat group.
23. To what food group does pop belong?
- A. Meat group. B. Fats and sweets group.
C. Bread and cereal group. D. Vegetable and fruit group.
24. To what food group does a hamburger bun belong?
- A. Bread and cereal group. B. Milk and cheese group.
C. Fats and sweets group. D. Vegetable and fruit group.

OBJECTIVE CODE: N-FFG 3

25. Which is a nutrient?
- A. Cells. B. Organ.
C. Protein. D. Blood.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

26. Which is not a nutrient?

- | | |
|----------|------------------|
| A. Meat. | B. Carbohydrate. |
| C. Fat. | D. Vitamin C. |

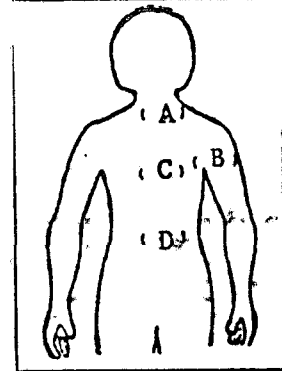
27. Which is a nutrient?

- | | |
|-----------|-------------|
| A. Bread. | B. Calcium. |
| C. Apple. | D. Tomato. |

OBJECTIVE CODE: GD-MBP 1

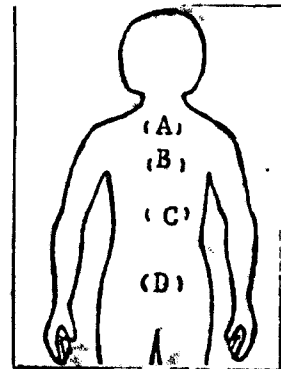
28. Which letter shows the place where your heart is?

- | | |
|----|----|
| A. | B. |
| C. | D. |



29. Which letter shows the place where your stomach is?

- | | |
|----|----|
| A. | B. |
| C. | D. |



30. One of our sense organs is the:

- | | |
|-----------|------------|
| A. lung. | B. kidney. |
| C. ankle. | D. nose. |

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

OBJECTIVE CODE: GD-MBP 2

31. The intestine:

- A. stores energy. B. pumps blood.
C. digests food. D. moves bones.

32. When you breathe in, air goes into your:

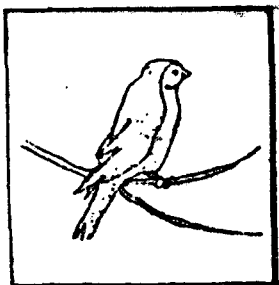
- A. stomach. B. lungs.
C. heart. D. brain.

33. The liver:

- A. breathes for us. B. digests food.
C. stores energy and cleans
blood. D. moves bones.

OBJECTIVE CODE: GD-OLT 3

34. Which one of these animals grows inside its mother's body until it is born?



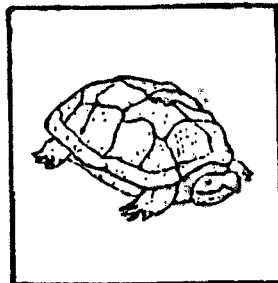
A.



B.



C.



D.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

35. Which of the following is hatched from an egg?

- A. Cat.
- B. Seal.
- C. Turtle.
- D. Tree.

36. Which of the following comes from a seed?

- A. Fish.
- B. Apple.
- C. Frog.
- D. Shell.

OBJECTIVE CODE: GD-IG 1

37. To stay healthy, we all need:

- A. to have a bowel movement every day.
- B. enough sleep, exercise, and a balanced diet.
- C. to drink a gallon of milk every day.
- D. wash your hair daily.

38. Pick out the one thing that will not result in growing in some way.

- A. A balanced diet.
- B. Feeling good about yourself.
- C. Enough sleep and exercise.
- D. Avoid meeting new friends.

39. Eating which of the following will make sure that you will grow strong and healthy?

- A. Variety of foods.
- B. High protein diet.
- C. Low protein diet.
- D. Only vegetables.

OBJECTIVE CODE: GD-IG 2

40. All children:

- A. are happy all the time.
- B. like to eat vegetables.
- C. are different shapes and sizes.
- D. are good in sports.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions,

OBJECTIVE CODE: FH-FRR 3

49. Steve broke his leg. How can his sister help him?

- | | |
|---------------------|----------------------------|
| A. Do his homework. | B. Leave him alone. |
| C. Sign his cast. | D. Offer to do his chores. |

50. Pat's little sister was being teased by a big kid on the way home from school. What can Pat do to help?

- | | |
|---------------------------------------|---------------------------------------------|
| A. Tease the big kid's little sister. | B. Walk the little sister home from school. |
| C. Fight the big kid. | D. Do nothing to help. |

51. Wanda's family is moving to a new city. What can she do to help?

- | | |
|-------------------------------------------|----------------------------------|
| A. Try to talk her parents out of moving. | B. Keep her feelings to herself. |
| C. Help with the packing. | D. Move in with a friend. |

OBJECTIVE CODE: SUA-SUA 3

52. Smoking cigarettes can:

- | | |
|----------------------------|---------------------------------|
| A. help you feel better. | B. help you think better. |
| C. make you look grown-up. | D. make your heart beat faster. |

53. People who smoke find it hard to stop because:

- | | |
|--------------------------------|----------------------------------|
| A. everyone smokes. | B. they feel smarter. |
| C. cigarettes don't hurt them. | D. they are addicted to tobacco. |

54. A major cause of house fires is:

- | | |
|----------------------|--------------------------|
| A. lightning. | B. burning candles. |
| C. careless smoking. | D. leaving the stove on. |

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

OBJECTIVE CODE: EMH-FM 2

55. Which sentence is true about angry feelings?
- A. Only babies cry when they get very angry.. B. Everyone has angry feelings sometimes.
- C. Good children do not have angry feelings. D. Adults do not cry.
56. Lynn and Janice are good friends. Everyone in their class entered a contest, and Janice won a prize. Lynn is happy that her friend won, but she is also jealous because she did not win. What is the best advice to give Lynn?
- A. Understand that she has both feelings. B. Stop being friends with Janice.
- C. Stop feeling jealous. D. Decide not to enter contests.
57. Al's class has been given a poem to learn. He is afraid that his teacher will ask him to recite. Al should:
- A. cheat by having the poem written on a little piece of paper to read, B. skip school.
- C. tell the teacher he is too sick to recite. D. understand that it's okay to be nervous and do his best.

OBJECTIVE CODE: EMH-C 1

58. Billy can't finish his math paper on time. He feels pressured and frustrated. The worst thing for Billy to do is:
- A. give up and do something else. B. ask the teacher for help.
- C. ask his family for help. D. try to relax and do the best he can.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

59. Della's mother and father just got divorced and her father moved away. Della misses her father very much. The worst thing she could do is:

- | | |
|---------------------------------------------------|---------------------------------------------------|
| A. understand that the divorce was not her fault. | B. talk to other kids whose parents are divorced. |
| C. act as if nothing has happened. | D. tell her family she misses her father. |

60. Debra has a new baby brother. No one in the family seems to have time for Debra anymore. She is jealous. The best thing to do is:

- | | |
|---------------------------------|---------------------------------------------|
| A. ignore her new baby brother. | B. tell her family how she feels. |
| C. act like a baby herself. | D. spend most of her time with her friends. |

OBJECTIVE CODE: EMH-C 2

61. Paul and Lorna saw a beautiful bird crash against the window and die. The best thing for them to do would be:

- | | |
|-----------------------------------------------|--------------------------------------|
| A. just go on playing as if nothing happened. | B. use the bird to tease other kids. |
| C. have a funeral for the bird. | D. make a joke about it. |

62. Joe's dog died. He feels very sad. The worst thing Joe could do is:

- | | |
|------------------------------------|----------------------------|
| A. tell a friend how sad he feels. | B. try to forget about it. |
| C. remember the good times. | D. have a funeral. |

63. Jean always had a good time with her uncle, Tim. Then her uncle died. Jean feels sad and lonely. The best thing for Jean to do is:

- | | |
|-----------------------------------|--------------------------------------------------|
| A. try to forget about her uncle. | B. tell herself she has other uncles. |
| C. keep her feelings to herself. | D. tell her mother how sad and lonely she feels. |

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

OBJECTIVE CODE: CUH-HWA 1

64. Who would help you the most if you had the flu?

- | | |
|------------|-------------------------|
| A. Doctor. | B. Ambulance attendant. |
| C. Nurse. | D. Dentist. |

65. Who would help you the most if your tooth hurt?

- | | |
|----------------|----------------|
| A. Nurse. | B. Eye doctor. |
| C. Pharmacist. | D. Dentist. |

66. Who would you most likely go to for a shot?

- | | |
|-------------------|--------------------|
| A. Social worker. | B. Veterinarian. |
| C. Doctor. | D. Police officer. |

OBJECTIVE CODE: EMH-SH 1

67. What should you do if your best friend left your bicycle unlocked, and your bike was stolen?

- | | |
|------------------------------------------------|----------------------------|
| A. Talk to your friend about the way you feel. | B. Stop being his friend. |
| C. Take your friend's bike. | D. Try to forget about it. |

68. Mary broke her leg and can't play outside this summer. What should her friends do?

- | | |
|---------------------------------------|----------------------------------|
| A. Spend all their time with her. | B. Wait until her leg is better. |
| C. Take turns spending time with her. | D. Find another friend. |

69. I will hurt my friend most if I:

- | | |
|-------------------------------------|------------------------------------|
| A. always tell my friend the truth. | B. break my promises to my friend. |
| C. get angry at my friend. | D. listen to how my friend feels. |

TO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

OBJECTIVE CODE: COH-EH 1

70. At a treatment plant, the germs in sewage are killed by:

- | | |
|-------------------------|-------------------------|
| A. boiling the sewage. | B. adding chlorine. |
| C. freezing the sewage. | D. coloring the sewage. |

71. Air can be polluted by:

- | | |
|---------------|-------------|
| A. factories. | B. farms. |
| C. lakes. | D. forests. |

72. Water can be polluted by:

- | | |
|-----------------|-------------------|
| A. automobiles. | B. factory smoke. |
| C. chemicals. | D. open burning. |

OBJECTIVE CODE: SUA-SUA 1

73. You are sick. You should take:

- | | |
|--------------------------------------|------------------------------------------|
| A. the medicine the doctor gave you. | B. your sister's medicine. |
| C. the medicine your father uses. | D. a medicine from the medicine cabinet. |

74. When is it safe to take medicine?

- | | |
|----------------------------------------|--------------------------------------------------|
| A. When you find it in your house. | B. When your best friend gives it to you. |
| C. When a doctor tells you to take it. | D. When a person you don't know gives it to you. |

75. If people drink alcohol regularly, it:

- | | |
|-----------------------------|------------------------------|
| A. makes them run faster. | B. helps them think clearly. |
| C. helps them make friends. | D. may hurt their bodies. |

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

OBJECTIVE CODE: SUA-SUA 2

76. Poisons are:

- A. bad tasting.
- B. to be kept out of the reach of children.
- C. always in red bottles.
- D. helpful when you are sick.

77. Here are some things you might read on the labels of bottles in your home. Which one is a warning that what is in the bottle is a poison?

- A. "Shake well before using"
- B. "For relief of pain"
- C. "Take 2 tablets with water"
- D. "Can be fatal if swallowed"

78. Which one is poisonous if eaten?

- A. Dog food.
- B. Some house plants.
- C. Dandelions.
- D. Library paste.

OBJECTIVE CODE: SUA-SUA 4

79. John went to the doctor with a sore throat. The doctor gave him enough medicine to take for five days. After three days, John felt better. What should John do with the medicine?

- A. Finish taking the medicine as the doctor recommended.
- B. Throw the medicine out.
- C. Keep the medicine for the next time he has a sore throat.
- D. Return the medicine to the doctor.

80. John went next door to visit his third-grade classmate, Jane. His stomach started to hurt. What should Jane do?

- A. Tell John to go to the drug store.
- B. Call an ambulance.
- C. Tell John to go home and tell his mother.
- D. Give John some medicine.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

81. Drinking too much alcohol can cause all of the following except:

- A. harm to your heart.
- B. harm to your liver.
- C. family problems.
- D. tooth decay.

OBJECTIVE CODE: CUH-HSP 1

82. Why are health products advertised?

- A. Because they are the best products.
- B. One medicine is good for everyone.
- C. The companies want to sell what they make.
- D. Because medicine is expensive.

83. Who is the best person to help you buy a new toothbrush?

- A. Dental hygienist.
- B. Librarian.
- C. Drug store clerk.
- D. Grocery store clerk.

84. The best reason to use a particular kind of health product is:

- A. your friend uses it.
- B. it is shown on TV a lot.
- C. it costs less.
- D. it works well for you.

OBJECTIVE CODE: SFA-SAP 5

85. What is a dangerous way to cross the street?

- A. Cross with the "walk" sign.
- B. Cross at the cross-walk.
- C. Look both directions before crossing.
- D. Cross between parked cars.

86. How should you ride your bicycle on the street?

- A. In the opposite direction as cars are moving.
- B. In the same direction as cars are moving.
- C. In the middle of the street.
- D. Side by side with a friend.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

87. There are many ways to enjoy riding a bicycle. Which is a safe way?

- A. Riding single file down the street. B. Two people on a bike.
 C. Being towed by a car. D. Riding with no hands.

OBJECTIVE CODE: COH-CHR 1

88. What does a public health nurse do?

- A. Tests drinking water. B. Checks public eating places.
 C. Helps to collect garbage. D. Gives shots.

89. Which of the following is a health worker?

- A. Ambulance driver. B. Librarian.
 C. Police officer. D. Farmer.

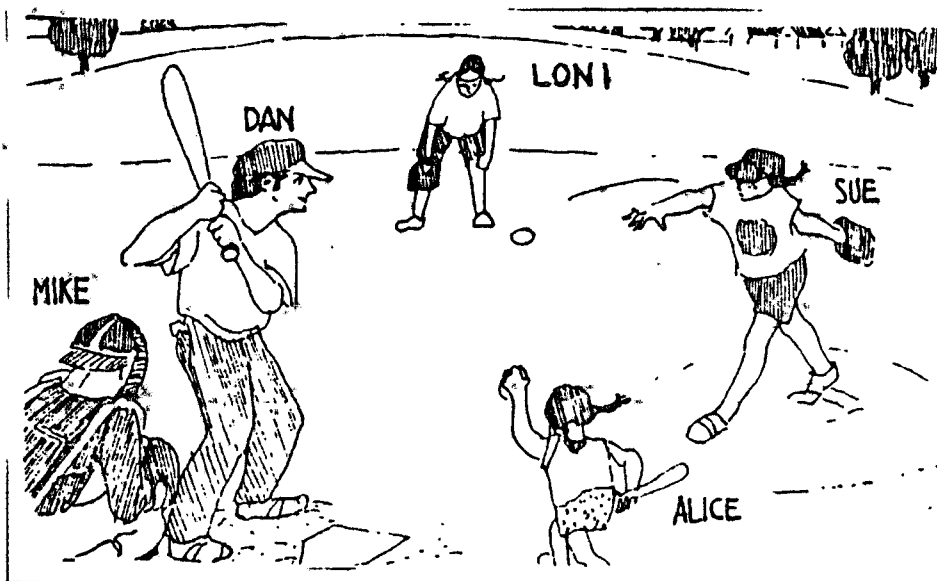
90. A sanitarian:

- A. gives hearing tests. B. checks public eating places.
 C. cleans your teeth. D. runs the X-ray machine.

OBJECTIVE CODE: SFA-SAP 6

91. Look at the picture below. Which person is most likely to be hurt?

- A. Loni
 B. Alice
 C. Dan
 D. Sue



GO ON TO THE NEXT PAGE

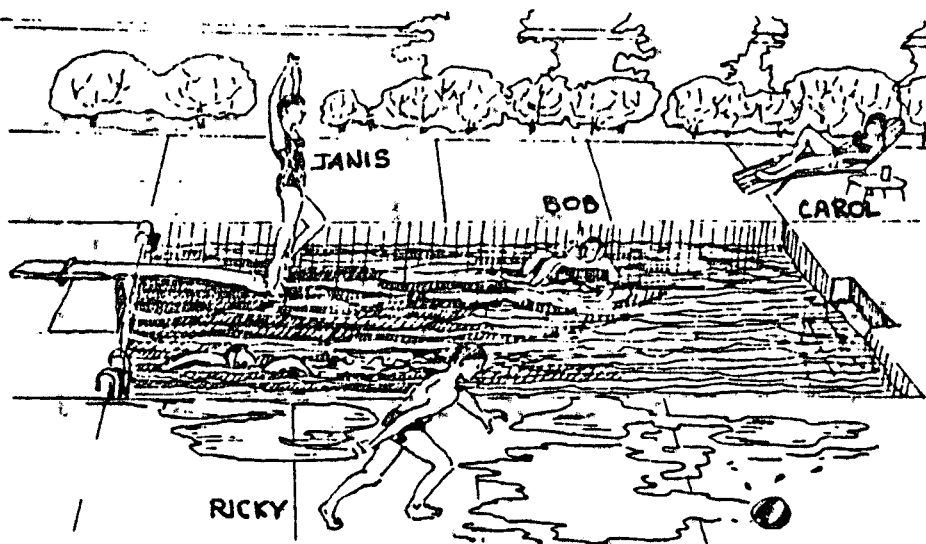
DIRECTIONS: Answer the following questions.

92. You and your friends are going to play kick ball. Where should you play?

- A. On the school playground. B. In the living room.
C. In the street. D. In the parking lot.

93. Which person is most likely to get hurt?

- A. Bob
B. Carol
C. Ricky
D. Janis



OBJECTIVE CODE: SFA-ER 1

94. If you think someone has taken poison, it is best to call the:

- A. police department. B. fire department.
C. drug store. D. hospital.

95. Someone is knocked out in an accident at the community park. Who should you call for help?

- A. Your parents who are at home. B. Your friends who are nearby.
C. An adult who is nearby. D. The police department.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

96. If your friend is badly hurt after a fall from a tree in your yard, you should first:

- | | |
|---------------------------------------------------------------------|------------------------------|
| A. have the nearest adult get help while you stay with your friend. | B. try to phone his parents. |
| C. get your friend on his feet and walk him home. | D. shout for help. |

OBJECTIVE CODE: SFA-ER 2

97. A person tells you his back and neck hurt after an accident. He should:

- | | |
|-------------------------------------------------|----------------------------------|
| A. twist his body to the right and to the left. | B. lie down until help comes. |
| C. get up and walk around even if it hurts. | D. sit down as long as it hurts. |

98. When someone is burned and you are waiting for help to come, it is a good idea to:

- | | |
|--------------------------------------------------|-----------------------------------------|
| A. wrap the burned place tightly with a bandage. | B. press on the place which was burned. |
| C. put cold water on the burned place. | D. rub the burned place. |

99. If a person falls on the playground and scrapes a knee, the first thing to do is:

- | | |
|------------------------------------------------------------|---------------------------------------|
| A. have the person sit down and put the leg up on a chair. | B. wash the spot with soap and water. |
| C. put first-aid creme on the knee. | D. put a bandage on the knee. |

STOP

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Michigan Educational Assessment Program

STUDENT ASSESSMENT BOOKLET

**GRADE 7
HEALTH
EDUCATION
FORM 70**



Michigan State Board of Education

D I R E C T I O N S

In this test you will show how you are doing in some skills important in health education.

Be sure you understand all the directions before you begin. You will have as much time as you need to finish the test. If you are not sure about the answer to a question, do your best.

You will be marking your answers on the answer sheet. Mark only one answer for each item. If you change an answer, be sure to erase the first mark completely. Now look at the sample item below:

SAMPLE: Which of the following organs pumps blood to every part of the body?

- A. liver
- B. stomach
- C. heart
- D. lungs

Answer

Sample Item: A B D

Since the heart pumps blood to all parts of the body, you would fill in space "C" because "C" is in front of heart, which is the correct answer.

Remember, only one answer should be marked for each question. If you change your answer, erase your first answer completely. Make a dark mark that fills the space. Use a pencil, do not use a ballpoint pen.

When you are sure that you understand the directions, you may begin the test. Your teacher will collect the test when you are finished.

DIRECTIONS: Read each question. Mark the best answer for each question on your answer sheet.

OBJECTIVE CODE: DPC-DC 2

1. One way in which communities protect people from the spread of disease is by:
 - A. providing police service.
 - B. inspecting restaurants.
 - C. building new houses.
 - D. putting out fires.
2. Communicable diseases are caused by:
 - A. sitting in a draft.
 - B. cold and rainy weather.
 - C. eating too many sweets.
 - D. germs passing from person to person.
3. Which one of these insects is most likely to spread disease?
 - A. Mosquito.
 - B. Bee.
 - C. Ant.
 - D. Butterfly.

OBJECTIVE CODE: DPC-DPC 1

4. A factory can help protect workers from dangerous chemicals by:
 - A. hiring only healthy people.
 - B. providing protective clothing.
 - C. providing a lunch program.
 - D. asking workers to be careful.
5. Which one of the following could make contaminated water safe to drink?
 - A. Boiling the water.
 - B. Adding salt to the water.
 - C. Adding fluoride to the water.
 - D. Leaving the water in strong sunlight for 24 hours.
6. Which one of the following is a reason for immunization?
 - A. To heal a person with a disease.
 - B. To learn about the effects of a disease.
 - C. To keep a person from catching a disease.
 - D. To cure the symptoms of a disease.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

OBJECTIVE CODE: DPC-DPC 3

7. The greatest cause of preventable disease and death is:
- A. cigarette smoking. B. drunk driving.
C. high-fat diet. D. lack of exercise.
8. Which behaviors can help to detect breast and testicular cancers early when they are most treatable and controllable?
- A. Stress reduction. B. Self-examination.
C. Exercise. D. Dieting.
9. Which of the following actions can help to reduce your risk of heart disease and cancer?
- A. Taking vitamins every day. B. Smoking cigarettes.
C. Reducing fat in the diet. D. Limiting exercise.

OBJECTIVE CODE: DPC-DPC 4

10. Regular exercise does not:
- A. cure disease. B. increase mental alertness:
C. reduce risk of disease. C. reduce weight.
11. Eating a lot of foods high in animal fat can lead to:
- A. multiple sclerosis. B. heart disease.
C. arthritis. D. lung disease.
12. If you are regularly exposed to cigarette smoke, you have an increased risk of:
- A. diabetes. B. arthritis.
C. respiratory infection. D. kidney disease.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

OBJECTIVE CODE: PHP-DH 3

13. Dental plaque can be made visible on the teeth:
- A. by using a mouth rinse.
 - B. by using disclosing tablets.
 - C. in bright light.
 - D. by looking in a mirror.

14. Plaque removal is best accomplished by:
- A. daily toothbrushing and flossing.
 - B. use of a tooth pick after meals.
 - C. rubbing baking soda on your teeth.
 - D. daily use of a mouthwash.

15. Plaque removal is an effective technique to prevent:
- A. gum boils.
 - B. oral cancer.
 - C. canker sores.
 - D. periodontal disease.

OBJECTIVE CODE: PHP-DH 4

16. What does an orthodontist do for people?
- A. Moves crooked teeth to improve the way they bite.
 - B. Removes calculus from teeth and treats gums.
 - C. Extracts teeth and does surgery on the jaw bone.
 - D. Fits dentures (artificial teeth).
17. Which one of the following is a dentist who specializes in treating children's teeth?
- A. Psychiatrist.
 - B. Pediatrician.
 - C. Pedodontist.
 - D. Periodontist.
18. A dental hygienist is educated and licensed to do which of the following?
- A. Remove calculus and stains from teeth.
 - B. Remove decay and fill cavities.
 - C. Straighten crooked teeth.
 - D. Diagnose and treat dental disease.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

OBJECTIVE CODE: PHP-PC 2

19. Under doctor's supervision, proper exercise can help people get better if they have:
- A. liver disease.
 - B. dental cavities.
 - C. heart problems.
 - D. cancer.
20. A major aid in toning muscles is:
- A. regular exercise.
 - B. occasional exercise.
 - C. one week of exercise.
 - D. rest.
21. Which one of the following activities would be best for strengthening the heart and lungs:
- A. relaxing and avoiding any vigorous exercise which might strain the heart.
 - B. eating at least two servings of meat each day.
 - C. breathing pure oxygen a few minutes each day.
 - D. running a mile each day.

OBJECTIVE CODE: PHP-PC 3

22. Going for a full week without adequate sleep can cause:
- A. vitamin shortage.
 - B. swollen ankles.
 - C. dehydration.
 - D. fatigue.
23. If you do not have adequate rest or sleep, your body will:
- A. function at a lower level.
 - B. fight illness and infections better.
 - C. be in top condition.
 - D. allow you to be alert.
24. A healthy individual requires a balanced diet, regular exercise, and:
- A. long vacations.
 - B. properly fitted clothing.
 - C. extra Vitamin C.
 - D. adequate rest or sleep.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

OBJECTIVE CODE: PHP-PC 4

25. A safe way to remove a particle from your eye is to:
- A. flush the eye with water.
 - B. put a cotton swab in your eye.
 - C. turn the eyelid inside out.
 - D. rub the eye with a tissue.
26. Which one of the following is a sign of possible vision problems?
- A. Tears in your eyes on a windy day.
 - B. Changes in the size of your pupils.
 - C. Squinting your eyes a lot.
 - D. Blinking your eyes regularly.
27. Besides hearing, the ear is important for:
- A. moving.
 - B. balance.
 - C. feeling.
 - D. thinking.

OBJECTIVE CODE: PHP-PC 5

28. Which one of the following health decisions should be a responsibility of people your age?
- A. Making an appointment with the dentist for a checkup.
 - B. Making an appointment with the doctor for immunization.
 - C. Deciding when you should eat sweets or have soft drinks.
 - D. Deciding when you should go on a diet.
29. What can you do to keep your brain healthy?
- A. Get enough sleep for your age and activity.
 - B. Take proper medication.
 - C. Wear a hat in cold weather.
 - D. Do eye exercises.
30. When weather conditions worsen, it is your responsibility to:
- A. always wear a hat.
 - B. wear clothes that keep you warm and dry.
 - C. make sure your clothes are in fashion.
 - D. stay indoors.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

OBJECTIVE CODE: N-FS 2

31. You are going to eat at a restaurant. Which choice gives a serving from each of the four essential food groups?
- | | |
|------------------------------------------------------|-----------------------------------------|
| A. Fruit salad, hamburger on a bun, milk. | B. Spaghetti, broccoli, chocolate cake. |
| C. Tossed salad, hamburger on a bun, chocolate cake. | D. Pork chops, green beans, milk. |
32. Which after-school snack adds the most nutrients to a balanced diet?
- | | |
|---------------------------|-------------------------------|
| A. Granola bar. | B. Buttered popcorn. |
| C. Diet pop and a cookie. | D. Cheese cubes and an apple. |
33. Which statement is true?
- | | |
|-----------------------------------------------------------------|-------------------------------------------------------|
| A. All nutrients needed by the body are available through food. | B. Protein supplements are necessary for good health. |
| C. People need to take a multiple vitamin supplement each day. | D. All people need to take mineral supplements. |

OBJECTIVE CODE: N-FS 3

34. Which meal provides at least one food from each of the Essential Food Groups?
- | | |
|--------------------------------------|------------------------------------------------|
| A. French fries and milkshake. | B. Peanut butter sandwich, apple, and brownie. |
| C. Yogurt, peach, and tuna sandwich. | D. Cottage cheese, peach, and brownie. |
35. Mary is on a vegetarian diet. Which meal provides a serving from each of the Essential Food Groups?
- | | |
|---------------------------------------------|-------------------------------------------------|
| A. Egg salad sandwich, carrot sticks, milk. | B. Vegetable soup, crackers, jello. |
| C. Tomato sandwich, milk, brownie. | D. Beans and rice, orange juice, spinach salad. |

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

36. Which lunch provides food from each of the Essential Food Groups?

- | | |
|---------------------------------------|-----------------------------------------------|
| A. Granola bar, yogurt, french fries. | B. Turkey sandwich, carrots and celery, milk. |
| C. Snack cake, chips, fruit drink. | D. Cheese and crackers, apple, cola. |

OBJECTIVE CODE: N-FS 4

37. The two food groups which provide most protein in American diets are:

- | | |
|----------------------------------------------|-------------------------------------------------|
| A. bread and cereal, milk and cheese groups. | B. vegetable and fruit, milk and cheese groups. |
| C. meat, milk and cheese groups. | D. meat, vegetable and fruit groups. |

38. Vegetables and fruits are a good source of:

- | | |
|--------------------------------|---------------------------|
| A. carbohydrates and proteins. | B. vitamins and minerals. |
| C. fats and minerals. | D. vitamins and proteins. |

39. The bread and cereal group is a source of:

- | | |
|--------------------------------|--------------------------|
| A. vitamins and carbohydrates. | B. vitamins and calcium. |
| C. vitamins A and C. | D. iron and vitamin D. |

OBJECTIVE CODE: FH-FRR 2

40. Earning money to buy food for the family is usually the responsibility of:

- | | |
|------------------------------|-------------------------------------|
| A. the oldest children. | B. the child who has a paper route. |
| C. mother or father or both. | D. the whole family. |

41. Herb is twelve years old. One of Herb's responsibilities is probably to:

- | | |
|---------------------|--------------------|
| A. do the dishes. | B. fix the car. |
| C. repair the roof. | D. do the cooking. |

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

42. Jane is eleven years old. She is probably not responsible for:

- A. raking leaves.
- B. setting the table.
- C. making the bed.
- D. planning the family meals.

OBJECTIVE CODE: GD-MBP 3

43. The two body systems that work together to allow people to move their bodies are the:

- A. muscular and skeletal systems.
- B. circulatory and muscular systems.
- C. muscular and digestive systems.
- D. respiratory and circulatory systems.

44. The two body systems that work together to bring oxygen to all the cells of the body are the:

- A. muscular and excretory systems.
- B. digestive and respiratory systems.
- C. circulatory and nervous systems.
- D. circulatory and respiratory systems.

45. The two body systems that work together to bring food to all the cells of the body are the:

- A. circulatory and respiratory systems.
- B. digestive and circulatory systems.
- C. skeletal and muscular systems.
- D. digestive and respiratory systems.

OBJECTIVE CODE: SUA-SUA 1

46. Which one of these diseases can sometimes be caused by smoking?

- A. Anemia
- B. Diabetes
- C. Heart disease
- D. Arthritis

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

47. The major cause of chronic bronchitis in the United States is:

- A. poor nutrition. B. cigarette smoking.
C. cold weather. D. alcoholic beverages.

48. In sports, smoking cigarettes may slow you down by:

- A. increasing your weight. B. making you tired.
C. making the heart beat slower. D. reducing lung capacity.

OBJECTIVE CODE: GD-IG 1

49. Mike is the shortest student in class. Mike's parents are both tall. Why is Mike so short?

- A. Mike does not get enough exercise. B. Mike has a slow rate of growth.
C. Mike is emotionally immature. D. Mike drinks a lot of pop.

50. Hormones are the chemical messengers in the body which cause:

- A. physical, emotional, and sexual development during adolescence. B. heartbeat change.
C. improved hearing in teenagers. D. variation in voice sound.

51. Which of the following can you not control?

- A. Amount of sleep. B. Food eaten.
C. Pattern of growth. D. Emotions.

OBJECTIVE CODE: CUH-EH 2

52. All of the following cause pollution except:

- A. spraying pesticides. B. driving an untuned car.
C. recycling bottles and cans. D. shipping oil in super tankers.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

53. What is the most polluting form of transportation?

- | | |
|---------------|------------------|
| A. Trains. | B. Automobiles. |
| C. Airplanes. | D. Ocean liners. |

54. What is the most serious source of pollution in the world?

- | | |
|-------------|-------------|
| A. Plants. | B. Insects. |
| C. Animals. | D. Humans. |

OBJECTIVE CODE: GD-IG 2

55. How do boys and girls compare when they start to grow more rapidly during puberty?

- | | |
|------------------------------------------------------------|---------------------------------------------------------------------------|
| A. There is no rapid growth for boys or girls. | B. The age for going through rapid growth is the same for boys and girls. |
| C. Boys tend to go through rapid growth at an earlier age. | D. Girls tend to go through rapid growth at an earlier age. |

56. What happens to females during puberty?

- | | |
|-------------------------------|---------------------------------------------|
| A. Widening of the hips. | B. A growth of coarse hair on their cheeks. |
| C. Widening of the shoulders. | D. Marked deepening of the voice. |

57. What happens to males during puberty?

- | | |
|--------------------------------------|----------------------------------------------|
| A. Widening of the hips. | B. They develop faster than females. |
| C. They become smarter than females. | D. There is a marked deepening of the voice. |

OBJECTIVE CODE: SUA-SUA 7

58. A common reason given for getting drunk is:

- | | |
|------------------------|--------------------|
| A. tiredness. | B. boredom. |
| C. to cure a headache. | D. to lose weight. |

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions:

59. A common reason people abuse alcohol is to:
- A. make them more sophisticated. B. help them think better.
C. help them escape problems. D. make them more active.
60. Young people often take illicit drugs because:
- A. their friends do. B. they have health problems.
C. they can't concentrate in school. D. they don't know any better.

OBJECTIVE CODE: GD-IG 3

61. During puberty, which of the following does not happen to teenagers?
- A. They are concerned about changes taking place in their bodies. B. They feel closer to people their own age.
C. They like adults to tell them what to do. D. They want to make more decisions for themselves.
62. Signs of puberty include all of the following except:
- A. decreased physical growth. B. menstruation in females.
C. emotional changes. D. hair growth under arms and pubic area.
63. During puberty, it is not considered normal to:
- A. develop acne. B. become clumsy and awkward.
C. grow rapidly. D. drink alcohol.

OBJECTIVE CODE: COH-HWA 1

64. The 24-hour medical services are best equipped to provide:
- A. overnight care. B. emergency care and X-rays.
C. counseling. D. a check-up for colds and sore throats.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

65. Where do you go for treatment of a dog bite?

- | | |
|--------------------------------|----------------------------------|
| A. Local Hospital. | B. Animal Clinic. |
| C. Consumer Protection Agency. | D. American Medical Association. |

66. Where would you go to get a TB test?

- | | |
|------------------------------|-------------------------------------|
| A. American Red Cross. | B. Local Health Department. |
| C. United Fund Headquarters. | D. Environmental Protection Agency. |

OBJECTIVE CODE: FH-FRR 1

67. Bob has a five-year old sister. He can take good care of her by:

- | | |
|-----------------------------------------------|------------------------------------|
| A. watching her while she plays with matches. | B. letting her eat what she wants. |
| C. letting her swim alone. | D. teaching her bike safety rules. |

68. John was asked to put away the food left from dinner. The best health reason for doing this is that:

- | | |
|-------------------------------|-------------------------------------|
| A. it keeps his mother happy. | B. it keeps the food from spoiling. |
| C. it keeps the food cold. | D. it keeps the food from drying. |

69. George has chickenpox. What is the best thing George can do to keep his sister from catching the disease?

- | | |
|--------------------------------------------------------------|---------------------------------------------|
| A. Chase her away or tease her so she doesn't come near him. | B. Keep his room dark and his sister away. |
| C. Go stay at a friend's house. | D. Keep his glass and towels away from her. |

OBJECTIVE CODE: EMH-C 3

70. People who are in good physical condition:

- | | |
|-------------------------------------|----------------------------------------|
| A. have lots of money. | B. have high blood pressure. |
| C. usually have good mental health. | D. usually ride their bikes every day. |

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

71. When you are tired, you can expect to:

- A. think quickly. B. be grouchy.
C. get excited. D. feel sad.

72. Dave has a healthy way of dealing with difficult situations. When he is in a difficult situation, he is most likely to:

- A. use what worked best last time. B. come up with different solutions depending on the situation.
C. watch what others do. D. ask someone else what he should do.

OBJECTIVE CODE: EMH-FM 3

73. For most people, which will create the most stress?

- A. Having a close friend move to another town. B. Going to the doctor.
C. Having many big changes in their life at the same time. D. Getting a new teacher.

74. Which of the following stressful situations are not good for most people?

- A. Aerobic dancing. B. Worrying about a test.
C. Studying for a test. D. Jogging.

75. Judy is on her first airplane trip. She is holding tightly to the arms of the seat. Her heart is beating fast. The stress in this situation is caused by:

- A. the airplane. B. the people in the airplane.
C. the pilot. D. Judy's feelings about flying.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

OBJECTIVE CODE: CUH-EH 1

76. The most serious communicable-disease problems related to water pollution are due to:

- A. chemical wastes. B. human wastes.
C. animal wastes. D. plant wastes.

77. The long-range health effects of using new chemicals:

- A. have been clearly identified. B. are clearly understood.
C. are not well known. D. are of no importance.

78. Air pollution can be a cause of all of the following except:

- A. bronchitis. B. arthritis.
C. lung cancer. D. emphysema.

OBJECTIVE CODE: EMH-C 1

79. Which of the following is not a step in the decision-making process?

- A. Finding alternatives. B. Saying what the problem is.
C. Thinking about consequences. D. Asking an adult to solve your problem.

80. Before you act on any problem situation, you should always:

- A. think for a week. B. think of a number of things you could do.
C. make up your mind quickly. D. go to the library.

81. When faced with a problem situation, the first thing to do in trying to solve it would be:

- A. list all the possible things you could do. B. ask a friend to take care of it.
C. try to pick the right solution. D. decide what the problem is.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

OBJECTIVE CODE: SFA-SAP 5

82. Traffic laws must be followed by bicycle riders;

- | | |
|---------------------------|--------------------------------------|
| A. during daylight hours. | B. at all times. |
| C. within city limits. | D. only when a policeman is present. |

83. Where there are no sidewalks, walkers should stay on the:

- | | |
|----------------------------------------------------|-------------------------------------------------------|
| A. side of the road with the least traffic. | B. far right-hand side of the road, with the traffic. |
| C. far left-hand side of the road, facing traffic. | D. side of the road with the best surface. |

84. When is it safe to cross the street without looking?

- | | |
|-----------------------------------------------|--------------------------------------|
| A. When the traffic guard tells you to cross. | B. When the traffic light is red. |
| C. When the traffic light is green. | D. Never, even if it is a clear day. |

OBJECTIVE CODE: EMH-SH 2

85. Mary's brother is always teasing her in front of her friends. Her parents have tried to help but it seems to get worse instead of better. What else could Mary try?

- | | |
|-------------------------------------|---------------------------------------------|
| A. Ask her friends for some advice. | B. Do not bring any friends to her house. |
| C. Lock her bedroom door. | D. Find a way to get even with her brother. |

86. Louise is in the hospital and will be out of school for a long time. She is bored and lonely. What is the best thing her friends can do to make her feel better?

- | | |
|-----------------------------------|------------------------------|
| A. Stay away until she gets well. | B. Send flowers. |
| C. Visit and phone her often. | D. Send her a get-well card. |

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

87. Jim can't talk to his parents about his problem. Jim should:

- A. keep the problem to himself. B. try to forget his problem.
C. stay away from home. D. talk to an adult he trusts.

OBJECTIVE CODE: SUA-SUA 2

88. One of the most common reasons many young people start smoking is:

- A. they like the taste of tobacco. B. it helps them lose weight.
C. it makes them feel older. D. it smells good.

89. John started smoking when he was in the seventh grade. Which of the following choices was most likely important in his beginning to smoke?

- A. John's parents were heavy smokers. B. John was old enough to buy his own cigarettes.
C. John did not know that cigarettes were harmful. D. John earned his own money and could spend it any way he pleased.

90. Which one of the following is the most common reason young people start smoking?

- A. It warms them up. B. To rebel against parents and teachers.
C. To calm their nerves. D. Because their friends smoke.

OBJECTIVE CODE: SUA-SUA 8

91. Al was feeling left out of activities at school. He also thought his family did not like him very much. Someone suggested that Al should smoke some marijuana to help him forget his troubles. What is the best thing for Al to do?

- A. Try the marijuana. B. Ask to be transferred to another school.
C. Try not to think about his problems. D. Talk to an adult or friend that he trusts.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

92. Eric had to walk to school each morning in cold weather. A friend suggested that he drink whiskey to warm up before he left the house. What would be the best thing Eric could do to stay warm in the morning?

- A. Follow his friend's advice. B. Eat hot cereal.
C. Put on more layers of clothing. D. Walk with a group of his friends.

93. Barry's mom and dad had a fight and they both were extremely angry. What is the best thing for them to do to make up?

- A. Go to a marriage counselor. B. Have friends tell them what to do.
C. Spend time away from each other until the problem is forgotten. D. Calm down and then talk about their problems.

OBJECTIVE CODE: COH-HSP 1

94. The best way to get a person to try a pill for headaches is to advertise that it:

- A. has more pain relief ingredients than any others. B. is cheaper than any others.
C. has a pleasant taste. D. works as well as other brands.

95. Advertising on TV for a new low-calorie soft drink is most likely to show:

- A. overweight people drinking it after exercising. B. slim people drinking it at a party.
C. young children asking parents to buy it. D. older people ordering it at a restaurant.

96. Advertisers use ads to:

- A. describe products simply and honestly. B. entertain people.
C. compare prices of similar products. D. persuade people to buy or use products.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

OBJECTIVE CODE: SFA-ER 1

97. If a cut or wound is squirting blood, what should be done to stop the bleeding?

- A. Press a pad or cloth tightly against the wound.
- B. Expose the wound to the air so that the blood will clot.
- C. Pour an antiseptic on the wound.
- D. Place an ice pack on the wound.

98. If a person is choking, but is still able to breathe, what is the first thing that should be done to help him or her?

- A. Give the person a large glass of water to drink.
- B. Stick your finger down the person's throat to cause him or her to gag.
- C. Have the person try to cough up the object.
- D. Give artificial respiration by blowing into the victim's mouth.

99. If a person has a bad head injury, you should have the person:

- A. sit up in the chair.
- B. walk around as much as possible.
- C. drink water.
- D. lie down.

OBJECTIVE CODE: SFA-ER 2

100. Joe's little brother just swallowed a whole bottle of aspirin. What should Joe do first?

- A. Hold his brother down and not let him move, then call for help.
- B. Force an object between his brother's teeth, then call for help.
- C. Give his brother milk or water to drink, then call for help.
- D. Give his brother lemon juice or sugar water, then call for help.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

101. Mr. Perruzi's sixth grade class was playing basketball during recess. Suddenly, one of the boys looked very pale and said that he might faint. What should be done to help him?

A. Give him a glass of cold water to drink.

B. Have him hold his breath and count to twenty.

C. Have him sit down with his head between his knees.

D. Give artificial respiration by blowing into his mouth.

102. You are walking in the park and see a child hit in the head by a swing. He is lying on the ground crying. What should you do to help?

A. Help him stand up and get him some water.

B. Get him to sit up and see if he can move his neck.

C. Move him away from the swing, and cover him.

D. Keep him lying down and get emergency help.

STOP

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Michigan Educational Assessment Program

STUDENT ASSESSMENT BOOKLET

GRADE 10
HEALTH
EDUCATION
FORM 90



Michigan State Board of Education

D I R E C T I O N S

In this test you will show how you are doing in some skills important in health education.

Be sure you understand all the directions before you begin. You will have as much time as you need to finish the test. If you are not sure about the answer to a question, do your best.

You will be marking your answers on the answer sheet. Mark only one answer for each item. If you change an answer, be sure to erase the first mark completely. Now look at the sample item below:

SAMPLE: Which of the following organs pumps blood to every part of the body?

A. liver

B. stomach

C. heart

D. lungs

Answer

Sample Item: A B D

Since the heart pumps blood to all parts of the body, you would fill in space "C" because "C" is in front of heart, which is the correct answer.

Remember, only one answer should be marked for each question. If you change your answer, erase your first answer completely. Make a dark mark that fills the space. Use a pencil, do not use a ballpoint pen.

When you are sure that you understand the directions, you may begin the test. Your teacher will collect the test when you are finished.

DIRECTIONS: Read each question. Mark the best answer for each question on your answer sheet.

OBJECTIVE CODE: DPC-DC 2

1. Which person is at greatest risk to develop heart disease?
 - A. An underweight woman who smokes and drinks.
 - B. An overweight woman who smokes with no family history of heart disease.
 - C. An underweight man who smokes and drinks.
 - D. An overweight man who has high blood pressure, and has a family history of heart disease.
2. Where does cancer occur most frequently?
 - A. Suburban areas.
 - B. Rural areas.
 - C. Urban areas.
 - D. It is not related to geography.
3. An individual has a greater risk of having sickle cell anemia if his parents are:
 - A. Black.
 - B. Hispanic.
 - C. American Indian.
 - D. White.

OBJECTIVE CODE: DPC-DPC 1

4. Children who are exposed to secondhand cigarette smoke are more susceptible to:
 - A. upper respiratory infection.
 - B. skin irritation.
 - C. bladder infections.
 - D. blurred vision.
5. Which of the following immunizations is no longer necessary to protect against illness?
 - A. Diphtheria.
 - B. Polio.
 - C. Measles.
 - D. Smallpox.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

6. The leading cause of preventable deaths in the United States is:

- A. high fat diets.
- B. cigarette smoking.
- C. high sodium intake.
- D. alcohol abuse.

OBJECTIVE CODE: DPC-DPC 2

7. Syphilis is diagnosed through:

- A. an X-ray.
- B. a urine test.
- C. a blood pressure test.
- D. a blood test.

8. What is the usual way diabetes is detected?

- A. Urine test.
- B. Blood test.
- C. X-ray.
- D. Blood pressure test.

9. A Pap smear is used for early detection of cancer of the:

- A. prostate.
- B. breast.
- C. cervix.
- D. lungs.

OBJECTIVE CODE: DPC-DPC 4

10. An overweight student interested in losing weight should:

- A. use a nationally advertised diet pill.
- B. use a protein diet.
- C. try fasting.
- D. consult a health professional.

11. The doctor wrote a prescription for Joe consisting of 30 antibiotic pills to be taken: one pill, three times daily. By the fifth day, his illness seemed to be gone. Joe should:

- A. save the pills in case another family member comes down with the same illness.
- B. continue the prescription until the pills are gone.
- C. keep the remaining pills refrigerated until needed.
- D. dispose of the remaining pills in a safe manner.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

12. Jane has blurred vision and stomach aches. What should she tell the doctor?
- A. About all her symptoms and any medication she has taken. B. The symptoms she thinks are important.
- C. Answer only the questions the doctor asks. D. The symptoms she now has.

OBJECTIVE CODE: DPC-DPC 5

13. To reduce the risk of heart disease, the most important step to take is:
- A. to eat a high-protein diet. B. to exercise regularly.
- C. not to smoke. D. to get enough sleep.
14. Which of these diseases is not a preventable disease?
- A. Periodontal disease. B. Diabetes.
- C. Gonorrhea. D. Measles.
15. Studies have shown that an individual is less likely to have a heart attack or stroke if that individual:
- A. does regular isometric exercises. B. exercises strenuously once a week.
- C. lifts weights twice a week. D. exercises vigorously three or four times a week.

OBJECTIVE CODE: PHP-DH 1

16. The best thing to use for cleaning between your teeth is:
- A. dental floss. B. a toothpick.
- C. your toothbrush. D. mouthwash.
17. If you can't brush after meals, you should:
- A. eat an apple. B. not worry about it.
- C. chew gum. D. rinse your mouth with water.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

18. How could you prevent tooth decay?

- A. Chew gum after meals to remove food particles.
- B. Use a mouthwash to kill the bacteria.
- C. Eat fewer snacks containing sugar.
- D. It is not possible to prevent the decay process.

OBJECTIVE CODE: PHP-PC 6

19. Aerobic exercises are those in which:

- A. muscle groups are tensed and relaxed systematically.
- B. strength and flexibility are emphasized.
- C. speed and agility are required.
- D. the body's oxygen needs are met.

20. An effective physical activity program must include:

- A. a vigorous workout every weekend.
- B. swimming once a week.
- C. aerobic exercise at least three times a week.
- D. exercising every group of muscles.

21. Once fitness is achieved through regular exercise, an individual should:

- A. exercise when the need is felt.
- B. reduce the exercise program.
- C. increase the exercise program.
- D. continue regular exercise.

OBJECTIVE CODE: N-BDR 2

22. Which class of nutrients is needed in only very small amounts?

- A. Vitamins.
- B. Carbohydrates.
- C. Fats.
- D. Proteins.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

23. Which of the following provides the most calories?

- A. One gram of protein.
- B. One gram of starch.
- C. One gram of sugar.
- D. One gram of fat.

24. The class of nutrients that supplies energy to red blood cells and the nervous system is:

- A. carbohydrates.
- B. proteins.
- C. fats.
- D. vitamins.

OBJECTIVE CODE: N-FS 2

25. The best eating pattern for an athlete is a balanced diet with added:

- A. calories from complex carbohydrates.
- B. protein from red meats.
- C. minerals from supplements.
- D. vitamins from supplements.

26. Natural vitamin supplements are:

- A. less expensive than synthetic vitamins.
- B. identical in chemical structure to synthetic vitamins.
- C. safer than synthetic vitamin supplements.
- D. effective in preventing the common cold.

27. Acne is the result of:

- A. too little vitamin E in the diet.
- B. poor hygiene.
- C. eating food containing fats and sugar.
- D. normal hormonal changes during adolescence.

OBJECTIVE CODE: N-FH 2

28. Lack of B vitamins in your diet can cause:

- A. rickets and scurvy.
- B. baldness and acne.
- C. night blindness and anemia.
- D. irritability and loss of appetite.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

35. How does the rate of growth of a person 12-15 years old generally compare to their rate of growth from 7-10?

- | | |
|--------------------------------------------|---------------------------------------|
| A. 12-15 has a slower rate of growth. | B. 12-15 has a faster rate of growth. |
| C. The rate of growth is usually the same. | D. The rate varies too much to chart. |

36. During adolescence, young people find their emotions:

- | | |
|---------------------------------------|------------------------------------------|
| A. about the same as earlier years. | B. characterized by self confidence. |
| C. within their control at all times. | D. changing and tending toward extremes. |

OBJECTIVE CODE: GD-SF 4

37. Which of these sexually transmitted diseases presently has no cure?

- | | |
|---------------|--------------------|
| A. Syphilis. | B. Genital herpes. |
| C. Gonorrhea. | D. Venereal warts. |

38. When making a decision, it is important to:

- | | |
|---------------------------------------|---------------------------------------------------|
| A. do what you really want to. | B. do what someone you respect says is right. |
| C. accept the values of your friends. | D. consider the consequences of each alternative. |

39. People who really love each other:

- | | |
|---------------------------------|--------------------------------------------|
| A. are always together. | B. talk about each other's faults. |
| C. respect each other's values. | D. expect sex as part of the relationship. |

OBJECTIVE CODE: GD-HPP 1

40. Concerns about weight control among adolescents are usually connected with which of the following?

- | | |
|----------------|---------------------|
| A. Body image. | B. Chronic fatigue. |
| C. Accidents. | D. Wardrobe. |

GO ON TO THE NEXT PAGE

41. Borderline malnutrition is most common in:
- A. teenagers who over-exercise.
 - B. teenagers with acne.
 - C. teenagers who diet.
 - D. teenagers who live in over-crowded cities.
42. Venereal diseases are transmitted by:
- A. germs found in swimming pools.
 - B. sexual contact with another person.
 - C. sitting on someone's lap.
 - D. contact with a contaminated toilet seat.
- OBJECTIVE CODE: FH-FRR 3
43. All of the following should be discussed by a couple considering marriage except:
- A. how much money to spend on food,
 - B. the number of children wanted.
 - C. which utility company to use.
 - D. whether the wife should keep her maiden name.
44. Which of these areas is the most common cause of disagreements between newlyweds?
- A. How to manage money.
 - B. What to name the first baby.
 - C. Where to live.
 - D. How to spend leisure time.
45. A healthy reason for a couple to decide to have children would be:
- A. to maintain family traditions.
 - B. to bring stability to a marriage.
 - C. to provide a love object for the parents.
 - D. because they feel they would make good parents.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

OBJECTIVE CODE: FH-S 2

46. Which one of the following statements is correct?

- | | |
|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| A. Venereal diseases occur only in lower socio-economic areas. | B. Teenagers who have received accurate sex education are less likely to be sexually active at an early age. |
| C. Homosexual activities between consenting adults are illegal in all states. | D. Medical authorities consider the health effects of masturbation during the teenage years to be very harmful. |

47. Which of the following is not a consequence of the decision to be sexually active at an early age?

- | | |
|----------------------------------|----------------------------|
| A. Sexually Transmitted Disease. | B. Unwanted Pregnancy. |
| C. Scoliosis. | D. Disapproval of Parents. |

48. Which of the following is least important in making a decision about sexual conduct?

- | | |
|------------------------------------|-----------------------------------|
| A. Religious and moral beliefs. | B. Family patterns of thinking. |
| C. Peer behavior and expectations. | D. Individual values and beliefs. |

OBJECTIVE CODE: FH-FP 2

49. Because of its potential to cause birth defects, it is dangerous to contract which of the following diseases during the first two months of pregnancy?

- | | |
|---------------------|--------------------|
| A. The common cold. | B. German measles. |
| C. Mumps. | D. Chickenpox. |

50. When a woman is pregnant, all of the following could be damaging to the development of her unborn baby except:

- | | |
|-------------------------------|-----------------------|
| A. heavy alcohol consumption. | B. cigarette smoking. |
| C. limiting food intake. | D. physical activity. |

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

51. Which of the following statements is not correct?

- | | |
|----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| A. Postnatal care is more important than prenatal care. | B. Only drugs prescribed by a doctor should be taken during pregnancy. |
| C. Heavy cigarette smoking during pregnancy increases the chance of a baby being born with a low birth weight. | D. If a pregnant woman is addicted to heroin, her baby will be born addicted to heroin. |

OBJECTIVE CODE: FH-FP 3

52. You notice a married friend has unusual bruises. When you question her she reacts nervously and changes the subject. What might you suspect?

- | | |
|------------------|------------------------|
| A. Pregnancy. | B. A blood disease. |
| C. Spouse abuse. | D. Accident proneness. |

53. Susan acts uncomfortable around her uncle. She refuses to be part of a group that includes the uncle and refuses to be alone with him. What might her mother suspect?

- | | |
|-------------------------------|---------------------|
| A. Child sexual abuse. | B. Susan is shy. |
| C. He does not like children. | D. He teases Susan. |

54. A father notices his teenage daughter is moody, does not eat properly, feels sick to her stomach, and stays in her room more than usual. He may suspect his daughter:

- | | |
|-----------------------|-------------------------------|
| A. has a sore throat. | B. is pregnant. |
| C. has the flu. | D. is doing poorly in school. |

OBJECTIVE CODE: EMH-C 3

55. Which of the following is least likely to be a cause of stress for most students?

- | | |
|-------------------------|------------------------|
| A. Solitude. | B. Poor health habits. |
| C. Pressure from peers. | D. Lack of time. |

GO ON TO THE NEXT PAGE

56. Sally worked part time in a store during the school year. She applied for a full-time position for the summer. The store gave that job to a new employee. What is the best way for Sally to deal with her disappointment?

- | | |
|----------------------------------------------------------|--------------------------------------------------|
| A. Decide that making more money is not that important. | B. Complain to the store about the new employee. |
| C. Decide that she didn't want the full-time job anyway. | D. Look for another full-time job. |

57. If you feel your parents are pressuring you to get higher grades, and you think you are already doing your best work, you should:

- | | |
|--------------------------------------|-------------------------------------|
| A. complain to your friends. | B. take easier classes. |
| C. talk this over with your parents. | D. spend more time on your studies. |

OBJECTIVE CODE: EMH-C 4

58. Which of the following responses would be appropriate in dealing with grief?

- | | |
|-------------------|------------------|
| A. Indifference. | B. Depression. |
| C. Embarrassment. | D. Exhilaration. |

59. Julie's father and mother are in the process of getting a divorce. Julie might react in any of the following ways except by:

- | | |
|-----------------------------------------------------------------|--------------------------------------|
| A. asking them to stay together if she begins to behave better. | B. being very angry at her parents. |
| C. being very pleased. | D. saying it does not matter to her. |

60. John's best friend was killed. John might behave in any of the following ways except:

- | | |
|----------------------------------------------------|-----------------------------------------------|
| A. being very angry at his friend for leaving him. | B. acting as if it had not happened. |
| C. finding it hard to keep his mind on things. | D. not wanting to believe his friend is dead. |

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

OBJECTIVE CODE: EMH-SH 4

61. You have a need to listen to rock music, but your mom has a need for peace and quiet. To resolve this conflict of need, it is best to:

- A. give in every time. B. explain what you need and try to work it out.
- C. fight for what you want. D. have someone else decide who should have his or her way.

62. Jane and Sam usually walk home together. For the third time this week, Sam has not waited for Jane and has walked home alone. Jane notices that Sam is also very quiet in class. Jane decides that:

- A. something is bothering Sam. B. Sam doesn't want to be friends anymore.
- C. there is something wrong with her. D. Sam likes to walk alone.

63. If Mary ridicules Jean in front of you, the best thing for you to do is:

- A. laugh and agree. B. pretend you do not hear.
- C. ridicule Mary. D. show you do not approve in some way.

OBJECTIVE CODE: SUA-SUA 1

64. Of the following, which will be affected first by drinking alcohol?

- A. Judgment. B. Vision.
- C. Coordination. D. Hearing.

65. Your blood alcohol content is determined by how much you drink and by your:

- A. weight. B. height.
- C. sex. D. age.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

66. Alcohol is considered:

- A. a hallucinogen.
- B. a depressant.
- C. an amphetamine.
- D. a stimulant.

OBJECTIVE CODE: SUA-SUA 2

67. Parents who regularly use alcoholic beverages and tranquilizers to "cope" with physical and mental discomforts are likely to:

- A. present their children with a normal pattern of drug use.
- B. encourage their children to use and abuse drugs.
- C. have no effect on their children's attitudes about drug use and abuse.
- D. effectively solve their problems.

68. A common reason that teenagers abuse alcohol is:

- A. excessive media advertising.
- B. lots of beer is available.
- C. they don't have a good self-image.
- D. they have trouble with their school work.

69. One reason young people abuse drugs is:

- A. it improves their school work.
- B. their friends use drugs.
- C. it keeps their weight down.
- D. it helps them think better.

OBJECTIVE CODE: CUH-HWA 2

70. A gynecologist specializes in:

- A. gastrointestinal conditions of females.
- B. the female reproductive system.
- C. reproductive disorders of males.
- D. old age problems of males and females.

71. A pediatrician specializes in:

- A. patent medicines.
- B. foot problems.
- C. gum diseases.
- D. childhood illness.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

72. A gerontologist specializes in:

- A. rare blood disorders.
- B. care of intestinal diseases.
- C. care of the elderly.
- D. surgery for the newborn.

OBJECTIVE CODE: SUA-ASA 1

73. Ellen is ten pounds overweight. What is the best thing she can do?

- A. Fast until she loses the ten pounds.
- B. Take diet pills.
- C. Go on a liquid diet.
- D. Reduce her calorie intake.

74. Kyle wants to go to a party Friday night. He knows his friends will want him to take some drugs. Kyle does not like to take drugs. What is the best thing for him to do?

- A. Decide not to go to the party.
- B. Go along with his friends and take the drugs.
- C. Think of ways of saying no to his friends.
- D. Avoid thinking about the situation.

75. Jill has trouble staying awake in her classes. What is the best thing she can do to stay awake?

- A. Take a pill.
- B. Get a good night's sleep.
- C. Drink two cups of coffee.
- D. Drink two colas.

OBJECTIVE CODE: CUH-HSP 1

76. Which magazine researches and reports on comparisons of new products?

- A. Consumer Reports.
- B. Good Housekeeping.
- C. Business Week.
- D. Time.

77. Consumers with a complaint about a product should first go to the:

- A. store where it was purchased.
- B. Consumer Fraud Division
- C. manufacturer.
- D. distributor.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

78. Generic drugs are usually:

- | | |
|----------------------------------------|------------------------------------------|
| A. safer than brand name drugs. | B. less researched than brand drugs. |
| C. the same price as brand name drugs. | D. less expensive than brand name drugs. |

OBJECTIVE CODE: CUH-HSP 2

79. What is the most important reason for having a physical examination or checkup every year?

- | | |
|------------------------------------------------------------------|-----------------------------------------------------|
| A. To keep in contact with the family doctor. | B. To be made aware of the latest medical advances. |
| C. To find and treat any illness or disease in the early stages. | D. To use health insurance benefits. |

80. Health factors under your control include:

- | | |
|--------------------------|---------------------------------|
| A. age and gender. | B. habits and attitudes. |
| C. wet and cold weather. | D. heredity and genetic traits. |

81. One benefit of being an informed health consumer is that you can:

- | | |
|--------------------------------------------------|---------------------------------|
| A. prevent all illnesses. | B. do without health insurance. |
| C. better communicate with your medical advisor. | D. can avoid regular checkups. |

OBJECTIVE CODE: SFA-SAP 1

82. When grease in a frying pan catches fire, you should:

- | | |
|----------------------|---------------------------|
| A. pour water on it. | B. quickly cover the pan. |
| C. take it outside. | D. call a neighbor. |

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

83. One of the most frequent causes of death among junior and senior high school students involves:

- A. automobile accidents.
- B. sports related accidents.
- C. water related accidents.
- D. hunting accidents.

84. From the list below, choose the most frequent contributing cause of traffic accidents involving teenagers.

- A. Being tired and sleepy.
- B. Use of illegal drugs other than alcohol.
- C. Bad weather.
- D. The misuse of alcohol by drivers.

OBJECTIVE CODE: SFA-SAP 2

85. What can the community do to reduce car accidents?

- A. Build better roads and raise the speed limits.
- B. Have driver education courses taught by the police.
- C. Support enforcement of the laws and penalties for drunken driving.
- D. Have two police officers in every patrol car.

86. All of the following help prevent water accidents, except:

- A. using the "buddy system".
- B. depending on a tire innertube for support when in deep water.
- C. knowing water conditions such as depth and location of obstacles.
- D. using appropriate equipment.

87. Preventing accidents in sports activities depends upon:

- A. proper conditioning and equipment.
- B. requiring players to be of the same sex.
- C. strictness of the officials.
- D. the players knowing each other's weaknesses.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

OBJECTIVE CODE: SFA-EFA 2

88. When putting a new battery in a car, battery acid spilled on the mechanic's hand and wrist. Which of the following would be the proper action to take immediately?
- A. Wrap a clean cloth around the area and seek medical attention.
- B. Rush to the hospital emergency room.
- C. Hold the hand and wrist under running water for several minutes.
- D. Apply ointment to the spots where acid spilled.
89. Bill is having sharp chest pains and also a hard time catching his breath. What should be done?
- A. Help Bill walk around to keep the blood circulating.
- B. Have Bill lie down and call for an ambulance.
- C. Put Bill in a car and rush him to the hospital.
- D. Call the hospital and find out what to do.
90. Sue was the first person to arrive at the scene of a car accident. A man was bleeding very badly and he seemed to be in shock. What should Sue do first?
- A. Try to stop the bleeding.
- B. Go call an ambulance.
- C. Begin to treat the man for shock.
- D. Stop the next car for help.

OBJECTIVE CODE: COH-EH 1

91. Which of the following technological changes have increased pollution problems?
- A. Increased use of home computers.
- B. The increased numbers of cars and trucks.
- C. Space exploration.
- D. Increased use of microwave ovens.

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

92. Why is the increased use of disposable plastic items a pollution problem?

- | | |
|-----------------------------|--------------------------------------------------------|
| A. Plastic can be recycled. | B. Plastic containers are damaging to the food inside. |
| C. Plastic is expensive. | D. Plastic items are not biodegradable. |

93. Safe disposal of radioactive waste is:

- | | |
|-----------------------------------|--------------------------------------------------------|
| A. easily done with new machines. | B. licensed in all states. |
| C. difficult to do. | D. the responsibility of the federal trade commission. |

OBJECTIVE CODE: COH-EH 2

94. Acid rain is caused by:

- | | |
|--------------------|-----------------------|
| A. factory smoke. | B. airplane exhaust. |
| C. nuclear plants. | D. toxic waste dumps. |

95. One feasible way to reduce air pollution is to:

- | | |
|-------------------------------|-------------------------------------------|
| A. use only electricity. | B. close down all coal-burning factories. |
| C. ban all cigarette smoking. | D. require auto emission inspections. |

96. An important thing to look for in choosing a toxic waste site is distance from:

- | | |
|-----------------------------|--------------------------|
| A. state highways. | B. state forests. |
| C. drinking water supplies. | D. wild animal habitats. |

OBJECTIVE CODE: COH-CHR 6

97. A person who specializes in treating conditions of the ear is a/an:

- | | |
|---------------------|-----------------|
| A. otologist. | B. neurologist. |
| C. ophthalmologist. | D. podiatrist. |

GO ON TO THE NEXT PAGE

DIRECTIONS: Answer the following questions.

98. A person who specializes in surgery of the eye is an:
- A. optician.
 - B. otologist.
 - C. optometrist.
 - D. ophthalmologist.
99. Individuals interested in the role of food, nutrition, and health should choose a career in:
- A. physical therapy.
 - B. dietetics.
 - C. physiology.
 - D. oncology.

OBJECTIVE CODE: EMH-SH 3

100. Marian won a beauty contest. She spent a whole year traveling, going to parties and celebrations, and meeting many people. She insisted on having two hours each day to be alone. Which of the following consequences is not to be expected from her decision to be alone?
- A. Improved personal problem-solving.
 - B. Improved coping skills.
 - C. Extreme loneliness.
 - D. Personal growth.
101. John is an accomplished painter. He wants his work to be his best. To accomplish this, he needs:
- A. encouragement from relatives.
 - B. ideas from friends.
 - C. people watching him.
 - D. time to work alone.
102. Which of the following is a negative aspect of being alone. Mark the negative one.
- A. Limits you to your own thoughts.
 - B. Permits you to regain your energy level.
 - C. Provides time to do your homework.
 - D. Gives you a chance to think.

STOP

APPENDIX D

CRONBACH ALPHA RELIABILITY COEFFICIENTS

APPENDIX D

MEAP HEALTH EDUCATION TEST*

Cronbach Alpha Reliability Coefficients

For Test Items, Grade Four

N of cases = 796 (4th grades) N of items = 3* = omitted

range = 0.0531-0.7462

average Cronbach Alpha Coefficient = 0.3590

Response No.	Alpha	Response No.	Alpha
1 - 3	0.4328-a	52 - 54	0.2091-a
4 - 6	0.2572-a	55 - 57	0.4201-a
7 - 9	0.1804-a	58 - 60	0.4381-a
10 -12	0.2783-a	61 - 63	0.3950-a
13 -15	0.1740-a	64 - 66	*
16 -18	0.2973-a	67 - 69	0.3355-a
19 -21	0.4407-a	70 - 72	0.3639-a
22 -24	0.3024-a	73 - 75	0.7462-a
25 -27	0.0990-a	76 - 78	0.3733-a
28 -30	0.0531	79 - 81	0.2292-a
31 -33	0.4782-a	82 - 84	0.3770-a
34 -36	0.4390-a	85 - 87	0.4885-a
37 -39	*	88 - 90	0.2886-a
40 -42	0.3655-a	91 - 93	0.5333-a
43 -45	0.3552-a	94 - 96	0.3314-a
46 -48	0.5076-a	97 - 99	0.4327-a
49 -51	0.5089-a		

a

$P < 0.01$
796

*Michigan School Health Association, Michigan Educational Assessment Program, Health Education Interpretive Report, Health Topic Area Attainment Rates by Grade, 1984-85, p. 79.

APPENDIX D

MEAP HEALTH EDUCATION TEST*

Cronbach Alpha Reliability Coefficients

For Test Items, Grade Seven

N of cases = 1792 (7th grades) N of items = 3* = omitted

range = 0.1223-0.6345

average Cronbach Alpha Coefficient = 0.3688

Response No.	Alpha	Response No.	Alpha
1 - 3	0.3196-a	52 - 54	0.3754-a
4 - 6	0.3369-a	55 - 57	0.5098-a
7 - 9	0.1837-a	58 - 60	0.4653-a
10 - 12	0.2968-a	61 - 63	0.3363-a
13 - 15	0.1778-a	64 - 66	*
16 - 18	0.1513-a	67 - 69	0.5235-a
19 - 21	0.3953-a	70 - 72	0.3122-a
22 - 24	0.4720-a	73 - 75	0.5496-a
25 - 27	0.2930-a	76 - 78	0.1223-a
28 - 30	0.3996-a	79 - 81	0.3637-a
31 - 33	0.2765-a	82 - 84	0.2831-a
34 - 36	0.3606-a	85 - 87	0.4505-a
37 - 39	*	88 - 90	0.4996-a
40 - 42	0.5662-a	91 - 93	0.6345-a
43 - 45	0.5250-a	94 - 96	0.4274-a
46 - 48	0.1804-a	97 - 99	0.3963-a
49 - 51	0.4589-a	100 - 102	0.1613-a

a

$P < 0.01$
1,000

*Michigan School Health Association, Michigan Educational Assessment Program, Health Education Interpretive Report, Health Topic Area Attainment Rates by Grade, 1984-85, p. 79.

APPENDIX D

MEAP HEALTH EDUCATION TEST*

Cronbach Alpha Reliability Coefficients

For Test Items, Grade Ten

N of cases = 3804 (10th grades) N of items = 3* = omitted

range = 0.0467-0.7370

average Cronbach Alpha Coefficient = 0.3403

Response No.	Alpha	Response No.	Alpha
1 - 3	0.0518	52 - 54	0.7370-a
4 - 6	0.1711-a	55 - 57	0.3292-a
7 - 9	0.1631-a	58 - 60	0.2990-a
10 -12	0.3339-a	61 - 63	0.5791-a
13 -15	0.0808	64 - 66	*
16 -18	0.2620-a	67 - 69	0.2679-a
19 -21	0.0487	70 - 72	0.3540-a
22 -24	0.0467	73 - 75	0.6162-a
25 -27	0.0962	76 - 78	0.5522-a
28 -30	0.0972	79 - 81	0.5836-a
31 -33	0.2944-a	82 - 84	0.6130-a
34 -36	0.2352-a	85 - 87	0.5766-a
37 -39	*	88 - 90	0.2333-a
40 -42	0.4830-a	91 - 93	0.5845-a
43 -45	0.2124-a	94 - 96	0.4512-a
46 -48	0.4656-a	97 - 99	0.3387-a
49 -51	0.2695-a	100 -102	0.4640-a

a

P

1,000 \leq 0.01

*Michigan School Health Association, Michigan Educational Assessment Program, Health Education Interpretive Report, Health Topic Area Attainment Rates by Grade, 1984-85, p. 79.

APPENDIX E

STATISTICAL COMPUTATIONS

SUMMATION NOTATION*

Σ = Sum

X = Scores

p = Person

i = Group #

K = # of groups

N = Total subjects or groups

n = Singular group (persons)

σ = Standard deviation

μ = Population mean

\bar{X} = Group mean

$\sigma_{\bar{X}}$ = Standard error of the mean

Z = Total

BB = Between groups

W = Within groups

C = Comparisons

f = Frequency

CRIT. = Pre-established Math level

OBS. = Math level computed by formula

* Shavelson, op. cit., pp. 607-614.

Appendix E
 STATISTICAL DATA
 NEW YORK STATE AND MICHIGAN

	Fourth Grade		Seventh Grade		Tenth Grade	
	NY	M	NY	M	NY	M
N =	156	796	152	1792	304	3804
Test Items	99	99	102	102	102	102
Mean Score	67	60	72	61	67	55
Low Score	34	10	29	0	22	0
High Score	90	90	93	97	90	94
Std. Dev.	9.83	15.51	11.05	16.76	11.00	15.24
Variance	96.62	240.653	122.10	280.93	121.00	232.47
Std. error	.78	.55	.98	.39	.25	.25
Reliability	.88	.35	.84	.36	.87	.34

Appendix E
INTERPRETIVE STATISTICS

NEW YORK STATE AND MICHIGAN DATA

A Calculation of Power -detection of a significant difference when it truly exists. (New York and Michigan means therefore, can be compared).

* Analysis of Variance (anova) -New York treatment effect was not caused by chance.

Omega Square W^2 -strength of association between independent variable (NY treatment) and the dependent variable (NY HTAR).

Tukey's HSD -comparison of means indicating that New York produced greater effects

	FOUR	SEVEN	TEN
W	.98	.97	.95
HSD	5.373	6.52	9.048
Anova	14.345	13.26	9.0829
<i>B</i>	3.078	7.135	13.30

HSD Ho : C = 0
 Ha : C ≠ 0

Anova Ho ; C = 0
 Ha : C > 0

B Ho : $\mu_{ny} - \mu_m = 0$
 Ha : $\mu_{ny} - \mu_m = > 0$

CALCULATION OF POWER*

ONE SAMPLE (CASE 1), ONE TAILED,

RESEARCH STUDY

REJECT OR NOT TO REJECT THE NULL HYPOTHESIS

GRADE 4 - NEW YORK.

$$H_0 : \mu_{ny} - \mu_m = 0$$

$$H_a : \mu_{ny} - \mu_m = > 0 \quad (6.158)$$

$$\alpha = .01 \text{ (one tailed)} \quad 2.33$$

$$\begin{aligned} \sigma_{\bar{X}_{ny} - \bar{X}_m} &= \sqrt{\frac{\sigma_{ny}^2}{N_{ny}} + \frac{\sigma_m^2}{N_m}} \\ &= \sqrt{\frac{9.83^2}{156} + \frac{15.573^2}{796}} \\ &= \sqrt{\frac{96.628}{156} + \frac{242.518}{796}} \\ &= \sqrt{.6194 + .3046} \\ &= \sqrt{.9240} \\ &= .961 \end{aligned}$$

$$\begin{aligned} (\bar{X}_{ny} - \bar{X}_m) \text{ CRIT} &= z_{\alpha} \sigma_{\bar{X}_{ny} - \bar{X}_m} \\ &= 2.33 \times .961 \\ &= 2.239 \end{aligned}$$

* Shavelson, op. cit., pp. 372-375.

$$Z(\bar{X}_{ny} - \bar{X}_m) (H_a) = \frac{(\bar{X}_{ny} - \bar{X}_m) - (\mu_{ny} - \mu_m)H_a}{\sigma_{\bar{X}_{ny} - \bar{X}_m}}$$

$$= \frac{2.239 - 6.158}{.961}$$

$$= \frac{-3.919}{.961}$$

$$= -4.078$$

$\beta = 1 - \text{power}$

$\beta = 1 - -4.078$

$= +5.078 - \text{Reject the null hypothesis}$

CALCULATION OF POWER*

ONE SAMPLE (CASE 1), ONE TAILED,

RESEARCH STUDY

REJECT OR NOT TO REJECT THE NULL HYPOTHESIS

GRADE 7 - NEW YORK

$$H_0: \mu_{ny} - \mu_m = 0$$

$$H_a: \mu_{ny} - \mu_m = > 0 \quad 10.417$$

$$\alpha = .01 \text{ (one tailed)} \quad 2.33$$

$$\begin{aligned} \sigma_{\bar{X}_{ny} - \bar{X}_m} &= \sqrt{\frac{\sigma_{ny}^2}{N_{ny}} + \frac{\sigma_m^2}{N_m}} \\ &= \sqrt{\frac{11.05^2}{152} + \frac{16.761^2}{1792}} \\ &= \sqrt{\frac{122.102}{152} + \frac{280.931}{1792}} \\ &= \sqrt{.8033 + .1567} \\ &= \sqrt{.9600} \\ &= .979 \end{aligned}$$

$$\begin{aligned} \left(\frac{\bar{X}_{ny} - \bar{X}_m}{\sigma_{\bar{X}_{ny} - \bar{X}_m}} \right)_{CRIT.} &= z_{\bar{X}_{ny} - \bar{X}_m} \sigma_{\bar{X}_{ny} - \bar{X}_m} \\ &= 2.33 \times .979 \\ &= 2.281 \end{aligned}$$

* Shavelson, op. cit., pp. 372-375.

$$\begin{aligned}
 Z(\bar{X}_{ny} - \bar{X}_m)H_a &= \frac{\bar{X}_{ny} - \bar{X}_m - (\mu_{ny} - \mu_m)H_a}{\sigma_{\bar{X}_{ny} - \bar{X}_m}} \\
 &= \frac{2.281 - 10.417}{.979} \\
 &= \frac{-8.135}{.979} \\
 &= -8.310
 \end{aligned}$$

$\beta = 1 - \text{power}$

$\beta = 1 - .9310$

$= .0690 \rightarrow \text{Reject the null hypothesis}$

CALCULATION OF POWER*

ONE SAMPLE (CASE 1), ONE TAILED,

RESEARCH STUDY

REJECT OR NOT TO REJECT THE NULL HYPOTHESIS

GRADE 10 - NEW YORK

$$H_0: \mu_{ny} - \mu_m = 0.$$

$$H_a: \mu_{ny} - \mu_m \neq > 0 \text{ (11.26)}$$

$$\alpha = .01 \text{ (one tailed) } 2.33$$

$$\sigma_{\bar{X}_{ny} - \bar{X}_m} = \sqrt{\frac{\sigma_{ny}^2}{N_{ny}} + \frac{\sigma_m^2}{N_m}}$$

$$= \sqrt{\frac{11.00^2}{304} + \frac{15.247^2}{3804}}$$

$$= \sqrt{\frac{121}{304} + \frac{232.471}{3804}}$$

$$= \sqrt{.3980 + .0611}$$

$$= \sqrt{.4591}$$

$$= .677$$

$$(\bar{X}_{ny} - \bar{X}_m)_{CRIT} = Z_{\alpha} \sigma_{\bar{X}_{ny} - \bar{X}_m}$$

$$= 2.33 \times .677$$

$$= 1.577$$

* Shavelson, op. cit., pp. 372-375.

$$z(\bar{X}_{ny} - \bar{X}_m)H_a = \frac{\bar{X}_{ny} - \bar{X}_m - (\mu_{ny} - \mu_m^*)H_a}{\sigma_{\bar{X}_{ny} - \bar{X}_m}}$$

$$= \frac{1.577 - 11.26}{.677}$$

$$= \frac{-9.6825}{.677}$$

$$= -14.30$$

$\beta \Rightarrow 1 - \text{power}$

$\beta = 1 - +15.30$

$= -13.30 \rightarrow \text{Reject the null hypothesis}$

ONE-WAY ANALYSIS OF VARIANCE

GRADE FOUR, NEW YORK AND MICHIGAN STATE

TREATMENT LEVELStep

1 Control Group (M) $\bar{X} = 60.84$ Experimental Group (NY) $\bar{X} = 67.00$

60.0	3600.00	59.0	3481.00
70.5	4970.25	70.8	5012.64
49.6	2460.16	51.2	2621.44
64.2	4121.64	66.8	4462.24
77.8	5990.60	74.9	5610.01
61.3	3757.69	62.4	3893.76
64.6	4173.16	68.9	4747.21
73.7	5431.69	81.3	6609.69
69.7	4858.09	72.5	5256.25
61.1	3733.21	64.1	4108.81
<hr/>	<hr/>	<hr/>	<hr/>
652.5	43096.49	671.9	45802.34

SUM SCORES

$$2 \quad \left(\frac{\sum_{p=1}^n X_{pm}}{N_m} \right)^2 = \frac{652.5^2}{10} = \frac{425756.25}{10} = 42575.625$$

$$\left(\frac{\sum_{p=1}^n X_{pny}}{N_{ny}} \right)^2 = \frac{671.9^2}{10} = \frac{451449.61}{10} = 45144.961$$

TOTAL SUM

$$N \quad \sum_i X_p = 652.5 + 671.9 = 1324.4$$

INTERMEDIATE QUANTITIES

$$3 \quad (1) \quad \sum_{i=1}^K \left(\frac{\sum_{p=1}^n X_{pi}}{N} \right)^2 = 42575.625 + 45144.961 = 87720.586$$

$$(2) \quad \left(\frac{\sum_{p=1}^n X_p}{N} \right)^2 = \frac{1324.4}{20} = 66.22$$

$$(3) \quad \sum_{p=1}^N X_p^2 = 88898.83$$

$$43096.49 + 45802.34 =$$

SUM OF SQUARES TOTAL

$$SS_T = \sum_{p=1}^N X_p^2 - \left(\frac{\sum_{p=1}^N X_p}{N} \right)^2 = (3) - (2) = 88898.83 - 66.22$$

$$= 88832.61$$

SUM OF SQUARES BETWEEN

$$SS_B = \sum_{i=1}^K \left(\frac{\sum_{p=1}^n X_{pi}}{n_i} \right)^2 - \left(\frac{\sum_{p=1}^N X_p}{N} \right)^2 = (1) - (2)$$

$$= 87720.586 - 66.22$$

$$= 87654.365$$

SUM OF SQUARES WITHIN

$$SS_W = \sum_{p=1}^N X_p^2 - \sum_{i=1}^K \left(\frac{\sum_{p=1}^n X_{pi}}{n_i} \right)^2 = (3) - (1)$$

$$= 88898.83 - 87720.586$$

$$= 1178.27$$

COMPUTATIONAL FORMULAS FOR THE ONE-WAY ANOVA

$K = \# \text{ of groups}$

$df_B = \# \text{ of groups} - 1 = 2 - 1 = 1$

$df_W = 9 + 9 = 18$

$df_T = 19$

SOURCE OF VARIATION

SoV	Sum-of-Squares	df	Mean Squares	F
BE	87654.365	2-1 = 1	87654.365	1339.0645
WI	1178.27	20-2 = 18	65.4594	
T	88832.61	20-1 = 19		

STRENGTH OF ASSOCIATIONOMEGA SQUARE (W^2)

$$W^2 = \frac{SS_B - (K - 1) MS_W}{SS_T + MS_W}$$

$$SS_B = 87654.365$$

$$MS_W = 65.4594$$

$$SS_T = 88832.61$$

$$W^2 = \frac{87654.365 - (2 - 1)(65.4594)}{88832.61 + 65.4594} = \frac{87588.906}{88898.069} = .98$$

A PRIORI COMPARISONS, GRADE 4

$$\bar{X}_{ny} = 67.00$$

$$\bar{X}_m = 60.84$$

$$C_1 = +1\bar{X}_{ny} + (-\frac{1}{2})\bar{X}_m$$

$$C_1 = (+1)(67.00) + (-\frac{1}{2})(60.84)$$

$$= 67.00 - 30.42 = 36.58$$

SPECIFIED WEIGHTS

C_1	1	$-\frac{1}{2}$
C_2	0	+1

$$C_1 H_0 : C_1 = 0$$

$$H_1 : C_1 > 0$$

$$\alpha = .01$$

$$t_{\text{CRIT}} = 2.552$$

$$t_{\text{obs}} = 14.345 = \text{reject}$$

Conclude that μ_{ny} is significantly

higher than μ_m

$$t_{\text{obs}} = \sqrt{\frac{C.}{\frac{2MS_W}{N}}} = \sqrt{\frac{36.58}{\frac{2(65.4594)}{20}}}$$

$$= \sqrt{\frac{36.58}{\frac{130.9188}{20}}}$$

$$= \sqrt{\frac{36.58}{6.54594}} = \frac{36.58}{2.55}$$

$$= 14.3450$$

TUKEY'S HSD (HONESTLY SIGNIFICANT DIFFERENCE)*

NEW YORK-MICHIGAN COMPARISON, GRADE FOUR

H₀ : C = 0

H₁ : C ≠ 0

C = μ_{ny} - μ_m for all pairs

Reject H₀, concluding that the means are significantly different at the specified α = .01

$\bar{X}_m = 60.84$ $\bar{X}_{ny} = 67.00$

$\bar{X}_m = 60.84$	-	6.16
$\bar{X}_{ny} = 67.00$	-6.16	-

$$\begin{aligned}
 \text{HSD} &= q(\alpha, df_w, K) \sqrt{\frac{MS}{N}} \\
 &= q(.01, 18, 10) \sqrt{\frac{65.4594}{156}} \\
 &= 6.20 \sqrt{\frac{65.4594}{156}} \\
 &= 6.20 \sqrt{.4196115} \\
 &= 6.20 (.6477742) \\
 &= 4.0162
 \end{aligned}$$

* Shavelson, op. cit., p. 472.

ONE-WAY ANALYSIS OF VARIANCE*

GRADE SEVEN, NEW YORK AND MICHIGAN STATE

TREATMENT LEVELSStep

1 Control Group (M) $\bar{X} = 61.583$ Experimental Group (NY) $\bar{X} = 72.00$

65.6	4303.36	72.7	5285.29
63.5	4032.25	67.3	4529.29
50.3	2530.09	58.5	3422.25
66.3	4395.69	75.1	5640.01
84.5	7140.25	87.7	7691.29
67.7	4583.29	74.5	5550.25
72.9	5314.41	78.3	6130.89
64.1	4108.81	62.4	3893.76
53.8	2984.44	70.3	4942.09
51.7	2672.89	62.3	3881.29
<hr/>	<hr/>	<hr/>	<hr/>
640.4	42065.48	709.1	50966.41

SUM SCORES

$$2 \quad \frac{\left(\sum_{p=1}^n X_{pm} \right)^2}{N_m} = \frac{(640.4)^2}{10} = \frac{410,112.16}{10} = 41,011.216$$

$$\frac{\left(\sum_{p=1}^n X_{pny} \right)^2}{N_{ny}} = \frac{(709.1)^2}{10} = \frac{502,822.81}{10} = 50,282.281$$

TOTAL SUM

$$\sum_{i=1}^N X_i = 640.4 + 709.1 = 1349.5$$

* Shavelson, op. cit., pp. 452-468.

INTERMEDIATE QUANTITIES

$$3 \quad (1) \quad K \frac{\left(\sum_{p=1}^N X_{pi} \right)^2}{N_i} = 41,011.216 + 50,282.281 = 91,293.497$$

$$(2) \quad \frac{\left(\sum_{p=1}^n X_p \right)^2}{N} = \frac{1349.5^2}{20} = 67.475$$

$$(3) \quad \sum_{p=1}^N X_p^2 = 42,065.48 + 50,966.41 = 93,031.89$$

SUM OF SQUARES TOTAL

$$4 \quad SS_T = \sum_{p=1}^N X_p^2 - \frac{\left(\sum_{p=1}^N X_p \right)^2}{N} = 93,031.89 - 67.475 = 92,964.415$$

SUM OF SQUARES BETWEEN

$$SS_B = \sum_{i=1}^K \frac{\left(\sum_{p=1}^n X_{pi} \right)^2}{n_i} - \frac{\left(\sum_{p=1}^N X_p \right)^2}{N} = 91,293.497 - 67.475 = 91,226.022$$

SUM OF SQUARES WITHIN

$$SS_W = \sum_{p=1}^N X_p^2 - \sum_{i=1}^K \frac{\left(\sum_{p=1}^n X_{pi} \right)^2}{n_i} = 93,031.89 - 91,293.497 = 1738.393$$

COMPUTATIONAL FORMULAS FOR THE ONE-WAY ANOVA

$$K = 20 \quad (\text{no. of groups})$$

$$dfB = 1 \quad (\# \text{ of groups} - 1)$$

$$dfW = 18$$

$$dfT = 19$$

SOURCE OF VARIATION

SoV	Sum-of-Squares	df	Mean Square	F
BE	91,226.022	2-1 = 1	91,266.022	944.594
WI	1,738.393	20-2 = 18	96.577	
T	92,964.415	20-1 = 19		

STRENGTH OF ASSOCIATION

$$W^2 = \frac{SS_B - (K - 1) MS_W}{SS_T + MS_W}$$

$$= \frac{91,226.022 - (2-1)(96.577)}{92,964.415 + 96.577} = \frac{91,129.445}{93,060.992} = .9792$$

OMEGA SQUARE (W^2)

$$SS_B = 91,226.022$$

$$MS_W = 96.577$$

$$SS_T = 92,964.415$$

A PRIORI COMPARISONS, GRADE 7

$$\bar{X}_{ny} = 72.00$$

$$\bar{X}_m = 61.583$$

$$* C_1 = \bar{X}_{ny} + (-\frac{1}{2})\bar{X}_m$$

SPECIFIED WEIGHTS

C_1	1	$-\frac{1}{2}$
C_2	0	+1

$$* C_1 = (+1)(72.00) + (-\frac{1}{2})(61.583)$$

$$= 72 + (-30.79)$$

$$= 41.21$$

$$C_1 H_0 : C_1 = 0 \quad t_{obs} = \sqrt{\frac{C_1}{\frac{2MS_W}{N}}} = \sqrt{\frac{41.21}{\frac{2(96.577)}{20}}} = \sqrt{\frac{41.21}{9.6577}} = \frac{41.21}{3.108} = 13.26$$

$$H_1 : C_1 > 0$$

$$\alpha = .01$$

$$t_{CRIT} = 2.552$$

$$t_{obs} = 13.26$$

Reject H_0

Conclude that μ_{ny} is significantly higher than μ_m

TUKEY'S HSD (HONESTLY SIGNIFICANT DIFFERENCE)*

NEW YORK-MICHIGAN COMPARISON, GRADE SEVEN

$$H_0 : C = 0$$

$$HSD = q(\alpha, dfw, K) \sqrt{\frac{MS_W}{N}}$$

$$H_1 : C \neq 0$$

$$= q(.01, .18, .10) \sqrt{\frac{96.577}{152}}$$

$$C = \mu_{ny} - \mu_m \text{ for all pairs}$$

$$= 2.97 \sqrt{\frac{96.577}{20}}$$

$$\bar{X}_m = 61.583 \quad \bar{X}_{ny} = 72.00$$

$$\bar{X}_m = 61.583$$

-

$$10.417$$

$$= 2.97 \sqrt{4.829}$$

$$= 2.97 \quad (2.197)$$

$$\bar{X}_{ny} = 72.00$$

$$10.417$$

-

$$= 6.52$$

* Shavelson, op. cit., p. 472

ONE-WAY ANALYSIS OF VARIANCE
GRADE TEN, NEW YORK AND MICHIGAN STATE

TREATMENT LEVELS

Step

1	Control Group (M) $\bar{X} =$	Experimental Group (NY) $\bar{X} =$
	47.3 2237.29	54.8 3003.04
	52.2 2724.84	58.0 3364.00
	21.8 475.24	35.1 1232.01
	63.3 4006.89	74.2 5505.64
	60.1 3612.01	65.1 4238.01
	63.4 4019.56	76.1 5791.21
	66.7 4448.89	74.9 5610.01
	63.1 3981.61	75.4 5685.16
	64.6 4173.16	78.8 6209.44
	49.0 2401.00	62.4 3893.76
	551.5 32080.49	654.80 44552.28

SUM SCORES

$$2 \frac{\left(\frac{\sum_{p=1}^N X_{pm}}{N_m} \right)^2}{10} = \frac{551.5^2}{10} = \frac{304152.25}{10} = 30415.225$$

$$\frac{\left(\frac{\sum_{p=1}^n X_{pm}}{N} \right)^2}{10} = \frac{654.80^2}{10} = \frac{428763.04}{10} = 42876.304$$

TOTAL SUM

$$\sum_{i=1}^N X_{Pi} \Rightarrow 551.5 + 654.80 = 1206.30$$

INTERMEDIATE QUANTITIES

$$3 - (1) - \sum_{i=1}^K \left(\frac{\sum_{p=1}^n X_{pi}}{N_i} \right)^2 = 30415.225 + 42876.304 = 73291.529$$

$$(2) \left(\frac{\sum_{p=1}^N X_p}{N} \right)^2 = \frac{1206.30}{20} = 60.315$$

$$(3) \sum_{p=1}^N X_p^2 = 32080.49 + 44552.28 = 76632.77$$

SUM OF SQUARES TOTAL

$$4 \quad SS_T = \sum_{p=1}^N X_p^2 - \left(\frac{\sum_{p=1}^N X_p}{N} \right)^2 = 76632.72 - 60.315 = 76572.405$$

SUM OF SQUARES BETWEEN

$$SS_B = \sum_{i=1}^K \left(\frac{\sum_{p=1}^n X_{pi}}{N_i} \right)^2 - \left(\frac{\sum_{p=1}^N X_p}{N} \right)^2 = 73291.529 - 60.315 = 73231.214$$

SUM OF SQUARES WITHIN

$$SS_W = \sum_{p=1}^N X_p^2 - \sum_{i=1}^K \left(\frac{\sum_{p=1}^n X_{pi}}{N_i} \right)^2 = 76632.770 - 73291.529 = 3341.241$$

COMPUTATIONAL FORMULAS FOR THE ONE WAY ANOVA

$$K = \# \text{ of groups} = 20$$

$$dfB = \# \text{ of groups} - 1 = 20 - 1 = 19$$

$$dfW = 9 + 9 = 18$$

$$dfT = 19$$

SOURCE OF VARIATION

SoV	Sum-of-Squares	df	Mean Square	F
BE	73231.214	2-1 = 1	73231.214	394.512
WI	3341.241	20-2 = 18	185.625 ^f	
T	76572.405	20-1 = 9		

STRENGTH OF ASSOCIATIONOMEGA SQUARE (ω^2)

$$\begin{aligned} \omega^2 &= \frac{SS_B - (K-1) MS_W}{SS_T + MS_W} \\ &= \frac{73231.214 - (2-1) 185.625}{76572.405 + 185.625} \\ &= \frac{73046.589}{76758.057} = .95 \end{aligned}$$

$$SS_B = 73231.214$$

$$MS_W = 185.625$$

$$SS_T = 76572.405$$

A PRIORI COMPARISONS, GRADE 10

$$\bar{X}_{ny} = 67.00 \quad \bar{X}_m = 55.734$$

SPECIFIED WEIGHTS

C_1	1	$-\frac{1}{2}$
C_2	0	+1

$$C_1 = (+1)(67) + (-\frac{1}{2})(55.734) = 67 - 27.867 = 39.133$$

$$C_{1H_0} : C_1 = 0$$

$$H_1 : C_1 > 0$$

$$\alpha = .01$$

$$t_{CRIT} = 2.552$$

$$t_{obs.} = 9.0829 \Rightarrow \text{reject}$$

Conclude that μ_{ny} is significantly

higher than μ_m

$$t_{obs} = \sqrt{\frac{C_1}{\frac{2MS_{iW}}{N}}} = \sqrt{\frac{39.133}{\frac{2185.625}{20}}}$$

$$= \sqrt{\frac{39.133}{\frac{371.25}{20}}}$$

$$= \sqrt{\frac{39.133}{18.5625}}$$

$$= \frac{39.133}{4.3084}$$

$$= 9.0829$$

TUKEY'S HSD (HONESTLY SIGNIFICANT DIFFERENCE)*

NEW YORK-MICHIGAN COMPARISON, GRADE TEN

$H_0 : C = 0$

$H_1 : C \neq 0$

$C = \mu_{ny} - \mu_m$ for all pairs

$$\begin{aligned}
 HSD &= q(\alpha, dfW, K) \sqrt{\frac{MS}{N}} \\
 &= q(.01, 18, 2) \sqrt{\frac{185.625}{20}} \\
 &= 2.97 \sqrt{\frac{185.625}{20}} \\
 &= 2.97 \sqrt{9.28125} \\
 &= 2.97 (3.0465144) \\
 &= 9.048
 \end{aligned}$$

$\bar{X}_m = 55.734 \quad \bar{X}_{ny} = 67.00$

$\bar{X}_m = 55.734$	-	11.266
$\bar{X}_{ny} = 67.00$	11.266	-

* Shavelson, op. cit., p. 472

A COMPARISON OF STUDENT HEALTH KNOWLEDGE
IN MICHIGAN AND SELECTED NEW YORK STATE
SCHOOLS

ABSTRACT

By G. Greg Wojtowicz
State University of New York, College at Brockport,
1986

Thesis Advisor: Dr. William H. Zimmerli

The purpose of this study was twofold: first, to determine the Health knowledge levels of a selected sample of New York State students in grades four, seven and ten. Second, to compare these knowledge levels, represented by student test scores on the standardized MEAP test for Health education, with scores of Michigan students in similar grades levels on the same test.

Six hundred twelve students (156 fourth graders, 152 seventh graders and 304 tenth graders) from three selected New York State school districts responded to multiple choice questions (99 questions in fourth grade, 102 questions in seventh and tenth grades) related to ten health topic areas. A Health Topic Attainment Rate (HTAR) of 75 percent is considered to be a satisfactory level of mastery in each of the ten topic areas.

New York State students achieved a satisfactory HTAR in seven topic areas out of a possible thirty at the fourth, seventh and tenth grade levels in comparison to only two for Michigan students at the same grade levels. Selected New York State students showed significantly higher knowledge levels (Grade 4 $F = 1339.0645$; $P < .01$, Grade 7 $F = 944.594$; $P < .01$, Grade 10 $F = 394.512$; $P < .01$) than did students from the state of Michigan.

The results of this investigation lend support to the conclusion that knowledge based health education programs can result in high student test scores.