

AN ASSESSMENT OF THE IMPACT OF NATIONAL DEFENSE
EDUCATION ACT TITLE III FUNDS USED FOR
SECONDARY SCHOOL SCIENCE IN TENNESSEE

December 1, 1965

To the Graduate Council:

I am submitting herewith a dissertation written by Harley H. Stephens entitled "An Assessment of the Impact of National Defense Education Act Title III Funds Used for Secondary School Science in Tennessee." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Education, with a major in Curriculum and Instruction.

Major Professor

We have read this dissertation
and recommend its acceptance:

Accepted for the Council:

Dean of the Graduate School

AN ASSESSMENT OF THE IMPACT OF NATIONAL DEFENSE
EDUCATION ACT TITLE III FUNDS USED FOR
SECONDARY SCHOOL SCIENCE IN TENNESSEE

A Dissertation

Presented to

the Graduate Council of
The University of Tennessee

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Education

by

Harley H. Stephens

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CHAPTER I

INTRODUCTION

The National Defense Education Act of 1958 is a compromise incorporating features of several bills, chiefly the Administration Bill (S 3187, H.F. 10279). It was passed in the Senate on August 22 by a vote of 66 to 15, in the House on August 23 by a vote of 212 to 85, and signed into Public Law 85-864 by President Eisenhower on September 2, 1958.

Its billion dollar program, though authorized for many separate programs, has been authorized for a single purpose--that every young person, from the day he first enters school, should have an opportunity to develop his gifts to the fullest.¹

The Title III provisions of the NDEA Act include financial assistance for strengthening science, mathematics, and modern foreign language instruction in public schools. The authority for this is found in Part 141.1 to 141.37 issued under Sections 301-304 of Public Law 85-864. These sections include the following topics: definitions, state plan, general provision, federal financial participation, federal payment procedures, acquisition of equipment, and supervision and administration.

For science programs Title III provides for the purchase on a matching basis of materials and equipment to be utilized in the improvement of science instruction through (1) increasing understanding of content, (2) offering more content, (3) developing greater student skill, (4) enriching

¹T. E. Carlson, Guide to National Defense Education Act of 1958, Office of Education, United States Department of Health, Education, and Welfare (Washington: Government Printing Office, 1959), p. 1.

student experiences, (5) introducing new subjects and more advanced courses, (6) improving teaching methods, and (7) increasing teacher efficiency through the use of equipment and materials. These seven general objectives are translated into specific objectives on the local level or state level.

The following specific objectives are presented as guides:

1. To develop an interest in and an understanding of the nature of science and the work of scientists.
2. To develop manipulative, experimental, and problem-solving skills in science.
3. To develop an understanding of the impact of science on society.
4. To provide an understanding of the dynamic nature of science as evidenced by current scientific developments.
5. To develop an understanding of the interrelationships that exist among the science fields.
6. To provide opportunities to discover, understand, and apply basic scientific principles.
7. To provide information concerning scientific careers and hobbies.²

I. STATEMENT OF THE PROBLEM

The purpose of this study was to identify changes in secondary school science in Tennessee which had been brought about through the utilization of NDEA Title III science funds. This investigation included changes in science curricula, in instructional procedures, in the extent and nature of materials and equipment, in the practices of the State Department of Education and local school systems in making NDEA Title III science project applications, in the type and quantity of laboratories equipped, and in the amount of science funds expended.

²United States Department of Health, Education, and Welfare, Office of Education, Guidelines to Regulations of Title III National Defense Education Act of 1958 (Washington: Government Printing Office, 1963), p. 32.

II. SIGNIFICANCE OF THE STUDY

The history of public education in the United States indicates that the federal government has shown an interest in the education of the people from the beginning of the constitutional government and has attempted in many ways to help the states fulfill their obligations to provide a good education for all.

Equality of educational opportunity has been a basic desire of the people of this country for many decades. Givens reports on this information in the National Education Association's Annual Report for 1950-51.

The concept of free public schools for all children began in the colonies of the New World. The idea of universal education was established by the time of the American Revolution.³

The National Defense Education Act passed by Congress in September, 1958, was another step to aid local educational systems in financing their curricula in science, mathematics, and modern foreign languages.

Exciting discoveries, major breakthroughs, and important new applications continue to widen our vistas of science, engineering, and technology producing an impact on society which touches every individual. These expanding frontiers inspire large numbers of our youth to consider careers in science, and thoughtful persons of all ages to seek a better understanding of the scientific-technological society in which we live. As a result, there is an insatiable demand for current, accurate scientific information.⁴

The National Defense Education Act was passed to help fill this need, as well as aid in furnishing information vital to national defense.

³Willard Givens, Schools of Our Times, Annual Report of the National Education Association, 1950-51 (Washington: National Education Association, 1951), p. 2.

⁴J. A. Hynek, Challenge of the Universe (New York: Scholastic Book Service, 1962), p. 3.

This study was designed to identify the changes in secondary school science instruction and science facilities in the public schools in Tennessee. Another significant factor has provided motivation for this study; a need was expressed by the curriculum and instructional staff of the State Department of Education to know more of the status of secondary school science and to identify areas of science in which the State Department of Education could furnish leadership for improvement to local school systems. It was also felt that the study would (1) aid colleges in teaching school personnel the procedures used in the selection of materials and equipment and in providing information on the methods used in making NDEA Title III project applications, (2) aid local school administrative personnel in the selection of science materials and equipment for the improvement of instruction.

These factors indicated a need for gathering and disseminating current practices in making NDEA Title III project applications, which may be the basis on which future progress will be made. An understanding of current practices is necessary if the procurement program is to adapt to the changing conditions of the public schools.

III. DEFINITION OF TERMS

Application. The term "application" in this study refers to a form standardized by the State Department of Education on which a public school system may submit a listing of the materials and equipment that it proposes to purchase and use.

Average. The term "average" in this study, when referring to students, indicates those students who have an intelligence quotient of approximately ninety to 110.

Equipment. In this study the term "equipment" shall be interpreted as applying to those fixed or movable articles which are particularly appropriate for use in providing science education in elementary or secondary schools and which are to be used either by the teachers or students in such courses, for example, audio-visual projectors, science furniture, television receivers, and storage facilities for such equipment.

Gifted. The term "gifted" as used in this study, when referring to students, indicates those students with an intelligence quotient of 130 and higher.

NDEA. This abbreviation will be used because of frequent reference throughout the study to the National Defense Education Act passed by Congress in 1958.

NDEA funds. These are monies allocated to the states by the federal government for use on a matching basis by the local school systems making NDEA Title III project applications.

Materials. This term refers to those items which with reasonable care and use can be expected to last for more than one year and are suitable for use in science education. The term includes such items as tapes, discs, slides, transparencies, books, pamphlets, and periodicals.

Project. This term refers to a proposal submitted by a local educational agency, or agencies, or any other public school authorities below the state level. Such proposals shall contain itemized description and current cost estimates of equipment to be acquired and/or buildings to be remodeled.

Secondary school. In this study the term "secondary school" will apply to a division of instructional organization of the public schools including grades nine, ten, eleven, and twelve.

Science course. This term refers to one of the many divisions of science encompassing a body of related scientific knowledge and organized for instructional purposes in courses, such as chemistry, physics, biology, physical science, and space science.

Slow. The term "slow" as used in this study refers to students with an intelligence quotient of approximately seventy to eighty-nine.

Technique. In this study the term "technique" will refer to the method of procedure used in bringing about change.

Title III. This term refers to that portion of the National Defense Education Act of 1958 which pertains to science, mathematics, and foreign languages.

IV. ASSUMPTIONS

In undertaking this study the following assumptions were made:

1. NDEA Title III science project applications were submitted on the basis of need.
2. The extent of the utilization of NDEA funds is related to instructional progress.
3. Information obtained from selected school systems' NDEA Title III science project applications, a questionnaire from local school systems, a check sheet from selected secondary schools' science staffs, and personal interviews with supervisors of selected school systems will produce sufficient evidence to indicate changes brought about by the utilization of NDEA Title III science funds in Tennessee school systems.
4. The examination of instructional practices reported by local school systems' science staffs will indicate ways Title III science funds have aided instruction.

V. LIMITATIONS OF THE STUDY

A detailed investigation of each of the many factors and problems involved in the submission and content of NDEA Title III project applications of the school systems is necessarily beyond the scope of this study; for example, the enumeration of the various kinds of materials and equipment, of which only a cursory treatment was made. For the purpose of this study it was desirable to confine the investigation to the following:

1. A review and analysis of selected public school system's NDEA Title III science project applications in Tennessee.
2. Information obtained from a check sheet submitted by selected secondary school science staffs.
3. Information obtained from personal interviews with supervisors of selected school systems.
4. The public school systems with secondary schools.

5. The area of secondary school science (although NDEA Title III supports other teaching areas).
6. The public school systems utilizing Title III science funds.

VI. PROCEDURES

In order to accomplish the purposes of this study, it was necessary (1) to select public school systems operating secondary schools and participating in NDEA Title Science Programs, (2) to select public school system supervisors for personal interview, (3) to prepare a questionnaire to be sent to selected secondary school science staffs, and (4) to prepare a questionnaire to be sent to all public school systems with secondary schools participating in NDEA Title III funds for science programs. The school systems of the State were screened to ascertain those systems with secondary schools. This procedure revealed sixty-one county systems and eleven city systems for a total of seventy-two systems with secondary schools.

The following procedures were used in conducting this study:

1. A random selection of public school systems was made to include 20 percent of the public school systems with secondary schools.
2. The NDEA Title III science project applications of the selected school systems were reviewed and analyzed at the Nashville office where they were on file with the State Department of Education. The pertinent data from these project applications were recorded.
3. A questionnaire was prepared and sent to all public school systems with secondary schools participating in NDEA Title III science funds. On the reception of the respondents' completed questionnaires, the pertinent data were recorded and analyzed.

4. A check sheet was prepared and mailed to the secondary school science staffs of the selected public school systems, and the respondents' check sheets were reviewed and analyzed.
5. Personal interviews with the supervisors of the fifteen selected school systems were conducted to ascertain the validity of the completed questionnaires and check sheets and to secure additional information on the use of NDEA Title III science project applications.

VII. ORGANIZATION OF THE REMAINING CHAPTERS

The requirements and practices of local school systems in the submission of NDEA Title III science project applications to the State Department of Education and the action of the State Department of Education on these applications are presented in Chapter II.

In Chapter III is a discussion of the enrollment of secondary school students in Tennessee, the number of project applications, the amount of NDEA Title III science funds expended since 1958, including yearly totals and the number of school systems utilizing these funds.

Chapter IV presents examples of science materials and equipment purchased, science courses benefiting most from Title III expenditures, science laboratories equipped, inventory maintenance, maintenance problems, and other additional materials and equipment acquired.

Curricular and instructional changes brought about in science programs by the utilization of NDEA Title III funds are presented in Chapter V.

Chapter VI presents a summary of the investigation.

CHAPTER II

REQUIREMENTS AND PRACTICES IN THE SUBMISSION OF NDEA TITLE III PROJECT APPLICATIONS

The National Defense Education Act of 1958 requires each state department of education participating in grants under this act to submit a state plan for the disbursements of federal funds to the local school systems. This state plan must provide a means for matching the federal grant dollar-for-dollar. The state has the option of matching this fund or asking the participating local school systems to do the matching.¹

The Federal Regulations Title III National Defense Education Act of 1958, Part 141.2 gives in detail the inclusions required in the state plan. These inclusions are (1) purpose, (2) submission of plan, (3) certification by the state board of education, and (4) certification by the state attorney general.²

The first plan by the State Department of Education was approved on November 7, 1958, by the State Board of Education. This plan required the following information to be supplied by the local school systems in the submission of NDEA Title III science project applications:

¹Committee on Labor and Public Welfare United States Senate, The National Defense Act of 1958 (Washington: Government Printing Office, 1958), pp. 3-4.

²United States Department of Health, Education, and Welfare, Regulations Title III National Defense Education Act of 1958 (Washington: Government Printing Office, 1963), p. 1.

1. History of the instructional program in the area for which the application is concerned.
2. Purpose of the project.
3. Description of the project.
4. Number and description of students for whom the proposed project is intended.
5. Qualifications of teachers now employed or to be employed to provide instruction using equipment or materials to be purchased under this application.
6. Inventory of space and facilities available for use with the project.
7. Cost analysis of the project.
8. Statement that funds are available.
9. Agreement to maintain records for audit.
10. Agreement to submit information on request to the Commissioner of Education.³

The State Department of Education began the NDEA Title III program by making an allocation of monies available to the local school systems based on the student average daily attendance for the school year 1957-58. The amount allocated per student in average daily attendance was \$2.09.

The first project application submitted under this plan was on June 9, 1959. It was for tables to equip a chemistry-physics laboratory combination. The total expenditure for the project was \$6,419.20. The Commissioner of Education approved the project application on July 8, 1959.⁴

The allocation of \$2.09 per pupil in average daily attendance was changed on July 1, 1960, to \$2.11 per pupil in average daily attendance for the school year 1958-59. Tennessee's Title III federal funds for the fiscal year 1960-61 were on the basis of \$1.80 per pupil in average daily attendance for the school year 1959-60. The sum of \$2.11 and \$1.80, or a

³Tennessee State Department of Education, National Defense Education Act of 1958 Application Form (Nashville: State Department of Education).

⁴Tennessee State Department of Education, 1959 NDEA Title III Folder and Ledger (Nashville: State Department of Education).

total of \$3.91, was reserved until January 1, 1961, for each local school system wishing to submit Title III project applications. After January 1, 1961, any local school system could submit Title III project applications requesting approval for any of the unobligated federal funds which were available.

A revision of the project application form by the State Department of Education, to be used after July 1, 1960, offered more guidance than the previous form (Appendix D). Although the headings were the same on the forms, Item IV-C provided a table for recording subjects and enrollment data of participating schools. Item V on teacher qualifications provided a listing of degrees with blank spaces for recording each teacher's degree. The inventory of space and facilities indicated by Item VI listed a table to give uniformity of the project and suggest a table form with the following headings: (1) Name of School, (2) Minor Remodeling, (3) Equipment, (4) Materials, and (5) Total Cost.⁵ The other items of the revised project application form remained the same as the original.

The State Department of Education, wishing to keep the participating school systems informed as to the treatment of submitted applications, prepared a letter stating the steps or procedures taken on each application. This letter included the following steps:

1. Applications for the Approval of Project Proposals under Title III shall be submitted in triplicate by local school superintendents . . .
2. Applications will be checked when received by the central office staff for completeness. Incomplete applications will be returned to superintendent indicating deficiencies.

⁵ Tennessee State Department of Education, 1959 NDEA Title III Education Act 1958 Application Form (Nashville: State Department of Education).

3. Completed applications will be reviewed by a small special committee of the staff. Visits may be made to systems submitting project proposals by members of the staff.
4. Applications will then be reviewed by an advisory panel of three to six people. Panel members will be selected from the ranks of school administrators, classroom teachers, and specialists.
5. A small staff committee will review scored applications and make recommendations.
6. Rejected applications will be referred to a small special committee (#3 above).
7. A visit will be made to a system having an approvable application by a staff member to ascertain conditions, etc.
8. The Coordinator of Instruction will review the applications and the recommendations of the staff committee and make final recommendations to the Commissioner of Education.
9. The Commissioner will notify the local superintendent of schools.⁶

There were three instructional areas eligible under the NDEA Title III Act: science, mathematics, and modern foreign languages. A separate project proposal under the present plan was to be submitted for each instructional area, provided that the local school system wished to submit project proposals in two or more of the eligible instructional areas.

The last revision of the project application form by the State Department of Education, at the time of this writing, became effective for the local school systems on January 1, 1964, and the guidelines were amended June 9, 1964. The changes made in the revised application form of November, 1963, considerably shortened the time in preparation and the length of the project application. Item I was changed from history of instructional area to present level of development of the instructional program in this area. Item VI eliminated the submission of an inventory of materials and equipment in the proposed project application instructional

⁶Tennessee State Department of Education, Division of Instruction, "National Defense Education Act 1958 Title III Procedures for Processing Applications" (Nashville: State Department of Education). (Letter.)

area. However, Item VI required the application to state that a copy was placed on file in the superintendent's office.⁷

Included with the revised project application form were guidelines for making and completing the project application and examples of materials and equipment eligible to be purchased. The guidelines offered suggestions on the following topics for the completion of NDEA Title III science project applications: (1) determining local goals, (2) making formal application, (3) purchasing approved materials and equipment, (4) filing a claim for reimbursement, and (5) completing the project during the fiscal year.⁸

The amendment to the guidelines dated June 9, 1964, enumerated materials and equipment heretofore classified as ineligible. These include test grading equipment, special typewriters, lamp bulbs, electronic digital computing equipment, specialized equipment for audio-visual libraries, storage equipment, books and other printed and published materials, and general reference material.⁹

The event that made this amendment possible was the amending by the Congress of the United States of the National Defense Education Act,

⁷ Tennessee State Department of Education, National Defense Education Act 1958 Title III Revised Application Form (Nashville: State Department of Education, 1964).

⁸ Tennessee State Department of Education, Guidelines for Local School Systems Participating in Title III of the National Defense Education Act (Nashville: State Department of Education, 1963), pp. 1-3.

⁹ Tennessee State Department of Education, Amendments to NDEA Title III Regulations (Nashville: State Department of Education, 1964), pp. 1-9.

Title III, as part of the Vocational Educational Act of 1963. The amendment and resulting revised federal regulations made possible the approval of some categories of equipment and materials not previously considered approvable.¹⁰

In addition to the state guidelines, the Purchase Guide for Programs in Science, Mathematics, and Modern Foreign Languages was prepared by the Council of Chief State School Officers with the assistance of Educational Facilities Laboratories, Incorporated. The guide was a service document to assist in the wise and economical purchase of materials, apparatus, and equipment for improving instruction in the sciences, mathematics, and modern foreign languages in elementary and secondary schools. In the guide were purchase order numbers for items of material and equipment. These items were broken down into three categories: basic, standard, and advanced. Tennessee adopted this guide as a resource for common reference pertaining to items of material and equipment as well as the purchase numbers assigned to the various items of material and equipment.¹¹

The items of material and equipment listed on the project application cannot be purchased until after the approval has been given by the Commissioner of Education. A claim for reimbursement is made to the Commissioner of Education after the ordered material and equipment has been delivered. The form for reimbursement has not changed from the

¹⁰

Ibid., p. 1.

¹¹ Council of Chief State School Officers, Purchase Guide for Programs in Science, Mathematics, and Modern Foreign Languages (New York: Ginn and Company, 1959), pp. iii-28.

original issued in 1959. This form is included in the appendix with the project application form as Appendix D.

The completion and submission of a science project application involves many of the school system's personnel. Instructions for the initiation of a Title III science project application are given in the guidelines from the State Department of Education. These instructions include the establishment of a science teaching staff committee to appraise the total science program in order to determine the materials and equipment needed.¹² There was a wide variance of initiations of project applications. Only fourteen local school systems used a science teacher committee for this initiation. The majority of the systems used administrative personnel. Of these personnel, the supervisor of instruction most frequently prepared the list, with the superintendent of schools next in frequency. Even the principal of the school was used more than the science teachers. One school system used the supervisor of attendance and another the coordinator of materials. Figure 1 gives the number of school systems utilizing various categories of personnel.

After initiation of the project application, the next step was the determination of the material and equipment to be used. As in initiating the project applications, the personnel responsible for this determination were, in the main, administrative people. In the largest number of school systems, however, the science teachers were involved in making the selection.

¹² Tennessee State Department of Education, Guidelines for Local School Systems Participating in Title III of the National Defense Education Act, Revised November 1963 (Nashville: State Department of Education), p. 1.

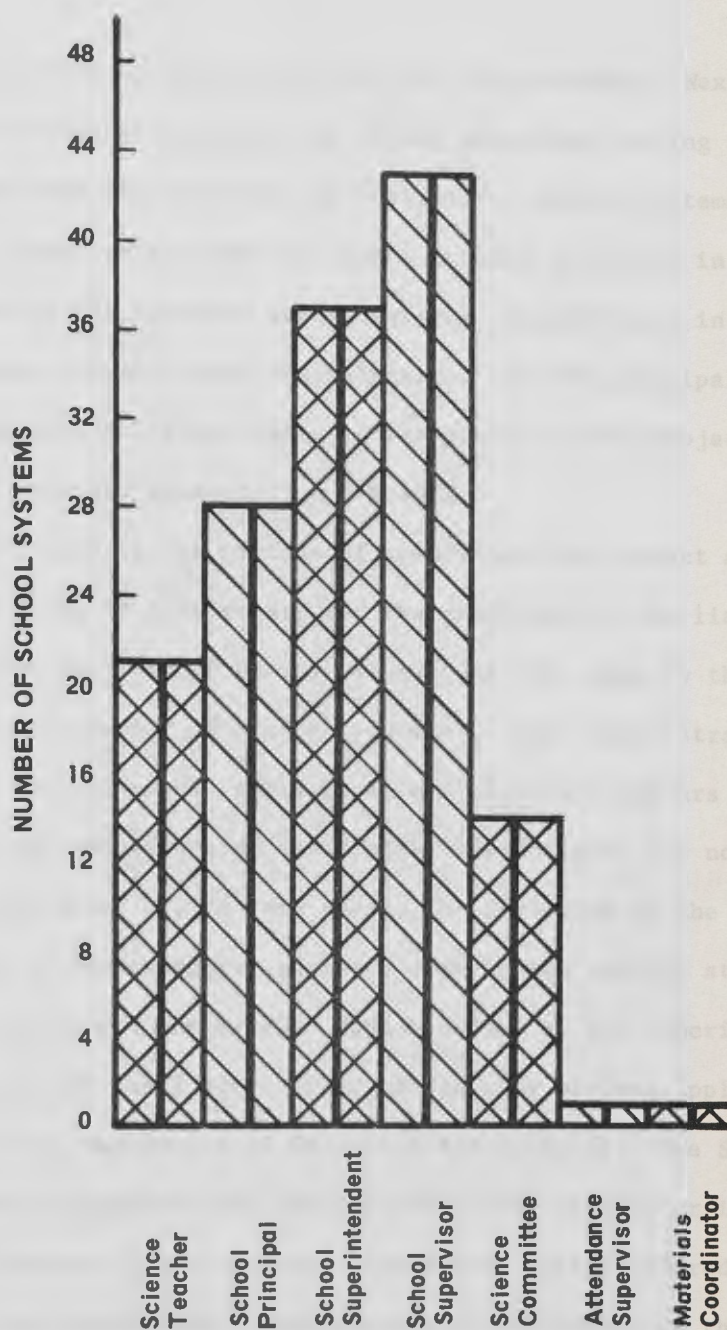


FIGURE 1

PERSONNEL INITIATING SCIENCE PROJECT APPLICATIONS
IN LOCAL SCHOOL SYSTEMS

A total of sixty-three school systems used this pattern. Next in number were the fifty-one systems with the school supervisor making the selections. The principal made the selection in forty-three school systems, the superintendent in twenty-eight systems, and a science committee in eleven systems.

Visits to the selected school systems revealed that in many instances the teacher actually made the selection, but the principal and superintendent approved the item before it was placed on the project application. These data are presented in Figure 2.

Another step in the process of completing the project application was the actual writing of this report and the compiling of the list of items needed. In the majority of school systems this was done by the school supervisor. In a number of systems, however, other administrative personnel were engaged in this work. A breakdown of these data appears in Figure 3.

After the completion of the project application, the normal procedure was the checking or, in some cases, the reviewing of the application. This checking or reviewing was normally done by the central staff or by the superintendent and his staff. Upon approval by the superintendent and chairman of the local board of education, the project application was sent to the State Department of Education for approval. The State Department of Education approved the application either totally or in part and notified the system of this action. The school system ordered the items approved on the application. Upon receipt of an invoice on the purchased equipment and material, a reimbursement claim was forwarded to the State Department of Education for one-half the total invoice. The State Department of Education acknowledged this claim, and the State Comptroller was authorized to forward a check to the school system.

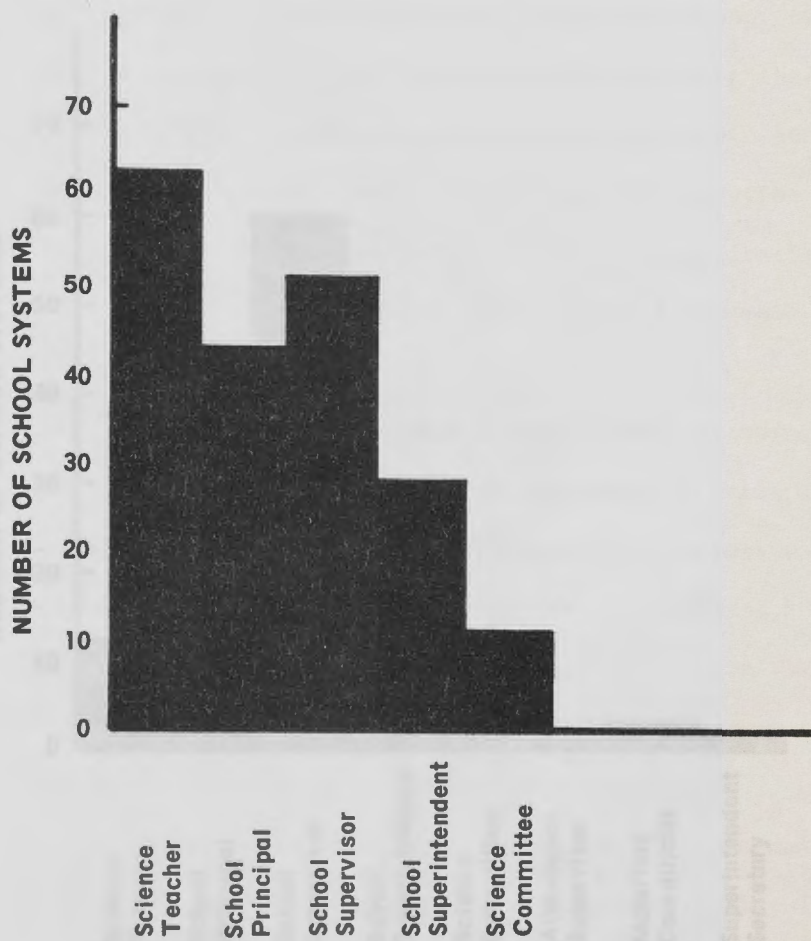


FIGURE 2

PERSONNEL SELECTING ITEMS FOR
SCIENCE PROJECT APPLICATIONS

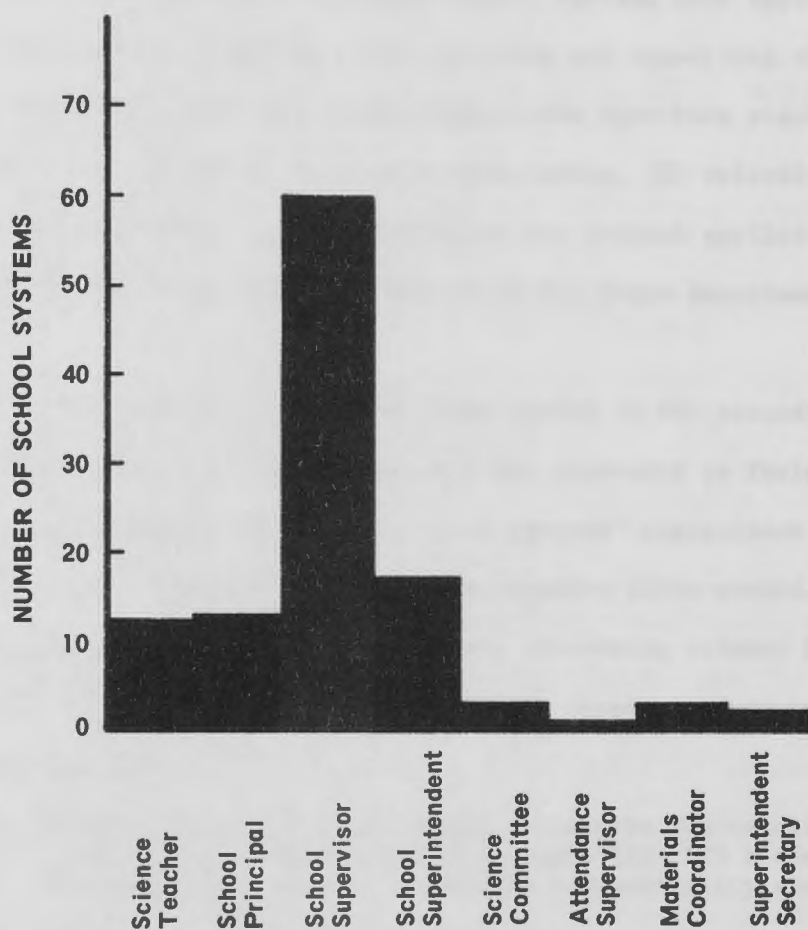


FIGURE 3

PERSONNEL COMPLETING TITLE III SCIENCE PROJECT
APPLICATIONS FOR SCHOOL SYSTEMS

The above mentioned state plan was completely satisfactory with seven local school systems. The other school systems were appreciative of the funds but had suggestions for improving and expediting the submission of project applications. These suggestions have been placed in four categories: (1) initiation of project application, (2) selection of materials and equipment, (3) compilation of the project application, and (4) submission of the project application to the State Department of Education.

Of the four categories and/or steps listed in the preceding paragraph, the practices most frequently used are presented in Table I. In addition to the data in Table I, the local systems' supervisors were requested to respond to an item on the questionnaire which stated, "List any other data or comments you wish to make concerning science NDEA Title III funds." The following is a listing of all these comments in exact wording as reported:

1. All the teachers are very eager to receive the materials and equipment that can be secured through Title III Projects, but they do not want to accept the responsibility involved.
2. Applications are too time consuming.
3. Irrelevant information and descriptions should be eliminated.
4. Form could be shortened.
5. Using materials and putting them back in place, clean, is one of the examples that we as teachers should set before students. This habit must be developed in many, many people. It seems to me that some money should be spent on a place to take care of materials not otherwise fitting into a science cabinet. I think it is a waste of money to purchase materials that cannot easily be used and replaced in each classroom. A small storage room that has everything else in it and most of the time has one lock and key is not the answer. Neither is the top of the classroom laboratory. That is what we need most in our small rural schools, and centers, I believe.

6. We are using Title III Funds as much as possible.
7. We will take all we can secure but do not like the red tape involved. I hope some changes can be made.
8. We feel that our total curriculum has been upgraded by the use of NDEA Funds. The new equipment and teaching materials have motivated both the teachers and the pupils in doing a much better job than formerly.
9. A tremendous amount of secretarial and clerical help is involved in compiling requests.
10. Why should an inventory be attached to every project since the superintendent keeps a copy in his office?
11. We feel we are extremely fortunate to have had NDEA Title III Funds for the upgrading of our science program. It is hoped that these funds will be available in the future.
12. We feel that the NDEA Title III Funds have been a great asset to our school system. They have certainly upgraded our science program.
13. It has helped to meet the general science objectives.
14. Students are getting laboratory experience which otherwise would have been impossible.
15. Add supplies and chemicals to the list of eligible materials.
16. Acquired equipment and materials have aided in the development of scientific attitudes and principles.
17. These materials have aided in an understanding of the scientific method of problem solving through laboratory exercises and demonstrations.
18. It is felt that much has been done to upgrade our science courses as a result of NDEA Funds. The continued support of this act is desired.
19. Someone should instruct the schools on the disposition of articles that are no longer useful, such as dissecting needles made of wood with a pin, and pulse glasses which developed leakage. These do not seem to be the same as maintenance problems.

The above comments have been recorded as stated by the study participants.

TABLE I

PRACTICES USED BY LOCAL SCHOOL SYSTEMS IN THE PRODUCTION
AND SUBMISSION OF TITLE III SCIENCE PROJECT APPLICATIONS

Step	Practice	Systems Reporting
Initiation of project application	Accomplished by a science committee	7
	Started with teacher conference	4
	Studied needs	19
	Made each school responsible	11
	Reviewed the curricula	2
	Allocated funds to each school	4
Selection of materials and equipment	Used state approved list	6
	Used consultant aid	5
	Studied cataloga	11
	Demonstrated new equipment	5
	Used salesmen	6
	Kept a needs record	4
	Studied inventory	4
	Selected by science teachers	49
	Secured bids on equipment	1
Compilation of project application	Completed by the superintendent	25
	Completed by the supervisor	19
	Completed by each department	4
	Completed by each school	17
	Completed by each committee	12
	Completed by the materials clerk	1
	Used clerical assistance	2
	Followed the guidelines	2
	Set the deadline	1
	Completed by one person per school	1
Submission of project application	Presented to the board of education	1
	Made application early	1
	Checked the application closely	5
	Secured the principal's approval	5

I. SUMMARY

The State Department of Education produced a form which local school systems used in the submission of NDEA Title III project applications. This form has been revised numerous times; the last revision was made in January of 1964. Matched with the last revision were guidelines for the completion of project applications. These guidelines gave examples of eligible and ineligible materials and equipment. An amendment to these guidelines was made which listed additional eligible materials and equipment. The revised form for proposed project applications is included in Appendix D.

The practices used in the initiation and submission of a project application were (1) the selection of materials and equipment items, (2) the selection of a project application committee, (3) the compilation of the project application, and (4) the submission of the project application to the State Department of Education. Also included in this chapter is the procedure used by the State Department of Education in approving a project application.

In addition to these data, the procedures used more frequently by local school systems in completing a project application are recorded. The chapter ends with comments made by local school systems supervisors about the NDEA Title III program.

CHAPTER III

NDEA TITLE III SCIENCE FUNDS EXPENDED

FOR THE PERIOD 1959 TO 1964

The proper, resourceful teaching of science is expensive, compared with other fields of education, but efforts to teach science without adequate laboratory and demonstration equipment deprive students of experiences with the very heart and soul of the scientific endeavor. In other words, to teach science without proper equipment is thought to be a questionable practice.¹

An average general science laboratory for twenty-eight students costs about eight thousand dollars, including furniture, apparatus, and instruments, a physics laboratory, about ten thousand dollars, and a chemistry laboratory, about thirteen thousand dollars.²

To provide instructional facilities for students, the Tennessee public schools have expended over the past six years \$9,923,443.36 of NDEA Title III money. Of this amount \$7,354,553.48 was spent in the area of science. More than 192 science laboratories were completely equipped, and over 540 science laboratories were partially equipped. The remainder of this money was used for science materials and equipment.

¹T. E. Carlson, Guide to National Defense Education Act of 1958, Office of Education, United States Department of Health, Education, and Welfare (Washington: Government Printing Office, 1959), p. 7.

²Ibid., p. 8.

The total expenditure by years of funds for science secured through NDEA Title III is reported in Table II.

The difference between the amount approved for the projects and the amount reimbursed to local school systems is due to one of two factors: (1) the claim for reimbursement was carried over into the next fiscal year or (2) the local school system did not complete projects initiated. The total program of NDEA Title III money approved for Tennessee is reported in Table III.

The federal appropriation was to be matched by the local school systems making project applications. Therefore, over the six-year period the State Department of Education could have approved for all projects \$16,581,002.00 instead of \$9,923,443.36, the actual amount approved for all projects. For each of the six years that NDEA Title III has been in effect, some appropriated funds have been unused, as indicated in Table IV. The funds in the column entitled "Appropriated" are to be matched at the local level dollar-for-dollar. The funds in the column entitled "Used and Matched" are approved for project applications--the local system making a project application (provided it is approved). This amount is reimbursed when the project is completed and reimbursement application is filed with the State Department of Education.

Seventy-four percent of all NDEA Title III funds were used for science during the six-year period covered by this study. The largest amount of money approved for science project applications was during the fiscal year ending in 1960; however, the largest amount of reimbursements was made during the fiscal year ending in 1961, and the largest number of project applications was submitted during the fiscal year ending in 1964.

TABLE II

SIX YEAR TOTAL EXPENDITURE OF NDEA TITLE III
FUNDS FOR SCIENCE IN TENNESSEE

Fiscal Year Ending	Number of Science Projects	Money Approved for Projects	Money Reimbursed to Local School Systems
June 1959	48	\$ 425,822.96	\$ 415,223.00
June 1960	170	1,697,236.97	848,618.00
June 1961	144	1,198,243.88	976,099.00
June 1962	143	1,250,773.62	718,909.35
June 1963	156	1,157,967.33	559,385.96
June 1964	177	1,624,509.08	619,754.92
Totals	838	\$7,354,553.84	\$4,137,990.23

TABLE III

NDEA TITLE III FUNDS APPROVED FOR TENNESSEE
SCHOOLS FOR THE PERIOD 1959-1964

Year	Federal Appropriation	Total Money for All State Approved Projects	Total Money Approved For Science Projects
1958-59	\$1,458,843.00	\$ 469,277.90	\$ 425,822.96
1959-60	1,532,640.00	2,193,832.31	1,697,236.97
1960-61	1,336,670.00	1,707,635.63	1,198,243.88
1961-62	1,328,731.00	1,638,178.22	1,250,773.62
1962-63	1,328,731.00	1,521,834.56	1,157,967.33
1963-64	<u>1,304,886.00</u>	<u>2,392,684.74</u>	<u>1,624,509.08</u>
Totals	\$8,290,501.00	\$9,923,443.36	\$7,354,553.84

TABLE IV

NDEA TITLE III APPROPRIATIONS USED AND UNUSED
FOR THE PERIOD 1959-1964

Fiscal Year Ending	Appropriated	Used and Matched	Unused
1959	\$1,458,843.00	\$ 469,277.90	\$1,224,204.55
1960	1,532,640.00	2,193,832.31	435,723.85
1961	1,336,670.00	1,707,635.63	482,852.19
1962	1,328,731.00	1,638,178.22	509,641.89
1963	1,328,731.00	1,531,834.46	567,823.72
1964	1,304,886.00	2,392,684.74	108,538.63
Totals	\$8,290,501.00	\$9,923,443.36	\$3,828,449.32

According to the annual educational statistical report of the Tennessee State Department of Education for the school year ending on June 30, 1964, there were ninety-five county school systems and thirty-seven city and special school districts, a total of 132 school systems in the state of Tennessee.³ The participation of these 132 school systems in the use of NDEA Title III science funds varied from year to year, as indicated in Table VI.

The number of school systems participating in the use of NDEA Title III science funds for the school year ending in 1959 was combined with the totals for the school year ending in 1960. The number of school

³Tennessee State Department of Education, *Annual Statistical Report* (Nashville: State Department of Education, 1964), pp. 26-31.

Of the eighty-two local systems answering the questionnaire, only five had not participated in the NDEA Title III science program. One system made twelve project applications during one year, while others varied from one to ten project applications during this six-year period. The number of project applications of these eighty-two systems is reported by year in Table V.

Of the eighty-two school systems reporting, the largest number of science project applications for NDEA Title III science funds was 104 in the year 1964. The smallest number of science project applications for NDEA Title III science funds was ninety-two in the year 1962. These years do not correspond with the largest and smallest amount of expenditures per year as reported in Table IV. These years were 1960 and 1963, respectively.

According to the annual educational statistical report of the Tennessee State Department of Education for the scholastic year ending on June 30, 1964, there were ninety-five county school systems and fifty-seven city and special school districts, a total of 152 school systems in the state of Tennessee.³ The participation of these 152 school systems in the use of NDEA Title III science funds varied from year to year, as indicated in Table VI.

The number of school systems participating in the use of NDEA Title III science funds for the school year ending in 1959 was combined with the totals for the school year ending in 1960. The number of school

³Tennessee State Department of Education, Annual Statistical Report (Nashville: State Department of Education, 1964), pp. 26-31.

TABLE V

THE NUMBER OF TITLE III SCIENCE PROJECT APPLICATIONS
REPORTED BY EIGHTY-TWO SCHOOL SYSTEMS FOR THE
PERIOD 1959-1964

Number of Systems	Number of Science Projects					
	1959	1960	1961	1962	1963	1964
82	--	99	96	92	103	104

TABLE VI

NDEA TITLE III SCIENCE PARTICIPATION OF ALL TENNESSEE
SCHOOL SYSTEMS BY YEARS FOR THE PERIOD 1959 TO 1964

Fiscal Year Ending	County School Systems	City School Systems	Total School Systems	Number of Science Applications
1959	(combined with 1960)			48
1960	27	20	47	170
1961	24	20	44	144
1962	46	28	74	143
1963	60	29	89	156
1964	85	29	114	177
Average Per Year	48.4	24.0	73.6	167.6

systems participating each succeeding year has increased. For the first two years the percentage of the city school systems participating in the NDEA Title III funds was greater than that of the county school systems. The two types of systems were about equal in percentage participation in the school year ending in 1962, but after this date the percentage participation of the county school systems was greater than that of the city school systems.

The total expenditure per student of NDEA Title III science funds was calculated on the yearly enrollment of all Tennessee secondary school students as reported in Table VII.

The total number of all secondary school students enrolled in Tennessee during the period of this study was 1,017,515. The amount of NDEA Title III science money approved for expenditure was \$7,354,553.84, yielding an average of \$7.23 per pupil enrolled in the secondary grades during the period 1959 to 1964. The percentage of expenditures of NDEA Title III monies was 74.1 percent in science, 9.9 percent in mathematics, and 16.0 percent in modern foreign languages. These percentages were computed from the sum of all Title III project applications at the close of the fiscal year 1964.

I. SUMMARY

The foregoing chapter has presented a summary of the NDEA Title III funds expended in Tennessee for the period 1959 to 1964. This expenditure summary includes (1) yearly expenditure of these funds, (2) federal appropriations for Tennessee, (3) number of project applications by year and the amount of funds approved for these project applications, (4) number

TABLE VII

YEARLY ENROLLMENT OF ALL TENNESSEE SECONDARY
SCHOOLS FOR THE SCHOOL YEARS ENDING IN
1959 TO 1964

Grade	Enrollment for the Year Ending in					
	1959	1960	1961	1962	1963	1964
9	57,164	54,274	61,851	69,179	69,287	69,574
10	50,450	48,259	47,118	54,491	61,953	61,840
11	41,100	43,199	41,791	40,823	47,824	55,147
12	<u>33,449</u>	<u>36,006</u>	<u>38,463</u>	<u>36,825</u>	<u>35,996</u>	<u>43,105</u>
Total	182,163	181,738	189,223	201,818	215,060	229,676

of systems making project applications, (5) expenditure per student enrolled in secondary schools in the state, (6) expenditure percentages of Title III funds for science, mathematics, and modern foreign languages, and (7) yearly enrollment of secondary school students in the state from 1959 to 1964.

The purpose of this chapter is to present (1) the materials and equipment purchased on a matching basis, dollar-for-dollar, with NEHA Title III science funds, (2) the materials and equipment acquired through the war surplus channels, and (3) the materials and equipment requested by supervisors of local school systems to be placed on the Title III purchase list.

In relation to Item one above, one of the larger categories of equipment purchased with NEHA Title III science money was that of science laboratories. The data presented by the eighty-two local school systems reporting included 192 science laboratories completely equipped and 340 science laboratories partially equipped. Of the science laboratories completely equipped, eighty-eight were in old school buildings, and 104 were in new school buildings. The type and number of science laboratories completely equipped are presented in Table VIII.

The preceding table presents the number of science laboratories in two groups: (1) science laboratories completely equipped in new and old school buildings, and (2) science laboratories completely equipped for each year from 1959 to 1964. In old school buildings more science laboratories were completely equipped during the school year ending in 1960, and fewer science laboratories were completely equipped during the school year ending in 1959.

CHAPTER IV

TYPES AND UTILIZATION OF ACQUIRED SCIENCE MATERIAL AND EQUIPMENT DURING THE PERIOD 1959-1964

The purpose of this chapter is to present (1) the materials and equipment purchased on a matching basis, dollar-for-dollar, with NDEA Title III science funds, (2) the materials and equipment acquired through the war surplus channels, and (3) the materials and equipment requested by supervisors of local school systems to be placed on the Title III purchase list.

In relation to item one above, one of the larger categories of equipment purchased with NDEA Title III science money was that of science laboratories. The data presented by the eighty-two local school systems reporting included 192 science laboratories completely equipped and 540 science laboratories partially equipped. Of the science laboratories completely equipped, eighty-eight were in old school buildings, and 104 were in new school buildings. The type and number of science laboratories completely equipped are presented in Table VIII.

The preceding table presents the number of science laboratories in two groups: (1) science laboratories completely equipped in new and old school buildings, and (2) science laboratories completely equipped for each year from 1959 to 1964. In old school buildings more science laboratories were completely equipped during the school year ending in 1960, and fewer science laboratories were completely equipped during the school year ending in 1959.

TABLE VIII

LABORATORIES COMPLETELY EQUIPPED FROM NDEA TITLE III
SCIENCE FUNDS FOR THE PERIOD 1959-1964

Year	In Old Buildings							In New Buildings							Combined Total
	59	60	61	62	63	64	Total	59	60	61	62	63	64	Total	
<u>Type of Laboratory</u>															
Biology	2	5	1	3	4	3	18		2	3	7	5	2	19	37
Chemistry	4	3	2	2	3	2	16		4	3	4	9	2	22	38
General Science	1	4	1	1	5	3	15	2	2		9	14	6	33	48
Physics	2	1	1		2		6	3	1	3	4	1		12	18
Combination Science Laboratories	4	7	9	1		1	22		1					1	23
Biology and Chemistry	2					2	4			1			1	2	6
Physics and Chemistry			1	1		1	3	5	1				1	7	10
General Science and Physics		1					1						1	1	2
General Science and Biology				3			3	4			1			5	8
General Science and Chemistry											1			1	1
Physics and Biology											1			1	1
Totals	15	21	15	11	14	12	88	10	15	10	27	29	13	104	192

More combination science laboratories than any other type were completely equipped, and fewer general science and physics laboratories were completely equipped for use in old school buildings. For use in new school buildings, more general science laboratories were completely equipped for the period 1959 to 1964 than any other type of laboratory. Additional combination laboratories were reported completely equipped and included in the above table.

When the numbers of science laboratories are added for each corresponding year in new and old school buildings, more science laboratories were completely equipped during the school year ending in 1963, and fewer science laboratories were completely equipped during the school year ending in 1959.

NDEA Title III funds were used in partially equipping 540 science laboratories during the period 1959 to 1964. Of this number, 477 science laboratories were partially equipped in old school buildings, and sixty-three science laboratories were partially equipped in new school buildings. In old school buildings more science laboratories were partially equipped during the school year ending in 1959, and fewer science laboratories were partially equipped during the school year ending in 1964. In new school buildings more science laboratories were partially equipped during the school year ending in 1963, and fewer science laboratories were partially equipped in the years 1959, 1960, and 1962, than in the years 1961, 1963, and 1964. The following table (Table IX) presents additional details on partially equipped science laboratories.

The laboratories partially equipped were largely found in old buildings. More partially equipped laboratories in both old and new school

TABLE IX

SCIENCE LABORATORIES PARTIALLY EQUIPPED FROM NDEA
TITLE III SCIENCE FUNDS FOR THE PERIOD 1959-1964

Year	In Old Buildings							In New Buildings							Combined Total
	59	60	61	62	63	64	Total	59	60	61	62	63	64	Total	
<u>Type of Laboratory</u>															
Biology	28	27	20	22	16	14	127	2	1	6	1	6		16	143
Chemistry	26	20	23	16	14	11	110	2	1	3	1	3		10	120
General Science	30	26	28	27	15	13	139	2	3	2	5	6	1	19	158
Physics	11	16	13	11	13	5	69	1	2	3		3	4	13	82
Combination Science Laboratories	4	4	5	8	2	3	26					2	2	4	30
Biology and Chemistry	2						2								2
Physics and Chemistry				1			1						1	1	2
Physical Science				1	1	1	3								3
Totals	101	93	89	86	61	47	477	7	7	14	7	20	8	63	540

buildings were for general science than for any other one type laboratory. Combination science laboratories partially equipped were fewer in both new and old buildings. Figure 4 on page 41 also shows the number of completely equipped and partially equipped science laboratories of the combined type in both new and old school buildings.

Another facet of this study was the reporting by supervisors of local school systems science courses receiving the greatest and least expenditures from Title III science funds. This information combined with the laboratory information presented a more precise understanding of the science facilities purchased with Title III science funds. The reporting supervisors were requested to give first, second, and third ratings of science courses with the greatest expenditures from NDEA Title III funds. Table X gives these ratings.

The science courses with the greatest expenditures were ranked by the supervisors of the local school systems in this order: chemistry first, biology second, and general science third. Those science courses ranked by the supervisors as second in expenditures were biology first, chemistry second, and physics third. Those science courses ranking third in expenditures were general science first, and biology, chemistry, and physics second in a three-way tie. From the ratings by the supervisors, more Title III science funds were used in biology and chemistry than in general science and physics.

In contrast with the above science courses, those science courses with least expenditures were rated by the same persons (supervisors of local school systems). These ratings are listed in Table XI.

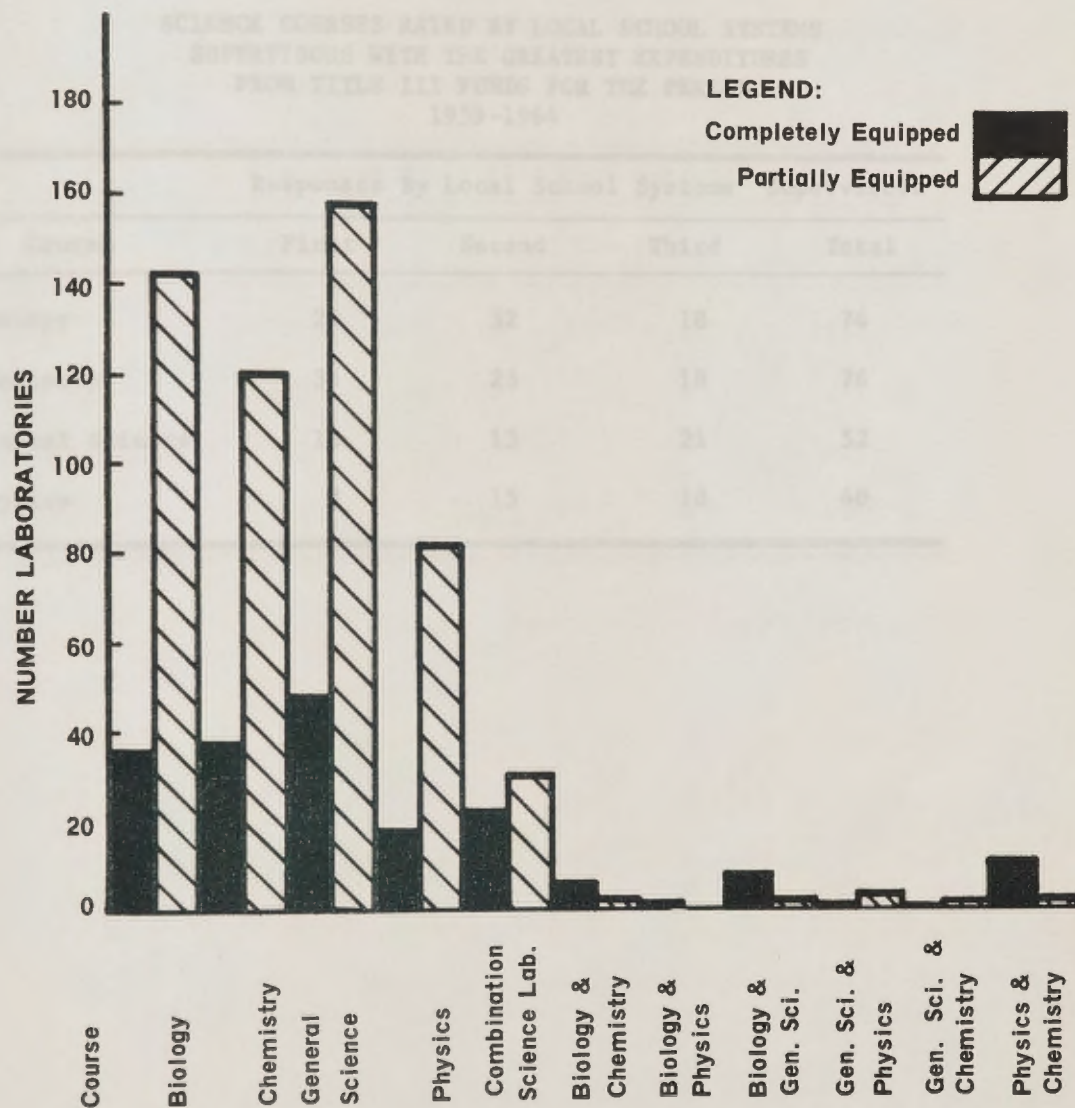


FIGURE 4

NUMBER OF SCIENCE LABORATORIES EQUIPPED WITH NDEA TITLE III
FUNDS FOR THE PERIOD 1959-1964

TABLE X

SCIENCE COURSES RATED BY LOCAL SCHOOL SYSTEMS
SUPERVISORS WITH THE GREATEST EXPENDITURES
FROM TITLE III FUNDS FOR THE PERIOD
1959-1964

Course	Responses By Local School Systems Supervisors			
	First	Second	Third	Total
Biology	24	32	18	74
Chemistry	35	23	18	76
General Science	18	13	21	52
Physics	7	15	18	40

TABLE XI

SCIENCE COURSES RATED BY LOCAL SCHOOL SYSTEMS
SUPERVISORS WITH THE LEAST EXPENDITURES FROM
TITLE III FUNDS FOR THE PERIOD 1959-1964

Course	Responses By Local School Systems Supervisors			
	First	Second	Third	Total
Biology	4	10	13	27
Chemistry	10	10	8	28
General Science	25	8	9	42
Physics	25	12	8	45

The science courses rated by supervisors with the least expenditures were in this order: In first place, physics and general science tied with the largest number of responses; chemistry was second; and biology was third in largest number of responses.

The secondary school science staffs reporting in this study were asked to rate the science courses with the greatest and least improvement as a result of using NDEA Title III science funds. The results are presented in Table XII and Table XIII.

The asterisk indicates the science course which was improved most in each rating. In comparison with Table X, the courses rated first and second are the same, except in reverse order.

The science staffs also rated science courses as to those with least improvement from the utilization of NDEA Title III science funds. These data are presented in Table XIII. From these data general science was the least improved by expenditures from NDEA Title III science funds.

The data on science courses with the greatest expenditures (Table X) list the courses in this order: chemistry, biology, general science, and physics. The data concerning science courses with least expenditures (Table XI) list the courses in this order: general science, physics, biology, and chemistry. The combined data on science courses with the greatest and least expenditures and the combined data of science courses with greatest and least improvements are presented in Table XIV.

The above tables and discussion relate mainly to equipment. Examples of this equipment include student study desks, teacher's work desks, incubators, motors, overhead projectors, solar cells, storage cabinets, centrifuges, and steam generators. Records of material purchased include charts,

TABLE XII

SCIENCE COURSES RATED BY SCIENCE STAFFS AS GREATEST
IMPROVED BY THE USE OF TITLE III FUNDS FOR THE
PERIOD 1959-1964

Responses Of Secondary Science Staffs				
Course	First	Second	Third	Total
Biology	15*	6	11*	32*
Chemistry	7	17*	8	32
General Science	2	5	3	10
Physics	10	8	9	27

TABLE XIII

SCIENCE COURSES RATED BY SCIENCE STAFFS AS LEAST
IMPROVED BY THE USE OF TITLE III FUNDS FOR THE
PERIOD 1959-1964

Responses Of Secondary Science Staffs				
Course	First	Second	Third	Total
Biology	1	3	3	7
Chemistry	3	1	1	5
General Science	12	1	1	14
Physics	2			2

TABLE XIV

SCIENCE COURSES RATED BY REPORTING PARTICIPANTS
WITH GREATEST AND LEAST EXPENDITURES AND
GREATEST AND LEAST IMPROVEMENTS FROM THE
UTILIZATION OF TITLE III FUNDS

Expenditure and Improvement	<u>Ratings</u>			
	First	Second	Third	Fourth
Greatest Expenditure	Chemistry	Biology	General Science	Physics
Greatest Improvement	Biology	Chemistry	Physics	General Science
Least Expenditure	Physics	General Science	Chemistry	Biology
Least Improvement	General Science	Biology	Chemistry	Physics

slides, films, film strips, special reference books, and transparencies. The ratio of monies expended for equipment and materials is approximately seven to three.

Another category eligible for NDEA Title III funds is minor remodeling of existing buildings. The guidelines for participation in Title III define minor remodeling as ". . . those minor alterations in a previously completed building in space used or to be used as a laboratory or classroom for science instruction, which are necessary to make effective use of equipment used in providing education in science. The term may also include utility lines within the existing building."¹ The nature of the work to be done, rather than the relative cost, was the determining factor for minor remodeling. A load-bearing wall was considered a major repair item. The following table (Table XV) provides the data on minor remodeling and the construction of new walls.

The minor remodeling provision in the NDEA Title III policy permits the conversion of a classroom into a science laboratory or science classroom. As Table XV indicates, twenty-two classrooms were remodeled for science instruction purposes.

The acquisition of material and equipment for science instruction was not limited to NDEA Title III. War surplus property was another source of acquisition of science teaching aids. Examples of the surplus property acquired are test tubes, batteries, refrigerators, chart paper, colored pencils, folders, motors, binoculars, wire cable, projectors, Geiger

¹Tennessee State Department of Education, Guidelines for Local School Systems Participating in Title III of the National Defense Education Act (Nashville: State Department of Education, November 1963), p. 20.

TABLE XV

MINOR REMODELING AND CONSTRUCTION OF
NEW WALLS FOR SCIENCE CLASSROOMS

Course	School Year Ending In						Total Classrooms
	59	60	61	62	63	64	
Biology		1	3			1	5
Chemistry		1		3			4
General Science		1				1	2
Physics	1					1	2
Combination Science Labora- tory and Class- room	4	1					5
General Science and Biology				3			3
General Science and Chemistry	—	—	—	1	—	—	1
Totals	5	4	3	7	0	3	22

counters, telescopes, and radios. The above items were reported by the supervisors of thirty-eight local school systems.

Many items not eligible to be purchased by Title III science funds were needed in science instruction as evidenced by the requests for these items. Table XVI presents these data. The largest number of requests in materials and equipment was for chemicals, glass tubing, consumable supplies, and spare parts.

Accounting for all this material and equipment purchased by Title III funds was a concern of the State Department of Education. To aid with this concern, the original project application for NDEA Title III funds required the submission of a list of all science materials and equipment on hand. This requirement has been revised to read "a statement saying that the science inventory is on file in the superintendent's office." Of the eighty-two local systems reporting, sixty-two had established an inventory system for science materials and equipment. The personnel responsible for the maintenance of this science inventory varied from system to system. Those commonly responsible for the science inventory were teachers, principals, and supervisors. The graph on page 52 (Figure 5) gives the number of personnel utilized for inventory maintenance by the sixty-two local school systems reporting this service.

In the utilization of the purchased NDEA Title III science material and equipment many maintenance problems have arisen. Many of these are reported here by the supervisory personnel of the local school systems involved in this study.

The largest number of responses, as indicated by the following table (Table XVII), is twenty-six for the item "Repairs." This is the

TABLE XVI

MATERIALS AND EQUIPMENT REQUESTED TO BE MADE
ELIGIBLE FOR PURCHASE BY NDEA TITLE III
SCIENCE FUNDS

Materials and Equipment	Requests
Chemicals	14
Glass tubing	11
Consumable supplies	10
Spare parts	8
Refrigerators	3
Biological specimens	2
Films	1
Laboratory tables	1
Tape recorder	1
Slide rules	1
Storage batteries	1
Tripods	1
Mercury	1
Safety equipment	1
Reference books	1
Audio equipment	1
Filing cabinets	1
Typewriters	1

IN SCHOOL SYSTEMS FOR THE PERIOD 1979-1984

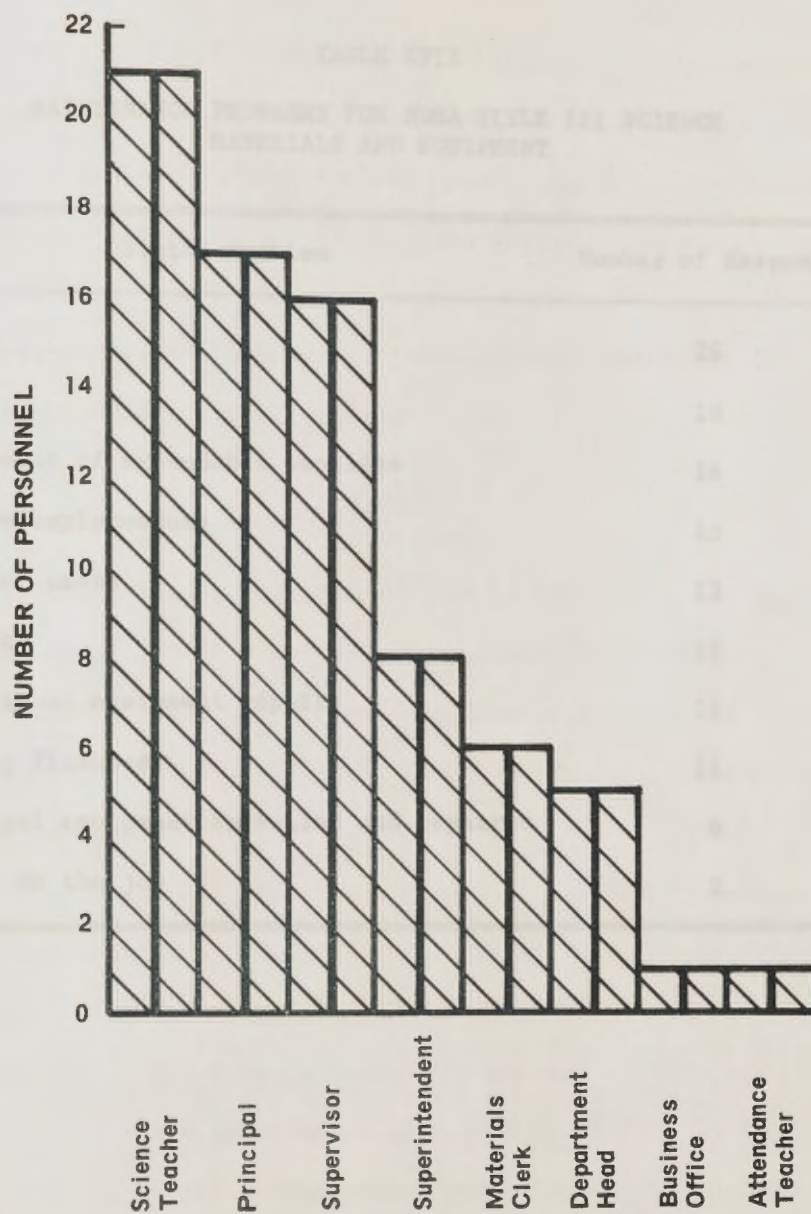


FIGURE 5

PERSONNEL RESPONSIBLE FOR SCIENCE INVENTORY MAINTENANCE
IN SCHOOL SYSTEMS FOR THE PERIOD 1959-1964

TABLE XVII

MAINTENANCE PROBLEMS FOR NDEA TITLE III SCIENCE
MATERIALS AND EQUIPMENT

Stated Problem	Number of Responses
Repairs	26
Storage	18
Replacement of expendable supplies	16
Breakage replacements	15
Untrained users	13
Plumbing	12
Audio-visual equipment repairs	11
Securing finances	11
Electrical equipment installed and repaired	6
Time to do the job	2

first item listed in Table XVII; however, there are other item statements that could be listed in the repair category, such as breakage, replacement of expendable supplies, audio-visual equipment repairs, and electrical repairs. Storage was a maintenance problem for eighteen school systems.

From the above responses more than 25 percent of the local school systems reporting had maintenance problems with the materials and equipment acquired by NDEA Title III science funds.

I. SUMMARY

The material and equipment purchased by NDEA Title III funds have completely equipped 192 science laboratories and have partially equipped 540 science laboratories. Of the science courses taught, the largest number of those partially equipped in both new and old school buildings was for general science.

The science courses reportedly showing the greatest improvement as a result of expenditure of NDEA funds were chemistry and biology. The science courses reportedly showing the least improvement as a result of expending NDEA Title III science funds were general science and physics.

The materials and equipment needed most which were ineligible for purchase by NDEA Title III science funds were chemicals, glassware, glass tubing, consumable supplies, and spare parts.

Thirty-eight local school systems reported science equipment and material received from the war surplus stocks. To account for the science material and equipment, sixty-two local school systems have established an inventory maintenance system.

NDEA Title III science maintenance of materials and equipment was considered a problem in more than 25 percent of the local school systems reporting in this study. The maintenance problems according to the responses concerned repairs, storage, replacements, finances, plumbing, and untrained users of materials and equipment.

The period 1959 to 1964 covers the first six years that Tennessee schools utilized money from the NDEA Title III Act. In order to determine the changes that have taken place in schools participating in NDEA Title III science funds, a random sample was drawn from the entire number of school systems in the state operating secondary schools. This sample represented approximately 25 percent of the school systems with secondary schools. Of these systems, only those schools involving grades nine through twelve were used for the collection of statistical data. These data involved a four-way check to insure maximum validity of the report.

These checks were (1) a questionnaire sent to all school systems operating secondary schools, (2) a check sheet sent to the science staffs of selected high schools, (3) a personal visit to the supervisors of the selected school systems, and (4) study of the preliminary reports of selected school systems on file with the State Department of Education.

CHAPTER V

SCIENCE CURRICULUM AND INSTRUCTIONAL CHANGES

DURING THE PERIOD 1959 TO 1964

Chapter V is a comparison of selected secondary school science programs for the years ending 1959 and 1964. The school year 1959-60 was the first year that local school systems could obtain financial aid from the NDEA Title III Act. At the beginning of this study the last recorded educational statistical data for a completed school year included the school year ending in 1964.

The period 1959 to 1964 covers the first six years that Tennessee schools utilized monies from the NDEA Title III Act. In order to determine the changes that have taken place in schools participating in NDEA Title III science funds, a random sample was drawn from the entire number of school systems in the state operating secondary schools. This sample represented approximately 20 percent of the school systems with secondary schools. Of these systems, only those schools involving grades nine through twelve were used for the collection of statistical data. These data involved a four-way check to insure maximum validity of the report. These checks were (1) a questionnaire sent to all school systems operating secondary schools, (2) a check sheet sent to the science staffs of selected high schools, (3) a personal visit to the supervisors of the selected school systems, and (4) study of the preliminary reports of selected school systems on file with the State Department of Education.

The recorded statistical data of the selected school systems give a dual picture of the individual school (1) one before the use of NDEA Title III funds and (2) one after six years use of these funds. These data are presented in Appendix C. Table XVIII on page 58 presents a summary of these data.

At the end of the school year 1959 the science courses offered by the thirty-two secondary schools selected for this study were biology, chemistry, physics, and general science. Not all courses, however, were offered by all the schools. The enrollment of students in the above four science courses from the largest number to the smallest number was general science, biology, chemistry, and physics. Those courses added since the school year ending in 1959 included advanced biology, advanced chemistry, advanced physics, biological sciences curriculum study, earth science, physical science, and survey science.

The greatest percentage increase reported in enrollment from the school year ending in 1959 to the school year ending in 1964 in courses offered by the summary of schools studied was in physics; this was a 73.5 percent increase over the school year ending in 1959. Next in line in enrollment increase was chemistry with 54.9 percent. These percentages are considerably above the total student enrollment increase of 31.0 percent for the six years.

The student enrollment increase by percentage rank of the science courses was as follows: physics first, chemistry second, biology third, and general science fourth. The increase in the number of sections of each course and in the number of teachers of each course was commensurable with the enrollment.

TABLE XVIII

STATISTICAL SUMMARY OF SECONDARY SCHOOL SCIENCE COURSES
IN FIFTEEN SELECTED SCHOOL SYSTEMS FOR THE SCHOOL
YEARS ENDING IN 1959 AND 1964

SUBJECT	SCHOOL SYSTEMS	HIGH SCHOOL		BIOLOGY		CHEMISTRY		PHYSICS		GENERAL SCIENCE		NUMBER OF STUDENTS	
		1959	1964	1959	1964	1959	1964	1959	1964	1959	1964	1959	1964
Number of Systems	15												
Number of Schools		32											
Total Student Enrollment		15,759	20,635	3123	4224	1238	1918	351	609	3525	4744	8237	11,495
Percentage Increase		31.0		35.3		54.9		73.5		34.6		38.3	
Percent of Enrollment				19.8	20.5	7.9	9.3	2.2	3.0	22.4	23.0	52.3	55.7
Percentage Increase				.7		1.4		.8		.6		3.4	
Number of Class Sections				102	153	49	71	18	29	110	163		
Number of Teachers				37	43	25	31	15	22	37	55		

Appendix C, using the same headings and comparisons as Table XVIII on page 58, presents the data of the individual schools. As a parallel to Table XVIII a comparison of the school years ending in 1959 and 1964 is presented in narrative form.

In the school year ending in 1959 twenty-two of the thirty-two schools had over 50 percent of their student enrollment taking science courses. The lowest and the highest percentages of student enrollment in science recorded in this study were 24.7 percent and 83.7 percent, respectively. Comparing the school year ending in 1964 with that ending in 1959, only five of the schools had below 50 percent of their student enrollment enrolled in science during the school year ending in 1964. The lowest and highest percentages of students enrolled in science recorded by the thirty-two schools involved in this study were 37.8 percent and 85.7 percent, respectively. Three of the schools listed did not exist in 1959; therefore, the data for these were so noted in the table.

The percentage of change listed under "Subject" in the table was recorded under the year 1964 of each course to give the percentage change of enrollment of each course offered in the school.

Another facet of the data collected was the change in the level of educational training of the teachers during this six-year study from 1959 to 1964. The comparison is presented in Table XIX.

The lowest number of years of college training was two years. The teacher listed in the "None" column for the school year ending in 1959 had two years of college training.

TABLE XIX

DEGREE STATUS OF SCIENCE TEACHERS IN THE SECONDARY
SCHOOLS STUDIED FOR THE SCHOOL YEARS ENDING IN
1959 AND 1964

Degree of Teachers in 1959				Total Teachers	Degree of Teachers in 1964				Total Teachers
None	BA	MS	MS+45		None	BA	MS	MS+45	
BS					BS				
1	93	12	0	106	0	129	26	1	156

The greatest changes as indicated by this table are the growth toward advanced degrees. During this six-year period fifteen teachers received advanced degrees, and forty-four teachers attended a National Science Foundation Institute. Of this number, twenty-six attended three times, three attended four times, and one teacher attended an academic year institute sponsored by the National Science Foundation.

Changes made in the science curriculum included the addition of science courses, but no report was given of any course being deleted. The courses added to the curriculum were of four instructional categories: (1) courses added to give depth to the science curriculum, (2) courses added for gifted students, (3) courses added for average students, and (4) courses added for slow students. The number and type of courses are presented in Table XX.

The data presented in Table XX were obtained from the questionnaires of the eighty-two local school systems and from the science staffs of selected secondary schools. The science courses receiving the largest number of responses added for depth in the science curriculum ranked in this order: physics, earth science, chemistry, advanced biology, and physical science. Additional courses were listed in this instructional category with one and two systems utilizing each course.

The first five courses receiving the largest number of responses added to the science curriculum for gifted students ranked in this order: physics, advanced biology, chemistry, physical science, and biology. Six other courses were used in this instructional category with one and two systems utilizing each.

TABLE XX

SCIENCE COURSES ADDED TO THE CURRICULUM
FOR THE PERIOD 1959 TO 1964

Course	For Depth	For Gifted	For Average	For Slow	Total Added Courses
Biology	2	3	1	1	7
Chemistry	6	6	2	0	14
General Science	2	2	2	2	8
Physics	13	11	5	0	29
Earth Science	9	1	6	1	17
Industrial Chemistry	1			1	2
Physical Science	3	4	4	4	15
Advanced High School Science		2			2
Applied Science	1			1	2
Advanced Biology	5	7			12
Advanced Chemistry	2	2			4
Advanced Physics	2	2			4
Physiology	1				1
Space Science	1				1
Science Seminar		1			1
Aerospace Science			1		1
Survey Science				1	1

The first three courses receiving the largest number of responses, added for the average student, ranked in this order: earth science, physics, and physical science. Four additional courses were utilized by one or two systems. The slow student was not left out, but fewer courses were added for his benefit. Physical science received the largest number of responses, and general science was next with two systems. A total of five other courses were added in this category. The science courses added in the combined categories and receiving the largest number of responses ranked in this order for the first five courses: physics, earth science, physical science, chemistry, and advanced biology.

In school systems where courses were not added, additional sections of presently taught courses were added. The sections added were (1) seven sections of biology, (2) five sections of chemistry, (3) two sections of general science, (4) seven sections of physical science, (5) six sections of physics, and (6) one section each of advanced chemistry and advanced physics. Three sections of chemistry and four sections of general science were deleted.

The reasons for changes in the number of class sections were requested by the local school systems supervisors. Their responses were tabulated as to enrollment increase or decrease and as to student interest increase or decrease. The results are recorded in Table XXI.

Increased student enrollment and student interest were the main reasons for a change in the number of class sections as indicated by Table XXI. It should be noted, however, that a decrease in student enrollment was reported in twelve instances and that a decrease in student interest was reported once.

TABLE XXI

REASONS FOR CHANGES IN SCIENCE CLASS SECTIONS
AS REPORTED BY LOCAL SCHOOL SYSTEM
SUPERVISORS

Course	Number of Responses		Number of Responses	
	Student Enrollment Increased	Student Enrollment Decreased	Student Interest Increased	Student Interest Decreased
Biology	48	3	40	
Chemistry	42	2	42	
Earth Science	3	1	4	
General Science	44	3	7	1
Physical Science	12		9	
Physics	35	3	35	
Space Science	2		2	

Another change in courses that affected the science curriculum was the change of course offerings from one designated grade level to another. The science course with the largest number of grade level changes was biology. In the main, biology was changed from grade ten to grade nine, and chemistry was changed from grades eleven and twelve to grades ten and eleven. The complete data are presented in Table XXII.

The revision of the science curriculum was another type of change. This report involved the original date of the school's written science curriculum and the latest revision as shown in Table XXIII.

The data shown in Table XXIII were obtained from selected secondary schools. The science staff of each of five secondary schools did not know the date of the last curriculum revision. Twenty-four of the school staffs had revised their science curriculum within the past five years. Six schools had revised their program within the past two years. Seven school staffs had not revised their curriculum since the beginning of NDEA Title III Act.

Thirty-four school systems indicated the use of local resources as an enrichment and a motivating factor. Along with this, science clubs were established. The number and type are listed in Table XXIV.

Other instructional areas have benefited from the science materials and equipment received through Title III funds. The local school systems supervisors gave the data presented in Figure 6 on page 69.

The increase of teacher training reported in this chapter along with the materials and equipment acquired by the funds provided by NDEA Title III produced the following evaluation of questions asked science staffs through the medium of a questionnaire. Science staffs were asked

TABLE XXII

GRADE LEVEL CHANGES IN SCIENCE COURSES
AS REPORTED BY LOCAL SCHOOL SYSTEM
SUPERVISORS

Courses	From Grade				To Grade				
	Nine	Ten	Eleven	Twelve	Eight	Nine	Ten	Eleven	Twelve
Biology	5	19	1			6	18	1	
Chemistry			2	4			2	4	
		1						1	
			1						1
General Science	2				2				
Physics		1		1				2	
			1						1

TABLE XXIII

SCIENCE CURRICULA ORIGINAL AND REVISION
 DATES OF THE THIRTY-TWO SELECTED
 HIGH SCHOOLS

School	Original Date	Last Revision Date
1	1959	
2	1963	1964
3	1961	
4	1949	1962
5	1963	
6	1960	
7	1960	
8	1965	
9	1952	
10	1959	
11	1961	
12	1960	
13	1964	
14	1954	
15	1945	
16	1958	
17	1960	
18	1960	
19	1962	
20	1955	1964
21	1955	1964
22	1959	
23	1960	
24	1961	
25	1962	
26	1964	
27	1952	1965
28	1949	1962
29	1960	
30	1960	
31	1964	
32	1958	

TABLE XXIV
SECONDARY SCHOOL SCIENCE CLUBS
ESTABLISHED DURING THE PERIOD
1959 TO 1964

Club	Number Established
Medical Careers Club	3
Science Club	7
Biology Club	3
Future Scientists of America	8
Chemistry Club	2
TJAS Club	1
JETS	1
Physics Club	2

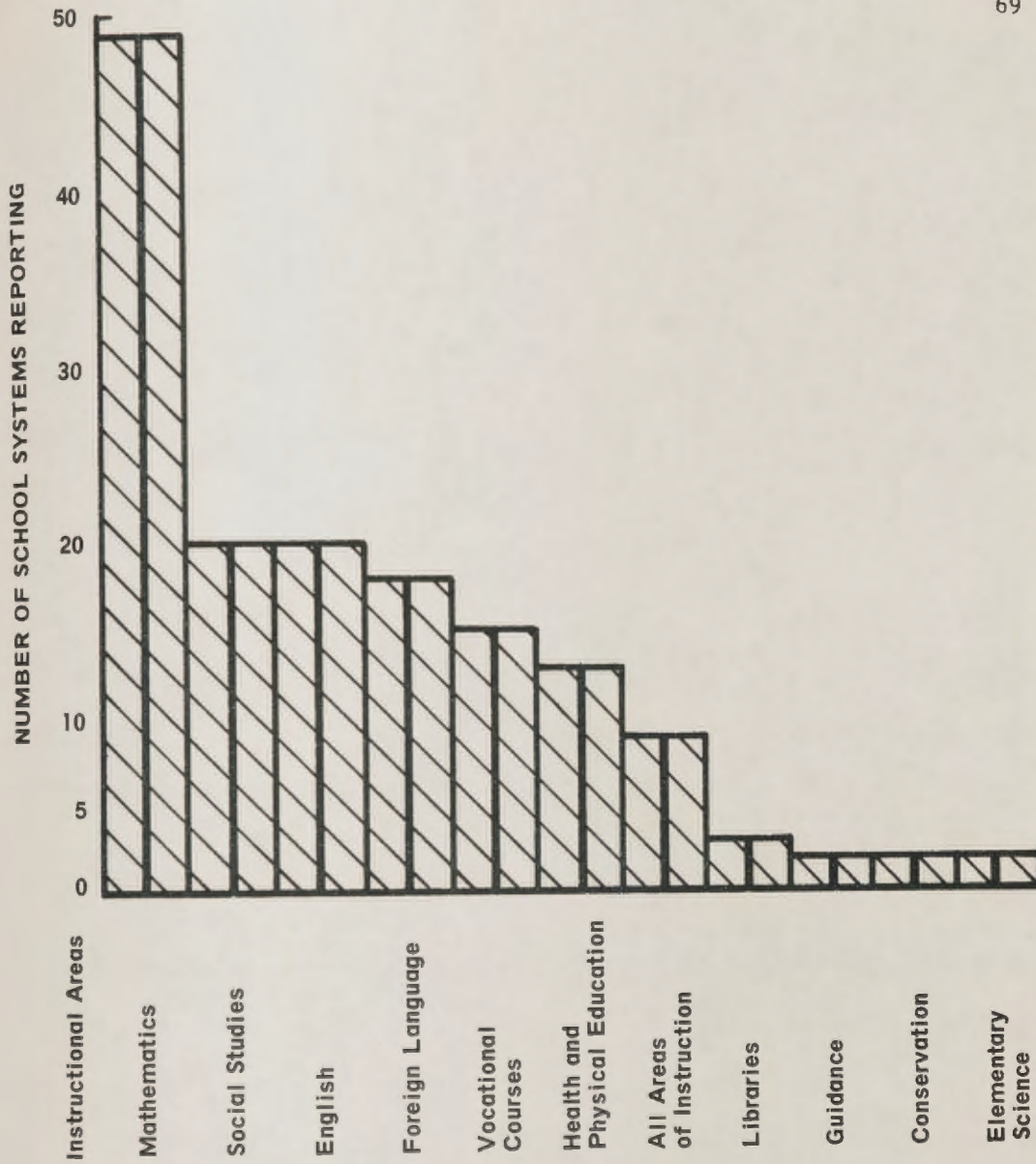


FIGURE 6

OTHER INSTRUCTIONAL AREAS BENEFITING FROM NDEA TITLE III
SCIENCE FUNDS AS REPORTED BY LOCAL SCHOOL SYSTEMS'
SUPERVISORS

to check on a questionnaire the ways in which the use of science NDEA Title III materials and equipment were helpful in their teaching. The ways and results are presented in Table XXV.

Of the ways teachers were helped by Title III science materials and equipment, Items Two, Three, and Eight received the most responses. Item Nine was next with only one less response, and Item Six had only two less responses than Items Two, Three, and Eight. Item Five was least important to the teachers of the items listed in Table XXV; however, twenty-three responses out of thirty-two indicated that it was important.

To parallel the responses in Table XXV, the science staffs were asked a similar group of questions concerning student changes because of the utilization of science NDEA Title III materials and equipment. The responses to these questions are presented in Table XXVI. In the list of student changes, Items One and Four had thirty-two responses; Item Three had thirty-one responses; and Item Seven had twenty-eight responses. The item receiving the least number of responses was Item Six. All the items in Table XXVI, with the exception of Item Six, received over 50 percent response from the school staffs studied.

As a parallel to the above data the supervisory personnel of the local school systems were asked to list improvements noted in both teachers and students as a result of Title III science funds. The areas of teacher improvement as noted by the supervisors are presented in Table XXVII.

Many items in Table XXV reported by science staffs and items in Table XXVII reported by local school systems' supervisors coincide. Although the wording of these items is different, the meaning is the same.

TABLE XXV

WAYS SCIENCE STAFFS REPORTED TITLE III SCIENCE
MATERIALS AND EQUIPMENT HELPED IN THEIR
TEACHING

Ways Helped	Number of Staffs
1. Aided in lesson preparation	24
2. Helped in the presentation of lessons	32
3. Improved science demonstrations	32
4. Provided more opportunity for laboratory exercises	25
5. Provided opportunity for extended experimentation beyond the regular laboratory period	23
6. Created a better classroom atmosphere	30
7. Aided in increasing the content of the course	29
8. Provided more materials and equipment for individual pupil activity	32
9. Made science courses easier to teach	31
10. Made the science courses more attractive	27

TABLE XXVI

STUDENT CHANGES AS A RESULT OF NDEA TITLE III
SCIENCE MATERIALS AND EQUIPMENT

Student Changes	School Staffs Responses
1. Increased interest	32
2. Extended scientific evaluation	23
3. Extended student knowledge	31
4. Increased laboratory participation	32
5. Increased understanding of the natural laws	22
6. Improved conservation practices	11
7. Changed scientific attitudes	28
8. Increased understanding of the economic value of our natural resources	17
9. Increased understanding of scientific occupations	25
10. Increased understanding of science in our daily lives	24
11. Increased pupil scores on standardized tests	17
12. Easier mastery of scientific concepts	26

TABLE XXVII

TEACHER IMPROVEMENTS RESULTING FROM THE UTILIZATION
OF NDEA TITLE III SCIENCE MATERIALS AND EQUIPMENT

Teacher Improvement	Number of Responses
1. Gave better instruction	39
2. Showed greater interest	30
3. Improved demonstrations	21
4. Used more materials and equipment	20
5. Desired more professional training	17
6. Used more audio-visual materials	16
7. Was better prepared to teach	13
8. Presented a wider range of subject matter	12
9. Improved teacher morale	6
10. Used the laboratory more	6
11. Attended summer institutes	6
12. Shifted from textbook to the laboratory	4
13. Established science fairs	3
14. Increased initiative	2
15. Took advanced science courses in college	1
16. Established a professional library	1

Of the eight items receiving the most responses in Table XXVII, six cover the improvement of instruction.

Supervisors of local school systems noted student improvements. These improvements are presented in Table XXVIII. The first four items in Table XXVIII had more responses than the other items. Item One, "Greater Interest," had forty-seven responses, which is eighteen more than the next highest response item. The greater interest factor is in harmony with the interest data presented in Table XXI on page 64.

I. SUMMARY

There was a 38.3 percent student enrollment increase in science in the fifteen school systems selected for this study. The science course with the greatest student enrollment increase was 73.5 percent in physics, and the least student enrollment increase was 34.6 percent in general science. The overall student enrollment increase in science was 7.3 percent greater than the percentage of enrollment increase.

The science courses offered during the school year 1958-1959 by the fifteen local school systems participating in this study were biology, chemistry, physics, and general science. The science courses added to the curriculum during this period of study were advanced biology, advanced chemistry, advanced physics, biological science curriculum study, physical science, and survey science. The number of teachers (involved in the instruction of these courses) holding master's degrees has more than doubled during this six-year period of study, including forty-four who attended a National Science Foundation Institute and one teacher who attended an

TABLE XXVIII

STUDENT IMPROVEMENTS RESULTING FROM THE UTILIZATION
OF NDEA TITLE III SCIENCE MATERIALS AND EQUIPMENT

Student Improvement	Number of Responses
1. Increased interest	47
2. Scored higher on achievement tests	29
3. Increased individual participation	23
4. Used better laboratory techniques	19
5. Worked independently	9
6. Accepted greater challenges	9
7. Increased experimentation	8
8. Increased class participation	5
9. Increased enthusiasm	2

academic year institute in science. The total science staff increased 47.0 percent during this study.

Additional science courses added to the curriculum were reported by the eighty-two local school systems participating in this study. These science courses are reported in Table XX on page 62. Another indication of attention being given to the gifted student was the change in grade level of biology from grade ten to grade nine in eighteen schools. Chemistry was also changed in grade level from grades eleven and twelve to grades ten and eleven. These chemistry changes took place in seven schools.

The science staff in twenty-four schools had revised their science curricula during the period 1959-1964, and science clubs were established in twenty-seven schools.

Although Title III science funds were expended for science courses, all other instructional areas benefited from these funds as indicated by Figure 6 on page 69.

Instructional improvements reported are presented in Table XXV on page 71 and Table XXVII on page 73. Additional evidence of instructional improvement is reported as student changes in Table XXVI on page 72 and Table XXVIII on page 75.

CHAPTER VI

SUMMARY

The purpose of this study was to identify changes in secondary school science programs in Tennessee which were found to accompany the utilization of NDEA Title III funds. These changes included (1) practices and procedures of the State Department of Education and local school systems in processing project applications, (2) the amount of NDEA Title III science funds expended in Tennessee, (3) the type and quantity of laboratories equipped, (4) the curricula and instructional changes, and (5) the extent and nature of materials and equipment acquired.

The major steps in the procedures followed in developing this study were as follows:

1. A random sampling of public school systems was made to include 20 percent of the systems with secondary schools.
2. The NDEA Title III science project applications of the selected school systems were reviewed and analyzed in the Nashville Office of the State Department of Education. The pertinent data from these project applications were recorded.
3. Two questionnaires were constructed to obtain certain additional information (a) from all school systems with secondary schools and (b) from the secondary science staffs of the school systems selected by the random sampling.
4. The data from replies to the questionnaires were analyzed to determine the influence of NDEA Title III science funds. The pertinent data were recorded.
5. A personal interview was held with the supervisor of each selected school system to ascertain additional information and to verify the questionnaire submitted by the science staffs of that system.

A summary of the chapters in this study is presented in four sections.

I. REQUIREMENTS AND PRACTICES IN THE SUBMISSION
OF NDEA TITLE III SCIENCE PROJECT APPLICATIONS

The requirements in the submission of NDEA Title III science project applications are incorporated in a five-page application form prepared by the State Department of Education. Instructions for filling out the application form are presented in a pamphlet entitled "Guidelines for Local School Systems' Participation in Title III of the National Defense Education Act." Both the application form and the guidelines have been revised a number of times. The local school systems followed various procedures in developing the project application. The procedure used most frequently involved four steps: (1) the initiation of a project application, (2) the selection of materials and equipment needed, (3) the compilation of the project application, and (4) the submission of the science project application to the State Department of Education.

Of the four steps listed in the preceding paragraph concerning the submission of Title III science project applications by the local school systems, the supervisors reported the following practices most frequently used at the local level:

1. Initiation of science project application
 - a. The science staff studied their curricula needs.
 - b. Each school accepted the responsibility of initiating a project application.
 - c. A science committee initiated the project application.
2. Selection of materials and equipment
 - a. The science teachers selected the items of materials or equipment needed for their departments.

is
b
32
b.3

- b. Catalogs of the various manufacturing companies were used in the selection of materials and equipment.
- c. The state approved list was used as a guide in the selection of materials and equipment.
- 3. Ways utilized in compiling the project application
 - a. The superintendent of schools completed the application form.
 - b. The supervisor of schools completed the application form.
 - c. Each school completed the application form.
- 4. Procedures for submitting project applications
 - a. The project applications were checked closely before being used.
 - b. The administration approved the project application before being submitted to the State Department of Education
 - c. The project application was begun early in the school year.

The following steps were used in processing the science project application by the State Department of Education:

- 1. The applications were checked by the central staff for completeness; incomplete applications were returned to the superintendent indicating deficiencies.
- 2. Complete applications were reviewed by a small special committee of the staff; visits were made to the systems submitting project proposals by members of the staff.
- 3. Applications were reviewed by an advisory panel of three to six people; panel members were selected from the ranks of school administrators, classroom teachers, and specialists.
- 4. A small staff committee reviewed scored applications and made recommendations.
- 5. Rejected applications were referred to a small committee (Item number two above).
- 6. A visit was made to a system having an approvable application by a staff member to ascertain conditions.
- 7. The coordinator of instruction reviewed the application and the recommendations of the staff committee and made final recommendations to the Commissioner of Education.

8. The Commissioner gave notification of approval or rejection to the superintendent of schools.

II. NATIONAL DEFENSE EDUCATION ACT TITLE III

SCIENCE FUNDS EXPENDED IN TENNESSEE

The total amount of NDEA Title III science funds expended in Tennessee during the period 1959 to 1964 was \$7,354,553.48, or \$7.23 for each secondary school student enrolled during this six-year period of study. This involved an average of 73.6 local school systems making an average of 167.6 science project applications per year for this six-year period. The science expenditures of Title III monies was 74.1 percent of all Title III monies expended in Tennessee during this six-year period. The two other instructional areas approved to receive Title III funds were mathematics and modern foreign languages. The Title III funds expended for mathematics was 9.9 percent, and the Title III funds expended for modern foreign languages was 16.0 percent. The federal appropriations for all Title III projects in Tennessee was 1.3 to 1.5 million dollars per year of this study. The total appropriations were \$8,290,501.00. Each year some of the appropriated funds were unused, and these funds were carried over into the next fiscal year. Of the eighty-two local school systems reporting, sixty-two school systems had budgeted funds for Title III over and above the normal budget.

III. TYPES AND UTILIZATION OF SCIENCE MATERIALS

AND EQUIPMENT ACQUIRED

The Title III science funds were expended for science materials, equipment, and minor remodeling. One of the larger categories of equipment

purchased was that of science laboratories. There were 192 science laboratories completely equipped and 540 science laboratories partially equipped as reported by eighty-two local school systems. Of the science laboratories completely equipped, eighty-eight were in old buildings and 104 were in new buildings. There were 477 partially equipped science laboratories in old school buildings and sixty-three science laboratories partially equipped in new school buildings.

Included in the report of the supervisors and science staffs were requests that additional science materials be made eligible for purchase under the Title III Act. The four items receiving the greatest number of requests were chemicals, glass tubing, consumable supplies, and spare parts.

Of the eighty-two local school systems responding to the questionnaire, sixty-two had established a system of inventory maintenance. The personnel most often used in this capacity were science teachers, school principals, and supervisors of instruction. The maintenance problems mentioned most often concerned repairs, storage, replacement parts, finances, plumbing, and untrained personnel. Also included in the report by the local supervisors and the science staffs were the science courses showing the greatest improvement resulting from Title III expenditures. These courses in order of improvement were biology, chemistry, physics, and general science; the courses in order of expenditures from Title III funds were chemistry, biology, general science, and physics.

IV. CHANGES IN SCIENCE CURRICULA AND SCIENCE INSTRUCTION

Science curricula changes during the six-year period were reported as follows: (1) Students enrolled in science courses increased 38.3 percent

in the fifteen selected school systems; (2) the number of science sections increased during this six-year period by 137 in the fifteen selected school systems; (3) the eighty-two local school systems responding to the questionnaire reported the addition of 121 science courses for the period 1959 to 1964; (4) biology was changed from grade ten to grade nine in eighteen school systems; (5) the science course of study was revised or completed in twenty-four local school systems; (6) laboratory participation increased in thirty-two school systems; and (7) science clubs were established in twenty-seven local school systems.

The instructional changes made during the past six years as reported in this study were (1) An increase of thirty-seven science teachers was reported in the fifteen selected school systems; (2) A science faculty increase of 47 percent was reported in the eighty-two responding school systems; (3) There was an increase of thirty-six bachelor of science degrees and fourteen master of science degrees reported in the fifteen selected school systems; (4) An increase of student interest was reported in 134 instances by the eighty-two responding school systems; and (5) Instruction for the gifted, average, and slow student was reported in approximately 50 percent of the eighty-two reporting school systems.

The science faculties of the fifteen local school systems selected for this study reported ways of instructional improvement through the utilization of Title III science funds.

NDEA Title III science funds have in the opinions of the science teachers:

1. Helped in lesson presentation.
2. Improved science demonstrations.

3. Provided more materials and equipment for individual pupil activity.
4. Made science courses easier to teach.
5. Created a better classroom atmosphere.
6. Aided in increasing the content of the science courses.
7. Provided more opportunity for laboratory exercises.
8. Aided in lesson preparation.

The supervisory personnel of the eighty-two local school systems made a parallel study of instructional improvements by teachers. Their reports of teacher instructional improvement included the following ways as a result of Title III science funds:

NDEA Title III science funds have in the opinions of the responding supervisors:

1. Improved teacher instruction.
2. Created greater teacher interest in science.
3. Improved teacher demonstrations.
4. Made use of more materials and equipment.
5. Created a desire for more training.
6. Made possible greater use of audio-visual materials.
7. Aided teachers in lesson preparation.

The secondary science staffs of the selected school systems reported student changes resulting from the utilization of materials and equipment provided by NDEA Title III funds. NDEA Title III science funds have in the opinions of secondary science staffs:

1. Increased interest.
2. Extended scientific evaluation.
3. Extended student knowledge.

4. Increased laboratory participation.
5. Increased understanding of the natural laws.
6. Improved conservation practices.
7. Changed scientific attitude.
8. Increased understanding of the economic value of our natural resources.
9. Increased understanding of scientific occupations.
10. Increased understanding of science in our daily lives.
11. Increased pupil scores on standardized tests.
12. Increased mastery of scientific concepts.

The supervisory personnel of the eighty-two local school systems made a parallel study of science student changes. This parallel study was to report student improvements resulting from the utilization of materials and equipment purchased by NDEA Title III funds. NDEA Title III science funds have in the opinions of the responding supervisors:

1. Increased interest.
2. Scored higher on achievement tests.
3. Increased individual participation.
4. Used better laboratory techniques.
5. Worked independently.
6. Accepted greater challenges.
7. Increased experimentation.
8. Increased class participation.
9. Increased enthusiasm.

The impact of NDEA Title III funds on secondary school science in Tennessee is indicated by these findings in the science program: (1) additional completion and partial completion of science laboratories and an

increase in student laboratory participation, (2) additional instructional aids for teachers, (3) an increase of pupil interest, (4) an increase of teacher interest, (5) higher student scores on standardized tests, (6) elevation of grade level for some science courses, (7) an increase in the number of science sections and science course offerings, (8) an increase in the number of science clubs, and (9) a general enlargement of the scope of secondary school science.

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Name of the supervisor preparing this report _____
 Job assignment _____

Science NMA Title III School System Questionnaire

1. Indicate the number of science laboratories totally equipped with science furniture in your school system with NMA Title III funds. Please answer in the chart below.

Type of Laboratory	Number in old buildings							Number in new buildings						
	'39	'40	'41	'42	'43	'44		'39	'40	'41	'42	'43	'44	
Example - Physics		1				1		1						
Biology														
Chemistry														
General science														
Physics														
Exhibitions (page)														
Other														

APPENDIX A

12. Indicate the number of science laboratories partially equipped with science furniture in your school system with NMA Title III funds. Please answer in the chart below.

Type of Laboratory	Number in old building							Number in new building						
Years	'39	'40	'41	'42	'43	'44		'39	'40	'41	'42	'43	'44	
Example - Physics				1							2			
Biology														
Chemistry														
General science														
Physics														
Exhibitions (page)														
Other														

13. List the science courses that have been added to the curriculum

For depth in the science curriculum _____

For gifted students _____

For average students _____

System _____ Name of the supervisor preparing this report _____
 Job assignment _____

Science NDEA Title III School System Questionnaire

- I. Indicate the number of science laboratories totally equipped with science furniture in your school system with NDEA Title III funds. Please answer in the chart below.

Type of laboratory	Number in old buildings							Number in new buildings						
	Years	'59	'60	'61	'62	'63	'64	'59	'60	'61	'62	'63	'64	
Example - Physics		1				1				1				
Biology														
Chemistry														
General science														
Physics														
Combinations (name)														
Others														

- II. Indicate the number of science laboratories partially equipped with science furniture in your school system with NDEA Title III funds. Please answer in the chart below.

Type of laboratory	Number in old building						Number in new building					
Years	'59	'60	'61	'62	'63	'64	'59	'60	'61	'62	'63	'64
Example - Physics			1								2	
Biology												
Chemistry												
General science												
Physics												
Combinations (name)												
Others												

- III. List the science courses that have been added to the curriculum

For depth in the science curriculum _____,

For gifted students _____,

For average students _____,

For slow students _____, _____, _____

IV. What science courses have been deleted from the curriculum?

_____, _____, _____

V. Indicate the reasons for any change in the number of science class sections in the chart below.

Course	Enrollment		Interest		List other reasons
	increased	decreased	increased	decreased	
Biology					
Chemistry					
Earth science					
General science					
Physical science					
Physics					
Space science					
Others					

VI. Indicate the courses that have changed grade level in the chart below.

Courses	From grade				To grade			
	9	10	11	12	9	10	11	12
Example - Biology		X			X			
Biology								
Chemistry								
Earth science								
General science								
Physical science								
Space science								
Others								

VII. List in order the three science courses that have received the greatest amount of NDEA III expenditures.

First _____ Second _____ Third _____

- VIII. List in order the three science courses that have received the least amount of NDEA Title III expenditures.

First _____ Second _____ Third _____

- IX. Indicate the number of laboratories in your school system remodeled by the construction of new walls or removal of old walls utilizing NDEA III funds.

Type of laboratory	Construction of new walls						Construction of old walls					
Years	'59	'60	'61	'62	'63	'64	'59	'60	'61	'62	'63	'64
Example - Physics			1									
Biology											1	
Chemistry												
Earth science												
General science												
Physics												
Combinations (name)												

- X. Were additional funds provided for science NDEA Title III materials and equipment over and above the normal budget for these items?

Yes _____ No _____

- XI. What other teaching areas have benefited from the use of science NDEA Title III funds?

- XII. What are some of the improvements noted that can be attributed to the utilization of science NDEA Title III funds?

Teacher improvements

Student improvements

- XIII. Indicate the number of times your school system has made science NDEA Title III project applications by years since 1958.

Year	Number of applications made
1959	
1960	
1961	
1962	
1963	
1964	

XIV. Who initiates the science NDEA Title III project applications in your system?

Teacher____ Principal____ Supervisor____ Superintendent____

Science committee____ (Please identify by title)

XV. Who determines what materials and equipment are to be placed on the science NDEA Title III project application?

Teacher____ Principal____ Supervisor____ Superintendent____

Science committee____ (Please identify by title)

XVI. Who compiles the science NDEA Title III project applications in your system?

Teacher____ Principal____ Supervisor____ Superintendent____

Science committee____ (Please identify by title)

XVII. Has your school system used war surplus materials for science?

Yes____ No____ (If yes, give examples)

XVIII. What ways could be used to expedite the processing of science NDEA Title III project applications by the State Department of Education?

A.

B.

C.

XIX. List the procedures you have found best in the submission of science NDEA Title III project applications.

A. The best procedures for the selection of materials and equipment are:

1.

2.

3.

4.

XX. Has your school system developed a science inventory system?

Yes _____ No _____

XXI. If your answer to Item XX is yes, who is responsible for the maintenance of this inventory?

Give title _____

XXII. List three of your school system's greatest science maintenance and repair problems in order of their severity.

First _____

Second _____

Third _____

XXIII. List any other data or comments you wish to make concerning science NDEA Title III funds.

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System _____

Name of the teachers preparing this
report _____

School _____

Course taught _____

CHECK SHEET FOR SECONDARY SCHOOL SCIENCE STAFF

Teacher Information

- I. Check all of the following ways in which the use of science NDEA Title III materials and equipment were important in your teaching:

- ☐ Aided in lesson preparation
- ☐ Helped in the presentation of lessons
- ☐ Improved science demonstrations
- ☐ Provided more opportunities for laboratory exercises
- ☐ Provided opportunity for extended experimentation beyond the regular laboratory period
- ☐ Created a better classroom atmosphere
- ☐ Aided in increasing the content of the course
- ☐ Provided more materials and equipment for individual pupil activity
- ☐ Made the science courses easier to teach
- ☐ Made the science courses more attractive
- ☐ Any others (please list)

- II. List three of the above ways which were of the greatest aid to you as a teacher. Please list in order.

First _____

Second _____

Third _____

- III. List the way in Part I which was of the least aid to you as a teacher.

- IV. How many teachers in your school are assigned to the science department?
_____ in number

- V. How many of the science teachers have attended National Science Foundation institutes since 1959? Answer below.

- ☐ Attended NSF institutes
- ☐ Attended one time
- ☐ Attended two times
- ☐ Attended three times
- ☐ Attended four times
- ☐ Attended an academic year

- VI. How many of the science teachers received an advanced degree since 1959? Answer below.

_____ Received an advanced degree since 1959.

- VII. What items of equipment or materials not included by the NDEA Title III program would be most beneficial to you in the development of science concepts? If any, please list below.

Student Information

- VIII. Check all of the following that were noted in student reactions due to the usage of NDEA Title III materials and equipment.

☐ Increase in interest
☐ Increased scientific evaluation
☐ Extended student knowledge
☐ Increased laboratory participation
☐ Expanded understanding of natural laws
☐ Improved conservation practices
☐ Aided the development of scientific attitudes
☐ Increased understanding of the economic value of our natural resources
☐ Increased the understanding of scientific occupations
☐ Increased understanding of science in our daily lives
☐ Increase in pupil scores on standardized tests
☐ Improved the mastery of scientific concepts
☐ Any others not listed. (Please list below)

- IX. Which three of the above ways were of the greatest benefit to the students? Please list in order.

First _____

Second _____

Third _____

- X. Which one of the ways in Part VIII was of the least benefit to the students? Please list below.

General Information

- XI. Which science courses were improved the most by using NDEA Title III materials and equipment? Please list in order of improvement.

First _____

Second _____

Third _____

- XII. Which science courses were not improved, or improved very little by NDEA Title III funds? Please list three in order not improved.

First _____

Second _____

Third _____

- XIII. List the science courses that have been added to the curriculum

For depth in the science curriculum _____ , _____

For gifted students _____ , _____ , _____

For average students _____ , _____ , _____

For slow students _____ , _____ , _____

- XIV. Which science courses have been changed in grade level? Please answer in the chart below.

Course	From grade	To grade
Example - Biology	10	9
Biology		
Chemistry		
Earth science		
General science		
Physical science		
Physics		
Space science		
Others		

- XV. What additional sections in science courses were added or deleted as a result of using NDEA Title III materials and equipment? Please answer in the chart below.

Course	Number of sections added	Number of sections deleted
Biology		
Chemistry		
Earth science		
General science		
Physical science		
Physics		
Space science		
Others		

XVI. When was your science course of study revised?

19____ Original date if known (Year)

19____ Last revision date (Year)

XVII. What science clubs have been formed since 1959?

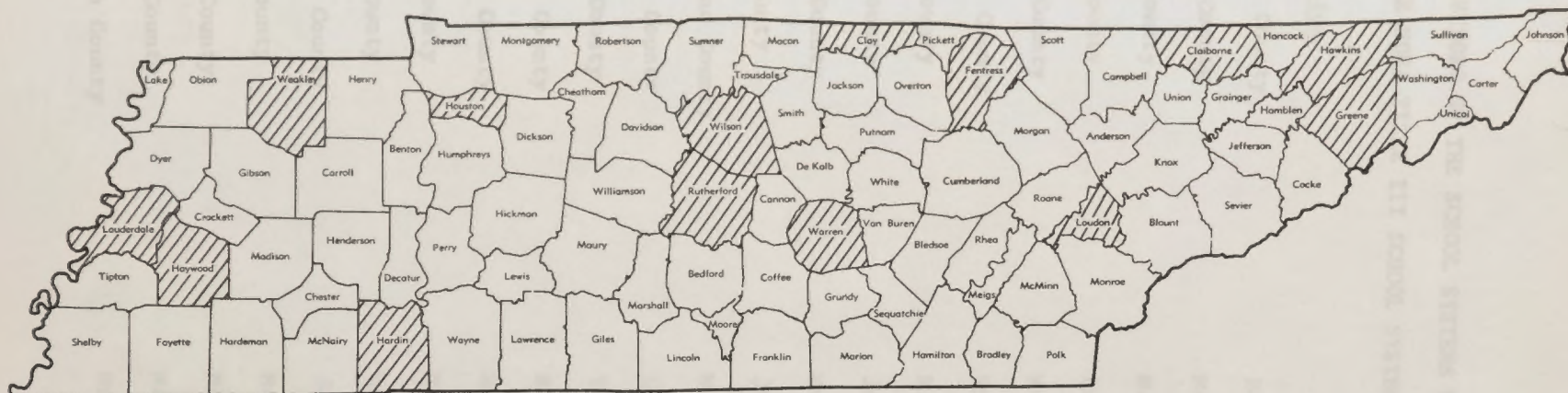
_____, _____
_____, _____

XVIII. Do you use local resources when available and appropriate?

Yes____ No____

XIX. Does your school have an inventory system of science equipment and materials?

Yes____ No____



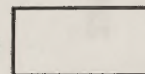
TENNESSEE COUNTIES INCLUDED IN THIS STUDY

LEGEND:

NO



YES



SUPERVISORS OF THE SCHOOL SYSTEMS LISTED TO BE SENT
THE NDEA TITLE III SCHOOL SYSTEM QUESTIONNAIRE

<u>System</u>	<u>Supervisor</u>
Anderson County	Paul Bostic
Bedford County	Miss Nellie Dye
Benton County	Mrs. Wyly Lockhart
Blount County	Fred Morton
Bradley County	Mrs. Grace Carroll
Campbell County	William Robinson
Cannon County	R. M. Hitt
Carter County	John N. Forbes
Chester County	Mrs. Nona P. Little
Cocke County	James H. Gaddis
Cumberland County	Mrs. Norene Padgett
Davidson County	Combined with Nashville
Dickson County	Tom T. Sugg
Franklin County	Mrs. Fayna Kennedy
Grainger County	Miss Della Cabbage
Greene County	Mrs. Rose Morton
Grundy County	Mrs. Lou Hill Foster
Hardeman County	James S. Smith
Hardin County	Mrs. Winnie D. Range
Hawkins County	Miss Annis Cope
Haywood County	Mrs. Harriett Smith
Henderson County	Mrs. Eva Derryberry

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SystemSupervisor

Houston County	Miss Verdie L. Robertson
Jackson County	Mrs. Rose Nell Anderson
Jefferson County	Mrs. Cora Lee Newman
Johnson County	Mrs. Elizabeth Dyer
Knox County	Beecher Clapp
Lake County	James W. Wilson
Lauderdale County	John Paul Burns
Lawrence County	Miss Myra Baxter
Lewis County	Carl Tatum
Lincoln County	Miss Marion McAfee
McMinn County	James R. Lemon
Macon County	Mrs. Mildred Dycus
Madison County	Miss Maggie Nell Brewer
Marshall County	William F. Shelton
Monroe County	Miss Ota Lou Sloan
Morgan County	Mrs. Virginia England
Obion County	Milton Hamilton
Overton County	Lilburn Lee Davis
Perry County	Wilson Sharp
Polk County	Mrs. Margaret Smiley
Putnam County	Miss Mary Barbour
Rhea County	Miss Lillie P. Campbell
Roane County	David Evans
Robertson County	Mrs. Susie B. Agee
Rutherford County	Robert Butler

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<u>System</u>	<u>Supervisor</u>
Scott County	Mrs. Edrie S. Huff
Sequatichie County	Mrs. Viva B. Rogers
Sevier County	Lloyd H. Tarwater
Smith County	J. B. Gore
Stewart County	Mrs. Dixie P. Gorham
Sullivan County	William L. Cox
Sumner County	Mrs. Evelyn Hall
Tipton County	William Bibb
Unicoi County	Henry A. Clouse
Van Buren County	Mrs. Faye M. Smith
Washington County	Ben K. Howze
White County	Mrs. Clara H. Erwin
Williamson County	Mitchell Wright
Wilson County	Miss Ruby Thornton
Alcoa City	Harley H. Stephens
Bristol City	Fred W. Gupton
Chattanooga City	Laney J. Roberts
Dyersburg City	Mrs. Maggie S. Wilborn
Greeneville City	Mrs. Lena Doty
Jackson City	Miss Jessie Lee Brooks
Knoxville City	Roy Wallace
Lenoir City	J. Guy Buckner, Superintendent
Milan City	J. W. Thomas, Superintendent
Morristown City	Harry Price
Rockwood City	Miss Margaret Ladd

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NATIONAL DEFENSE EDUCATION ACT - 1958

Title III

Procedures for Processing Applications for Approval
of
Project Proposals

1. Applications for the Approval of Project Proposals under Title III shall be submitted in triplicate by local school superintendents to:

Mr. W. B. Miller, Director
Curriculum and Supervision
Division of Instruction
Department of Education
Room 104 Cordell Hall Building
Nashville 3, Tennessee

2. Applications will be checked when received by the central office staff for completeness. Incomplete applications will be returned to superintendent indicating deficiencies.

APPENDIX B

3. Completed applications will be reviewed by a small special committee of the staff. Visits may be made to systems submitting project proposals by members of the staff.
4. Applications will then be reviewed by an advisory panel of three to six people. Panel members will be selected from the ranks of school administrators, classroom teachers, and specialists.
5. A small staff committee will review scored applications and make recommendations.
6. Rejected applications will be referred to a small special committee (see above).
7. A visit will be made to a system having an approvable application by a staff member to ascertain conditions, etc.
8. The Coordinator of Instruction will review the applications and the recommendations of the staff committee and make final recommendations to the Commissioner of Education.
9. The Commissioner will notify the local superintendent of schools.

NATIONAL DEFENSE EDUCATION ACT - 1958

Title III

Procedures for Processing Applications for Approval
of
Project Proposals

1. Applications for the Approval of Project Proposals under Title III shall be submitted in triplicate by local school superintendents to:

Mr. E. B. Eller, Director
Curriculum and Supervision
Division of Instruction
Department of Education
Room 104 Cordell Hull Building
Nashville 3, Tennessee
2. Applications will be checked when received by the central office staff for completeness. Incomplete applications will be returned to superintendent indicating deficiencies.
3. Completed applications will be reviewed by a small special committee of the staff. Visits may be made to systems submitting project proposals by members of the staff.
4. Applications will then be reviewed by an advisory panel of three to six people. Panel members will be selected from the ranks of school administrators, classroom teachers, and specialists.
5. A small staff committee will review scored applications and make recommendations.
6. Rejected applications will be referred to a small special committee (#3 above).
7. A visit will be made to a system having an approvable application by a staff member to ascertain conditions, etc.
8. The Coordinator of Instruction will review the applications and the recommendations of the staff committee and make final recommendations to the Commissioner of Education.
9. The Commissioner will notify the local superintendent of schools.

STATE OF TENNESSEE
DEPARTMENT OF EDUCATION
Office of Commissioner
Nashville 3

July 2, 1959

Mr. R. M. Robinson, Superintendent
Alcoa City Schools
Alcoa, Tennessee

Dear Mr. Robinson:

The Alcoa City School's (sic) application for the approval of a Science project under Title III of the National Defense Education Act of 1958 has been processed.

I wish to commend you and the members of your staff for the excellent work which you have done in preparing this application in such a short time.

I am approving the science project for the fiscal year 1958-1959 in the amount of \$6,419.20, for the purchase of materials and equipment listed in your application, subject to an audit to be made after the project has been completed.

The amount of reimbursement is not to exceed one-half of the total amount of the expenditure, up to \$2.09 per pupil in average daily attendance in the Alcoa City Schools for the school year 1957-1958.

Enclosed is a copy of the application, approved as of June 9, 1959.

Sincerely yours,

Joe Morgan,
Commissioner of Education

JM:G

Enc. (application)

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STATE OF TENNESSEE
DEPARTMENT OF EDUCATION
Office of Commissioner
Nashville 3

October 20, 1960

TO: All County, City, and Special School District Superintendents

FROM: Joe Morgan, Commissioner of Education

SUBJECT: National Defense Education Act, Title III

At the beginning of this school year (July 1, 1960) each local school system had available for matching purposes under Title III \$2.11 per pupil in average daily attendance during the 1958-59 school year. This amount was carried forward when it was not expended or obligated during fiscal 1959-60.

The U. S. Office of Education has recently informed us of the amount of Tennessee's Title III Federal funds for the fiscal year 1960-61. This appropriation makes available to local school systems on a matching basis \$1.80 per pupil in average daily attendance during the 1959-60 school year. This means that local school systems have available for matching purposes during the 1960-61 school year the following amounts of Title III Federal funds:

\$2.11 per pupil in average daily attendance
during the 1958-1959 school year

\$1.80 per pupil in average daily attendance
during the 1959-1960 school year

The above amounts are being reserved until January 1, 1961 for each local school system wishing to submit Title III application projects. After January 1, 1961, any local school system may submit Title III projects requesting approval for any of the unobligated Federal funds which are available.

SIX YEARS OF SCIENCE, MATHEMATICS, AND MODERN FOREIGN LANGUAGES
IN TENNESSEE UNDER TITLE III OF THE NDEA

Fiscal Year	STATE APPROVED FOR SCIENCE		MATHEMATICS		M.F.L.		TOTAL	
	Number Projects	Amount	Number Projects	Amount	Number Projects	Amount	Number Projects	Amount
July 1, 1958- June 30, 1959	48	\$ 425,822.96	11	\$ 26,170.53	7	\$ 17,284.41	66	\$ 469,277.90
July 1, 1959- June 30, 1960	170	1,697,236.97	64	216,639.71	55	279,955.63	289	2,193,832.31
July 1, 1960- June 30, 1961	144	1,198,243.88	51	193,206.54	51	316,185.21	246	1,707,635.63
July 1, 1961- June 30, 1962	<u>143</u>	<u>1,250,773.62</u>	<u>48</u>	<u>94,179.39</u>	<u>62</u>	<u>293,225.21</u>	<u>253</u>	<u>1,638,178.22</u>
	505	\$4,572,077.43	174	\$530,196.17	175	\$906,650.46	854	\$6,008,924.06
July 1, 1962- June 30, 1963	156	1,157,967.33	54	149,398.34	50	214,465.59	260	1,521,834.56
	661	5,730,044.76	228	679,594.51	225	1,121,119.35	1,114	7,530,758.62
July 1, 1963- June 30, 1964	<u>177</u>	<u>1,624,509.08</u>	<u>80</u>	<u>299,092.69</u>	<u>70</u>	<u>469,082.97</u>	<u>327</u>	<u>2,392,684.74</u>
	838	\$7,354,553.84	308	\$978,687.20	295	\$1,590,202.32	1,441	\$9,923,443.36

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September 11, 1964

Mr. Carl T. Vance
Superintendent
Memphis City Schools
Memphis, Tennessee

Dear Mr. Vance:

The Department of Education is participating in a national study conducted by Mr. Harley Stephens concerning with certain aspects of the Title III, National Defense Education Act, Program. We feel that the findings of this study may be worthwhile in evaluating the effect of the Title III acquisition program at the local level, and in evaluating the effectiveness of the administration and supervision of the Title III program at the state level.

Through a process of random sampling of school systems, the following high school was selected for the study:

Memphis High School

APPENDIX C

We request your cooperation in asking that the above listed school participate in the study by completing the enclosed check sheet. The completed form should be returned to:

Mr. Harley Stephens
Municipal Building
Alcoa, Tennessee

Let us express our appreciation for your cooperation in this study. Mr. Stephens would like to receive the completed check list by October 11, 1964.

Sincerely yours,

J. E. Hart
Commissioner

JEM/ab

Enclosure

September 11, 1964

Mr. Carl T. Vance
 Superintendent
 Morristown City Schools
 Morristown, Tennessee

Dear Mr. Vance:

The Department of Education is participating in a doctoral study conducted by Mr. Harley Stephens concerned with certain aspects of the Title III, National Defense Education Act, Program. We feel that the findings of this study may be worthwhile in evaluating the effect of the Title III acquisition program at the local level, and in evaluating the effectiveness of the administration and supervision of the Title III program at the state level.

Through a process of random sampling of school systems, the following high school was selected for the study:

Morristown High School

We request your cooperation in asking that the above listed school participate in the study by completing the enclosed check sheet. The completed form should be returned to:

Mr. Harley Stephens
 Municipal Building
 Alcoa, Tennessee

Let me express our appreciation for your cooperation in this study. Mr. Stephens would like to receive the completed check list by October 15, 1964.

Sincerely yours,

J. H. Warf
 Commissioner

JHW/vb

Enclosures

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HIGH SCHOOLS OF SYSTEMS SELECTED BY RANDOM SAMPLING

TO BE SENT THE CHECK SHEET FOR SCIENCE STAFFS

<u>System</u>	<u>Principal</u>	<u>High School</u>	<u>Address</u>
Chester County	James Williams	Chester County	Henderson
Davidson County	Raymond Huffman Buford Jewell John Koen William K. Wright Grayl Bruce Sarter Charles Lafever	Bellevue Dupont Hillsboro Hillwood Stratford Two Rivers	Bellevue Old Hickory 3812 Hillsboro Road Hickory Valley Road 1800 Stratford Drive McGavock Pike, Donelson
Dickson County	J. H. Clemmer	Dickson	Dickson
Henderson County	R. C. Rumfelt	Lexington	Lexington
Knox County	P. M. Walker Kenneth Sargent Max Clendenen Rollin McKeehan J. E. McCall	Carter Farragut Gibbs Karns Powell	Straw Plains Route 21, Concord Route 1, Corryton Route 18, Beaver Ridge Road Powell
Lawrence County	Oscar Few A. D. Chapman	Lawrence County Loretto	Lawrenceburg Loretto
Madison County	T. D. Reynolds Jack Brown Mack Barnett	North Side South Side Beech Bluff	Humbolt Highway, Jackson Route 3, Jackson Route 2, Denmark
Rhea County	Robert Stewart Denton Smith	Rhea Central Spring City	Dayton Spring City
Scott County	Taskel W. Welch	Robbins	Robbins
Smith County	Ervin Smith	Smith County	Carthage
Sullivan County	Paul Anderson Kenneth Carrier Blake Barnes	Blountville Bluff City Lynn View	Blountville Bluff City Walker Street, Kingsport
Washington County	Grady Clark, Jr.	Washington College Academy	Washington College

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<u>System</u>	<u>Principal</u>	<u>High School</u>	<u>Address</u>
Chattanooga City	George L. Mathis Creed F. Bates Jack Carr	Brainerd Chattanooga Kirkman Tech	1106 Moore Road, 11 1301 Dallas Road 215 Chestnut Street, 3
Greeneville City	U. M. Clemmer	Greeneville	Greeneville
Morristown City	Charles H. Strange	Morristown	Morristown

STATISTICAL SCHOOL COURSE DATA OF SECONDARY SCHOOLS STUDIED
FOR THE SCHOOL YEARS ENDING IN 1959 AND 1964

SUBJECT	SCHOOL ATTENDING	HIGH SCHOOL	BIOLOGY	CHEMISTRY	PHYSICS	TYPE SCHOOL
	1956	1956	1959	1959	1959	1959
Elementary	5.05	75.5	1.19	0.9	0.5	99
Percentage of Students at Elementary			19.1	7.9	2.2	13.3
Percentage of Students at High School	94.95	44.5	40.8	40.8	2.5	
Percentage of Students at College		4	0	1	1	3
Percentage of Students at University		3	4	4	1	1
Percentage of Students at Graduate School						
Percentage of Students at Postgraduate School						
Percentage of Students at Professional School						
Percentage of Students at Law School						
Percentage of Students at Medical School						
Percentage of Students at Theological School						
Percentage of Students at Other Postgraduate School						
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STATISTICAL SCIENCE COURSE DATA OF SECONDARY SCHOOLS STUDIED
FOR THE SCHOOL YEARS ENDING IN 1959 AND 1964

SUBJECT	SCHOOL SYSTEMS	HIGH SCHOOL		BIOLOGY		CHEMISTRY		PHYSICS		GENERAL SCIENCE		NUMBER OF STUDENTS	
		1959	1964	1959	1964	1959	1964	1959	1964	1959	1964	1959	1964
	Chester County	Chester											
Enrollment		608	726	119	178	48	62	14	16	90	127	271	383
Percent of Enrollment				19.6	24.5	7.9	8.5	.2	2.2	15.8	17.5	44.6	54.1
Percentage Change			+19.4		+4.9		+0.6		-2.0		+1.7		+9.5
Number of Sections				4	6	1	2	1	1	3	4		
Number of Teachers				3	2	1	1	1	1	1	1		
	Davidson County	Bellevue											
Enrollment		437	286	100	100		25	20		125	24	245	149
Percent of Enrollment				22.9	35.0		8.7	.46		28.6	8.4	56.1	85.7
Percentage Change		--	-34.6		+12.1		+8.7		-.46		-20.2		+29.6
Number of Sections				3	3		2	1		4	1		

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STATISTICAL SCIENCE COURSE DATA OF SECONDARY SCHOOLS STUDIED
FOR THE SCHOOL YEARS ENDING IN 1959 AND 1964

SUBJECT	SCHOOL SYSTEM	HIGH SCHOOL		BIOLOGY		CHEMISTRY		PHYSICS		GENERAL SCIENCE		NUMBER OF STUDENTS	
		1959	1964	1959	1964	1959	1964	1959	1964	1959	1964	1959	1964
	Davidson County	Bellevue											
Number of Teachers				1	1		1	1		1	1		
		Dupont											
Enrollment		510	623	119	159		52		28	115	156	234	395
Percent of Enrollment				23.3	25.5		8.3		4.5	22.5	25.0	45.9	57.6
Percentage Change			+17.1		+2.2		+8.3		+4.5		+2.5		+8.3
Number of Sections				4	5		2		1	4	4		
Number of Teachers				1	1		1		1	1	1		
		Hillsboro											
Enrollment		1,352	1,115	365	279	196	191	54	69	223	137	838	676
Percent of Enrollment				26.8	25.0	14.5	17.1	4.0	6.2	16.5	12.3	62.0	58.8

STATISTICAL SCIENCE COURSE DATA OF SECONDARY SCHOOLS STUDIED
FOR THE SCHOOL YEARS ENDING IN 1959 AND 1964

SUBJECT	SCHOOL SYSTEM	HIGH SCHOOL		BIOLOGY		CHEMISTRY		PHYSICS		GENERAL SCIENCE		NUMBER OF STUDENTS	
		1959	1964	1959	1964	1959	1964	1959	1964	1959	1964	1959	1964
	Davidson County	Hillsboro											
Percentage Change			-17.1		-1.8		+1.6		+2.2		-4.2		-3.2
Number of Sections				12	9	7	6	2	2	7	5		
Number of Teachers				4	2	2	2	1	1	4	2		
		Hillwood											
Enrollment			900		101		91		25		144		361
Percent of Enrollment					11.2		10.1		2.8		16.0		40.1
Percentage Change		No Report - 1959											
Number of Sections					4		4		1		5		
Number of Teachers					1		1		1		1		
	Davidson County	Stratford											

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STATISTICAL SCIENCE COURSE DATA OF SECONDARY SCHOOLS STUDIED
FOR THE SCHOOL YEARS ENDING IN 1959 AND 1964

SUBJECT	SCHOOL SYSTEMS	HIGH SCHOOL		BIOLOGY		CHEMISTRY		PHYSICS		GENERAL SCIENCE		NUMBER OF STUDENTS	
		1959	1964	1959	1964	1959	1964	1959	1964	1959	1964	1959	1964
Enrollment	Midway County		586		80		82				244		406
Percent of Enrollment					13.7		14.0				41.6		65.9
Percentage Change	No Report - 1959												
Number of Sections					3		4				7		
Number of Teachers					1		1				2		
	Two Rivers												
Enrollment			601		213		104				192		509
Percent of Enrollment					35.4		17.3				31.9		84.7
Percentage Change	No Report - 1959												
Number of Sections					7		3				6		
Number of Teachers					2		1				1		

STATISTICAL SCIENCE COURSE DATA OF SECONDARY SCHOOLS STUDIED
FOR THE SCHOOL YEARS ENDING IN 1959 AND 1964

SUBJECT	SCHOOL SYSTEMS	HIGH SCHOOL		BIOLOGY		CHEMISTRY		PHYSICS		GENERAL SCIENCE		NUMBER OF STUDENTS	
		1959	1964	1959	1964	1959	1964	1959	1964	1959	1964	1959	1964
	Dickson County	Dickson											
Enrollment		547	650	58	126	27	58		23	169	180	254	387
Percent of Enrollment				10.6	19.4	4.9	8.9		3.5	30.9	27.7	45.9	59.5
Percentage Change					+8.8		+4.0		+3.5		-3.2		+13.6
Number of Sections				2	5	1	3		1	5	5		
Number of Teachers				1	1	1	1		1	2	3		
	Greeneville City	Greeneville											
Enrollment		502	920	134	190	59	98	21	23		215	214	526
Percent of Enrollment				26.7	20.7	11.8	10.7	4.2	2.5		23.4	42.8	57.2
Percentage Change					-6.0		-1.1		-1.7		+23.4		+5.6
Number of Sections				4	7	2	3	1	1		7		

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STATISTICAL SCIENCE COURSE DATA OF SECONDARY SCHOOLS STUDIED
FOR THE SCHOOL YEARS ENDING IN 1959 AND 1964

SUBJECT	SCHOOL SYSTEMS	HIGH SCHOOL		BIOLOGY		CHEMISTRY		PHYSICS		GENERAL SCIENCE		NUMBER OF STUDENTS	
		1959	1964	1959	1964	1959	1964	1959	1964	1959	1964	1959	1964
	Greeneville City	Greeneville											
Number of Teachers				1	2	1	2	1	1		3		
	Morristown City	Morristown											
Enrollment		1,271	1,803	260	320	110	193	20	51	214	387	604	951
Percent of Enrollment				20.5	17.7	8.7	10.7	1.6	2.8	16.8	21.5	47.5	52.7
Percentage Change					-3.2		+2.0		+1.2		+4.7		+5.2
Number of Sections				8	11	4	7	1	3	7	13		
Number of Teachers				2	4	1	2	1	1	2	4		
	Chattanooga City	Kirkman Technical											
Enrollment		1,035	1,202			20		13	30	30	210	63	240
Percent of Enrollment						1.9		1.3	2.5	2.9	17.5	6.1	20.0

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FOR THE SCHOOL YEARS ENDING IN 1959 AND 1964

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STATISTICAL SCIENCE COURSE DATA OF SECONDARY SCHOOLS STUDIED
FOR THE SCHOOL YEARS ENDING IN 1959 AND 1964

SUBJECT	SCHOOL SYSTEMS	HIGH SCHOOL		BIOLOGY		CHEMISTRY		PHYSICS		GENERAL SCIENCE		NUMBER OF STUDENTS	
		1959	1964	1959	1964	1959	1964	1959	1964	1959	1964	1959	1964
	Knox County	Carter											
Enrollment		780	978	177	297	53	37	56	42	148	270	434	646
Percent of Enrollment				22.7	28.5	6.8	3.8	7.2	4.3	19.0	27.6	55.6	66.1
Percentage Change		+25.4		+5.8		-3.0		-2.9		+8.6		+10.5	
Number of Sections		+25.4		+5.8		-3.0		-2.9		+8.6		+10.5	
Number of Teachers				5	10	2	1	2	2	4	9		
				1	2	1	1	1	1	1	2		
		Farragut											
Enrollment		512	461	96	135	28	61	14	26	71	58	209	280
Percent of Enrollment		51		18.8	29.3	5.5	13.2	2.7	5.6	13.9	12.6	40.8	60.7
Percentage Change		-10.0		+10.5		+7.7		+2.9		+0.7		+19.9	
Number of Sections				3	5	1	3	1	1	1	3		

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STATISTICAL SCIENCE COURSE DATA OF SECONDARY SCHOOLS STUDIED
FOR THE SCHOOL YEARS ENDING IN 1959 AND 1964

SUBJECT	SCHOOL SYSTEMS	HIGH SCHOOL		BIOLOGY		CHEMISTRY		PHYSICS		GENERAL SCIENCE		NUMBER OF STUDENTS	
		1959	1964	1959	1964	1959	1964	1959	1964	1959	1964	1959	1964
		Farragut											
Number of Teachers				1	1	1	1	1	1	1	1		
		Gibbs											
Enrollment		332	415	95	98	44	28			67	163	206	289
Percent of Enrollment			80	28.6	23.6	13.3	6.7			20.2	39.3	62.0	69.6
Percentage Change			+23.9		-5.0		-6.6				+19.1		+7.6
Number of Sections				4	4	2	1			2	6		
Number of Teachers				2	1	2	1			1	2		
		Karns											
Enrollment		548	739	158	59	43	92	11	32	158	186	370	369
Percent of Enrollment				28.8	8.0	7.8	12.4	2.0	4.3	28.8	25.2	75.2	50.0

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STATISTICAL SCIENCE COURSE DATA OF SECONDARY SCHOOLS STUDIED
FOR THE SCHOOL YEARS ENDING IN 1959 AND 1964

SUBJECT	SCHOOL SYSTEMS	HIGH SCHOOL		BIOLOGY		CHEMISTRY		PHYSICS		GENERAL SCIENCE		NUMBER OF STUDENTS	
		1959	1964	1959	1964	1959	1964	1959	1964	1959	1964	1959	1964
	Knox County	Karns											
Percentage Change		+34.7		-20.8		+4.6		+2.3		-3.6		-25.2	
Number of Sections				5	2	2	3	1	1	5	6		
Number of Teachers				2	1	1	1	1	1	1	3		
		Powell											
Enrollment		641	852	163	227	52	83		15	261	118	467	443
Percent of Enrollment		32.9		25.4	26.6	8.1	9.7		1.8	40.7	13.8	74.3	52.0
Percentage Change		+32.9			+1.2		+1.6		+1.8		-26.9		-22.3
Number of Sections				6	9	2	3		1	8	4		
Number of Teachers				2	3	1	1		1	2	1		

STATISTICAL SCIENCE COURSE DATA OF SECONDARY SCHOOLS STUDIED
FOR THE SCHOOL YEARS ENDING IN 1959 AND 1964

SUBJECT	SCHOOL SYSTEMS	HIGH SCHOOL		BIOLOGY		CHEMISTRY		PHYSICS		GENERAL SCIENCE		NUMBER OF STUDENTS	
		1959	1964	1959	1964	1959	1964	1959	1964	1959	1964	1959	1964
	Lawrence County	Lawrence											
Enrollment		970	1,045	105	208	103	128	32	56	277	287	517	679
Percent of Enrollment				10.8	19.9	10.6	12.2	3.3	5.4	28.6	27.5	53.3	65.0
Percentage Change			+7.7		+9.1		+1.6		+2.1		-1.1		+11.7
Number of Sections				3	7	3	3	1	2	9	8		
Number of Teachers				1	2	1	2	1	1	3	2		
		Loretto											
Enrollment		481	522	103	122	30	43		30	166	146	299	341
Percent of Enrollment				21.4	23.4	6.2	8.2		5.7	34.5	28.0	62.2	65.3
Percentage Change			+8.5		+2.0		+2.0		+5.7		-6.5		+3.1
Number of Sections				3	4	1	2		1	5	5		

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STATISTICAL SCIENCE COURSE DATA OF SECONDARY SCHOOLS STUDIED
FOR THE SCHOOL YEARS ENDING IN 1959 AND 1964

SUBJECT	SCHOOL SYSTEMS	HIGH SCHOOL		BIOLOGY		CHEMISTRY		PHYSICS		GENERAL SCIENCE		NUMBER OF STUDENTS	
		1959	1964	1959	1964	1959	1964	1959	1964	1959	1964	1959	1964
		Loretto											
Number of Teachers				1	1	1	1		1	1	3		
	Madison County	Beech Bluff											
Enrollment		162	237		31		21			40	81	40	133
Percent of Enrollment					13.1		8.9			24.7	34.2	24.7	56.1
Percentage Change			+46.3		+13.1		8.9				+9.5		+31.4
Number of Sections					1		1			1	3		
Number of Teachers					1		1			1	3		
		North Side											
Enrollment		488	584	131	160	54	35		12	138	156	323	363
Percent of Enrollment				26.8	27.4	11.1	6.0		2.1	28.3	26.7	66.6	79.3

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STATISTICAL SCIENCE COURSE DATA OF SECONDARY SCHOOLS STUDIED
FOR THE SCHOOL YEARS ENDING IN 1959 AND 1964

SUBJECT	SCHOOL SYSTEMS	HIGH SCHOOL		BIOLOGY		CHEMISTRY		PHYSICS		GENERAL SCIENCE		NUMBER OF STUDENTS	
		1959	1964	1959	1964	1959	1964	1959	1964	1959	1964	1959	1964
	North Side												
Percentage Change			+19.7		+1.4		-5.1		+2.1		-1.6		+12.7
Number of Sections				4	5	2	2		1	5	5		
Number of Teachers				1	1	1	1		1	2	2		
	South Side												
Enrollment		525	591	82	145	53	45		11	150	140	285	339
Percent of Enrollment				15.6	24.5	10.1	7.3		1.9	28.5	23.7	52.2	57.4
Percentage Change			+12.6		+8.9		-2.8		+1.9		-4.8		+3.2
Number of Sections				3	5	2	2		1	6	5		
Number of Teachers				1	2	1	1		1	1	2		

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STATISTICAL SCIENCE COURSE DATA OF SECONDARY SCHOOLS STUDIED
FOR THE SCHOOL YEARS ENDING IN 1959 AND 1964

SUBJECT	SCHOOL SYSTEMS	HIGH SCHOOL		BIOLOGY		CHEMISTRY		PHYSICS		GENERAL SCIENCE		NUMBER OF STUDENTS	
		1959	1964	1959	1964	1959	1964	1959	1964	1959	1964	1959	1964
	Rhea County	Rhea Central											
Enrollment		625	570	140	175	33	52	12	24	164	162	349	413
Percent of Enrollment				26.7	30.7	6.3	9.1	2.3	4.2	31.2	28.4	72.1	72.5
Percentage Change			+8.4		+4.0		+2.8		+9		-2.8		+0.4
Number of Sections				5	5	2	2	1	1	6	6		
Number of Teachers				1	2	1	1	1	1	2	2		
		Spring City											
Enrollment		362	369	114	89	21	27	16		152	122	303	238
Percent of Enrollment				31.5	24.1	5.8	7.3	4.4		42.0	33.1	83.7	64.5
Percentage Change			+1.7		-7.4		+1.5		-4.4		-8.9		-19.2
Number of Sections				4	3	1	1	1		4	4		

STATISTICAL SCIENCE COURSE DATA OF SECONDARY SCHOOLS STUDIED
FOR THE SCHOOL YEARS ENDING IN 1959 AND 1964

SUBJECT	SCHOOL SYSTEMS	HIGH SCHOOL		BIOLOGY		CHEMISTRY		PHYSICS		GENERAL SCIENCE		NUMBER OF STUDENTS	
		1959	1964	1959	1964	1959	1964	1959	1964	1959	1964	1959	1964
	Rhea County	Rhea Central											
Number of Teachers				1	1	1	1	1		1	2		
	Scott County	Robins											
Enrollment		233	220	60	59	21			12	73	59	154	130
Percent of Enrollment				25.8	26.8	90			5.5	31.3	26.8	66.1	55.9
Percentage Change			-5.9		+1.0		-9.0		+5.5		-4.5		-10.2
Number of Sections				2	2	1			1	2	2		
Number of Teachers				1	1	1			1	1	1		
	Smith County	Smith											
Enrollment		483	524	102	118	17	54	18		74	26	211	198
Percent of Enrollment				21.1	22.5	3.5	10.3	3.7		15.3	5.0	46.2	37.8

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STATISTICAL SCIENCE COURSE DATA OF SECONDARY SCHOOLS STUDIED
FOR THE SCHOOL YEARS ENDING IN 1959 AND 1964

SUBJECT	SCHOOL SYSTEMS	HIGH SCHOOL		BIOLOGY		CHEMISTRY		PHYSICS		GENERAL SCIENCE		NUMBER OF STUDENTS	
		1959	1964	1959	1964	1959	1964	1959	1964	1959	1964	1959	1964
	Smith County	Smith											
Percentage Change			+8.5		+0.6		+6.8		-3.7		-10.3		-8.4
Number of Sections				4	4	1	3	1		3	1		
Number of Teachers				2	1	1	1	1		1	1		
	Sullivan County	Blountville											
Enrollment		493	699	61	86	51	95	19	17	89	147	220	345
Percent of Enrollment				12.4	12.3	10.3	13.6	3.9	2.4	18.1	21.0	44.6	49.4
Percentage Change			+41.8		-0.1		+3.3		-1.5		+2.9		+4.8
Number of Sections				2	3	2	4	1	1	3	5		
Number of Teachers				1	1	1	1	1	1	1	3		
		Bluff City											
Enrollment		401	595	70	126	50	42	11	18	118	191	249	377

STATISTICAL SCIENCE COURSE DATA OF SECONDARY SCHOOLS STUDIED
FOR THE SCHOOL YEARS ENDING IN 1959 AND 1964

SUBJECT	SCHOOL SYSTEMS	HIGH SCHOOL		BIOLOGY		CHEMISTRY		PHYSICS		GENERAL SCIENCE		NUMBER OF STUDENTS	
		1959	1964	1959	1964	1959	1964	1959	1964	1959	1964	1959	1964
	Washington County	Bluff City											
Percent of Enrollment				17.5	21.2	12.5	7.1	2.7	3.0	26.9	32.1	62.1	63.4
Percentage Change			+48.4		+3.7		-5.4		+0.3		+5.2		+1.3
Number of Sections				3	5	2	2	1	1	5	6		
	Sullivan County	Lynn View											
Enrollment		731	782	142	98	53	49	20	26	150	147	365	320
Percent of Enrollment				19.3	12.5	7.3	6.3	2.7	3.3	20.5	18.8	49.9	40.9
Percentage Change			+7.0		-6.8		-1.0		+0.6		-1.7		-9.0
Number of Sections				6	4	3	2	1	1	5	5		
Number of Teachers				3	2	1	1	1	1	2	3		

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STATISTICAL SCIENCE COURSE DATA OF SECONDARY SCHOOLS STUDIED
FOR THE SCHOOL YEARS ENDING IN 1959 AND 1964

SUBJECT	SCHOOL SYSTEMS	HIGH SCHOOL		BIOLOGY		CHEMISTRY		PHYSICS		GENERAL SCIENCE		NUMBER OF STUDENTS	
		1959	1964	1959	1964	1959	1964	1959	1964	1959	1964	1959	1964
	Washington County	Washington Academy											
Enrollment		238	252	45	34	31	28		8	60	64	136	132
Percent of Enrollment				18.9	13.5	13.0	11.1		3.2	25.2	25.4	57.1	52.4
Percentage Change			+5.9		-5.4		-2.9		+3.2		+0.4		-4.7
Number of Sections				2	1	1	1		1	2	2		
Number of Teachers				1	1	1	1		1	1	1		

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NATIONAL DEFENSE EDUCATION ACT - 1946

FORM 171

PROPOSED PROJECT REPORT

to be used for projects initiated after January 1, 1947
(Subject in Triplicate)

Project No. 17, issued by State Dept. of _____
(Continued)

The _____ Board of Education hereby submits the
following report for consideration by the Tennessee State Commissioner of
Education to participate in funds available under Section 225, Title 29,
P.S. 29-225.

APPENDIX D

1. Statement of purpose of the educational program
in this area.

2. Purpose of proposed project.

3. Description of project.

A. Title of proposed project to which funds will be
applied and subject.

B. Summary in short of the scope of work to be
done and the nature of the project which will be carried out in the
school system.

C. How will the proposed project operate over the
school program in this area from the present time?

D. A separate application will be submitted for each of the following
funds.

4. Do you wish to provide further application.

NATIONAL DEFENSE EDUCATION ACT - 1958

TITLE III

REVISED APPLICATION FORM

To be used for Projects Submitted after January 1, 1964
(Submit in Triplicate)

Project No. (Supplied by State Dept. of Education) _____ Project
Instructional Area* _____

The _____ Board of Education hereby submits the
following project for consideration by the Tennessee State Commissioner of
Education to participate in funds available under Section 303, Title III,
P.L. 85-864.

** I. Present level of development of the instructional program
in this area:

** II. Purpose of Proposed Project:

** III. Description of Project:

A. Scope of proposed project in your school system -
grades and subjects

B. Describe in detail the steps by which this phase
of the proposed project will be carried out in your
school system.

C. How will the proposed project up-grade your instruc-
tional program in this area from its present level?

* A separate application must be submitted for each of the instruc-
tional areas.

** Do not refer to previous project applications.

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IV. Number and Description of Students for Whom Proposed Project Is Intended:

A. Total Enrollment of System

B. Average Daily Membership of System. If change from previous year exceeds 10%, explain.

C. Table (Data) - Participating Schools

Name of School	Type (1-8) (9-12) Etc.	Total Enroll- ment in School	Enrollment in academic area with which project is concerned	Anticipated Increase in Enrollment in project Area	Grades or Subjects Covered in This Project

Total

D. Describe the Guidance Principles and Procedures by which children will be selected for this instructional program.

V. Qualifications of Teachers Now Employed or To Be Employed to Provide Instruction Using Equipment and Materials To Be Purchased Under This Application:

A. Teacher Competencies (Sec. 4.31 Tennessee State Plan)

1. What is the training of your teacher(s) in the instructional area or grades affected by this project?

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_____ Doctor's Degree	_____ 3 Yrs. College
_____ Master's Degree + 45 Qtr. Hrs.	_____ 2 Yrs. College
_____ Master's Degree	_____ 1 Yr. College
_____ Bachelor's Degree	_____ 0 College

2. List names of teachers in the instructional area or grades affected by this project now teaching in this area but not now certified in this area.

3. Describe plans for up-grading Teacher Training.

(Sec. 4.3 Tennessee State Plan)

B. Supervising Services

1. What are the qualifications of the local supervisor(s) and/or Supervising Principals in this instructional area?
2. What portion of his (her) time will be devoted to this project?

VI. Inventory of Space and Facilities Available for Use with This Project: (To be separate) for each school or Materials Center participating in this project.

A. Space to be utilized

1. Space now available (brief description)
2. Additional space needed
3. Number of classrooms and laboratories involved in minor remodeling, for which reimbursement is requested
4. Minor remodeling requested (submit drawing(s) and specifications of areas involved)
5. Estimated cost of materials and labor involved in minor remodeling

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B. Equipment (Indicate Appropriate Item)

1. A current inventory of the (Science)
(Mathematics) equipment is
(Modern Foreign
Language)
on file in the (respective school's office)
(supervisor's office)
(superintendent's office)

2. Additional equipment needed (List in detail including
cost estimate and services. The list accompanying
this proposal, if approved by the State Agency, becomes
the list for audit purposes.)

C. Materials (Indicate Appropriate Item)

1. A Current inventory of the (Science)
(Mathematics) material is on
(Modern Foreign
Language)
file in the (respective school's office)
(supervisor's office)
(superintendent's office)

2. Additional material needed. (List in detail including
cost estimates and services. The list accompanying this
proposal if approved by the State Agency becomes the list
for audit purposes.)

(See suggested form on following page.)

Suggested Form for VI B, 2 and/or C, 2:

_____ School

Item No.	Quan.	Description or Name of Article	*Specification	Unit Price	Extension
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*All items submitted in a project application must have specifications identical to, or be similar and equal to, those contained in the Purchase Guide and must bear the corresponding Purchase Guide number.

If there are items which do not appear in the Purchase Guide, you may include them in your project and state the specifications which you wish to be considered. Each item listed in a project but not contained in the Purchase Guide would be followed by (1) the name of the company and/or catalog; (2) the page number; (3) and item number.

Under materials, specification requirements for filmstrips will be met if the producer (not distributor) is given. Requirements for books will be name of author, title, and publisher. See Page 19 of Tennessee Title III, Revised November 1963.

VII. Cost Analysis of Project: (Suggested form)

Name of School	Minor Remodeling	Equipment	Materials	TOTAL

VIII. The _____ school system has sufficient funds available to participate in this project.

IX. The _____ Board of Education agrees to maintain records in the Office of the _____
(School System)

Superintendent of Schools as required in the Tennessee State Plan, Section 2.31.

X. A. _____ Agrees to make such reports to the State Commissioner of Education as he may deem necessary to fulfill the provisions of the Tennessee State Plan under Title III, P.L. 85-864. (Section 1.4 Tennessee State Plan)

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B. We certify that the individual items in Section I meet the standards as set forth in the Tennessee State Plan.

Recommended _____

Superintendent

Approved _____

Chairman

Board of Education

Approved: _____

Date

Commissioner

Tennessee State Department of Education

1. That we have met the requirements and agreements in the State Plan for strengthening of instruction in Science, Mathematics and Modern Foreign Languages under sections 301-304 of Title III, Public Law 85-625.
2. That the items represented in this request for payment are in accordance with our approved Project Proposal under Title III.
3. That the attached invoices are correct as to extensions and totals and all items have been received. Furthermore, payment has been made.
4. That no items have been purchased which originated in or have been exported from a communist country.

Given and subscribed to for affixing before
on this _____ day of _____ 1962

Superintendent of Schools

County Public

By contract expires _____

Chairman, Board of Education

Received July 30, 1962

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CLAIM FOR REIMBURSEMENT

For An Approved Project Under Title III
National Defense Education Act

Date: _____

System _____

List conditions of approval, if any _____

Project Number _____

Area of Instruction _____

Date Project was approved _____

Does this complete this project?
_____ yes _____ no

Warrant No. _____

Date _____

Payee _____

Amount
of
WarrantAmount of Warrant
Applicable to
Project

Total

We hereby certify:

1. That we have met the requirements and agreements in the State Plan for strengthening of instruction in Science, Mathematics and Modern Foreign Languages under Sections 301-304 of Title III, Public Law 85-864.
2. That the items represented in this request for payment are in accordance with our approved Project Proposal under Title III.
3. That the attached invoices are correct as to extensions and totals and all items have been received. Furthermore, payment has been made.
4. That no items have been purchased which originated in or have been exported from a communist country.

Sworn and subscribed to (or affirmed) before
me this _____ day of _____ 19____.

Superintendent of Schools_____
Notary Public

My commission expires _____ 19____

Chairman, Board of Education

Revised July 20, 1962

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