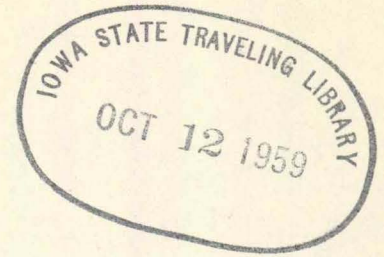


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State of Iowa  
DEPARTMENT OF PUBLIC INSTRUCTION  
J. C. Wright, Superintendent  
Des Moines 19  
1959

Circular No. 100e

Guide for Purchase of Equipment and Minor Remodeling  
Suitable for the Improvement of Instruction in Science,  
Mathematics, or Modern Foreign Languages in the Elementary  
or Secondary Schools or Both

(A circular setting forth standards for science, mathematics and modern foreign language materials and equipment and minor remodeling under Title III, Public Law 85-864, also known as the National Defense Education Act of 1958.)

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## I. INTRODUCTION

This circular includes the standards and principles upon which the Iowa State Department of Public Instruction will base its actions for approving reimbursement, under Title III, National Defense Education Act of 1958 (Public Law 85-864), projects submitted by local public school systems for the acquisition of equipment, and minor remodeling for the purpose of the improvement of instruction in science, mathematics and modern foreign languages, in elementary or secondary schools, or both.

### Standard 81

Standard 81 in Circular No. 100a reads as follows:

"Instructional equipment and supplies, such as: science apparatus, laboratory tables and demonstration desks; shop tools and machinery; gymnasium equipment, apparatus and supplies; equipment for home economics and agricultural laboratories; equipment and supplies for business education, art, and music rooms; audio-visual aids equipment; maps, atlases and charts; library books, encyclopedias and reference books, textbooks, and supplies shall be adequate and shall be used in such manner as to meet the needs of instruction for all courses and activities offered."

The standards outlined herein - while forming the basis for reimbursement of local school systems under the conditions of Title III, National Defense Education Act of 1958 (Public Law 85-864) - show what the State Department regards as adequate "to meet the needs of instruction" in science, mathematics and modern foreign languages in terms of the meaning of Standard 81. However, what is regarded as "adequate" in 1959 will need revision from time to time as the quality of instruction in science, mathematics and modern foreign languages is improved.

### Purposes of Title III

Funds for reimbursing local educational agencies for a matching portion of funds spent to acquire (1) equipment suitable for education in science, mathematics, or modern foreign languages in the elementary or secondary schools or both, and (2) minor remodeling of laboratory or other space suitable for such equipment will be distributed by the State Department. "Minor remodeling" does not include new wings on buildings but does include putting up partitions, knocking them down, and installing gas and electricity and other essential facilities.

### Standards of Priority

The National Defense Education Act of 1958 (Public Law 85-864) requires that principles be developed for determining priority of various projects. These principles as included in the Iowa plan for Title III, filed with and approved by the U. S. Office of Education, are quoted in full below:

"Principles for Determining Priorities. In order to make the most effective use of the funds available under Title III for strengthening science, mathematics, and modern foreign languages, the following principles are established for governing priority of projects submitted:

1. The planned pattern of program development is evident if a weak or
  - a. The planned program reflects attainable improvement of a weak or non-existent program in advanced sciences, mathematics, and/or modern foreign languages.

- b. The plan for the program is consistent with current trends, methods, and techniques in the field.
2. Adequacy of personnel to conduct and improve the program:
  - a. Qualified teacher in the field of instruction.\*
  - b. Amount of time spent by the teacher in the assigned field.
3. Ability to implement the plan immediately and continually:
  - a. Immediacy with which the program of improvement can be carried out.
  - b. Financial ability to maintain the proposed program.
4. Adequacy of facilities and apparatus to conduct an improved program:
  - a. Laboratory space available.
  - b. Facilities and apparatus.
  - c. Instructional materials and aids, including audio-visual.
5. Effort has been demonstrated by program history:
  - a. Use of qualified teachers.
  - b. Consistency of offerings.
  - c. Growth of quality and quantity of facilities and apparatus.
  - d. Consistency of budget provisions with economic resources.

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\*For purposes of reimbursement, junior and senior high school teachers must possess approval statements showing that they are qualified in the field of instruction (science, mathematics or modern foreign languages) involved. Except for modern foreign languages, certificated elementary school teachers, who meet the approval standards for such teachers outlined in Bulletin No. 32, "Certification and Approval of School Personnel," will be regarded as qualified to teach within the grade or grades which constitute their major assignment. Any elementary school teacher participating in a reimbursable project in modern foreign languages must meet the same minimum approval standards as are applied to junior and senior high school teachers. As an alternative arrangement where elementary school teachers participating do not meet the foregoing standards, and when a school employs a teacher with 30 semester hours of preparation in the designated modern foreign language and schedules that person for a defined part of the regular school day as a consultant in that language to elementary school teachers and/or as a direct teacher of elementary school pupils in the language, its project may be reimbursable. If such a teacher holds a certificate endorsed only for secondary school teaching, the Department may approve a request for a temporary certificate endorsed for elementary school teaching for that person.

6. Maximum utilization of available funds:
  - a. Potential number of students to be benefitted in relation to cost of improvements.
  - b. Permanency of attendance center.
7. Priority shall be based upon the adequacy of submitted local plans in terms of the area of instruction and the grade level or grade levels:
  - a. Equal weight shall be given to the established principles in determining priority for projects in each of the fields of instruction provided for under Title III.
  - b. The established principles shall apply equally to project applications for public elementary, junior high, and senior high schools."

### Definitions

For the purposes of administering Title III, the following definitions apply:

#### A. Equipment

Equipment is that category of teaching device which is relatively permanent in nature and would normally be expected to be used over a period of one or more years. Illustrations are:

1. Furniture such as demonstration desks, laboratory desks, storage cabinets, work benches, sinks, fume hoods and project tables.
2. Apparatus and chemical glassware used in laboratory or demonstration teaching.
3. Apparatus used for specialized experimentation by either teacher or pupils.
4. Audio-visual projection, recording equipment, cameras, models, globes and projection screens.
5. Typewriter with mathematical keys.
6. Electronic installations for language laboratories.

Equipment is not regarded as including such items as standard office typewriters or filing cases, classroom furniture other than that specifically required for teaching of science, mathematics, or modern foreign languages. Nor may equipment be regarded as including expendable items such as chemicals, biological specimens for dissection, or live specimens.

#### B. Materials

Materials are those articles and devices employed in teaching which are usually less permanent in nature than equipment, but do not fall in the category of consumable supplies. Instructional materials such as the following are included under this category:

1. Motion picture films, filmstrips, slides, microscope slides, transparencies, and other projected materials.

2. Pre-recorded magnetic tapes, records, and transcriptions.
3. Pictures, graphics, maps, charts, and other illustrative materials.
4. Pertinent literature other than textbooks.
5. Material for local preparation of teaching devices.
6. Mounted or preserved specimens other than those intended for dissection.

#### C. Supplies

Supplies which are consumed through use - chalk, paper and chemicals, for example - are not included as reimbursable items.

#### Meaning of Sections Discussing Approved Equipment and Materials

The following sections of this guide give only examples of equipment and materials, and also items of minor remodeling which will be considered acceptable for approval. These suggestions are not meant to be regarded as an exhaustive presentation of all items which would likely be approved. Thus, local school systems should not hesitate to include items which are consistent with the examples cited. For instance, we understand that the National Council of Teachers of Mathematics is to have an early publication giving a fairly complete list of acceptable teaching aids. Organizations similarly recognized in science and modern foreign languages will have good sources to consult when decisions as to expenditures are being made at the local level. Certain accredited institutions of higher learning in Iowa and other states have excellent audio-visual centers which provide both rental and consultative services. The Department will regard decisions pertaining to audio-visual materials and equipment based upon recommendation of these service centers as worthy of consideration for approval.

The Department anticipates the preparation of additional guides from time to time giving more definite presentation of standards for science equipment and materials for the improvement of instruction in science, mathematics, and modern foreign languages.

## II. SCIENCE

### Purposes, Materials and Equipment

The Iowa plan for the implementation of Title III, filed with and approved by the U. S. Office of Education, includes the purposes for the improvement of instruction in science:

#### A. Elementary Schools

##### 1. Purposes

##### "Science in the Elementary School

##### a. Description of Program:

The following objectives will be pursued for strengthening science instruction in the elementary schools:

The development of greater articulation and continuity in the science program from grade to grade.

The development and use of the laboratory method to encourage scientific concept developments through experimentation and more meaningful learning experiences.

The improvement of library enrichment and reference materials to improve learning opportunities and science vocabulary development.

The introduction of children to the ideas of science and the scientific method at an early age through the addition and use of suitable equipment.

The encouragement of science class projects which will provide opportunities for more rapid learners to progress in keeping with their interests and capacities.

The development in elementary children of understandings of the relationship of science to other areas of learning as essential to intelligent citizenship.

Assist classroom teachers in adapting to, and adopting, the newer methods and techniques in instruction and the use of enrichment aids and materials.

Increased supervisory services, and improved equipment and materials will contribute to the improvement of science instruction in the elementary schools."

## 2. Approved Science Equipment and Materials (Elementary Schools)

Please refer to page 11, "2. Approved Science Equipment and Materials (Senior High Schools)." Here will be found a fairly complete guide for the purchase of science equipment and materials including audio-visual items and printed science materials. To the degree that the units of instruction in elementary school science call for the use of items discussed on page 11, the Department will regard their purchase also for exclusive use in the science program in elementary schools as reimbursable. Furthermore, items which are clearly related to regularly taught units in elementary school science will be regarded as reimbursable even though they do not specifically appear on any of the lists cited for senior high schools.

Recognized scientific manufacturing companies can supply mobile laboratories for science teacher demonstrations which must be conducted in rooms not equipped with convenient gas, electric and water outlets or with demonstration desks. Such items will be regarded as reimbursable for elementary schools.

Printed materials for elementary science pupils cover a wide variety of topics and types. They should include books (not textbooks), periodicals, pamphlets, papers, charts and graphs prepared for use by both pupils and teachers. As an alternative to the inclusion herein of an extensive list of acceptable items, the Department will regard as acceptable for reimbursement items selected from authentic sources such as those listed below:



American Library Association. Basic Book Collection for Elementary Grades. Chicago: American Library Association, 1956. Pp. vii + 133. \$2.

Booklist and Subscription Books Bulletin. Chicago: American Library Association. Subscription, \$6. Published twice each month.

Children's Catalog. New York: H. W. Wilson Company. (Subscription basis; write to company for information.)

Craig, Gerald S. Science for the Elementary Teacher. Boston: Ginn and Company, 1958. Pp. 894. \$6.75.

Rockcastle, Verne N. and Gordon, Eva L. Science Books for Children. Cornell Rural School Leaflet, Teachers Number, Vol. 51, No. 1. Ithaca, New York: State College of Agriculture, Cornell University, Fall, 1957. Pp. 64. \$0.40.

## B. Junior High Schools

### 1. Purposes

#### "Science in the Junior High School

##### Description of Program:

The following objectives will be pursued for strengthening science instruction at the junior high school level (grades 7, 8, and 9):

The improvement of the sequence in the development of science concepts from the elementary school to the senior high school level.

The development of a more varied science program for grades 7, 8, and 9 to meet the increasing range of aptitudes, interests and abilities of students at this level, including programs for both rapid and slower learners.

The improvement of library enrichment and reference materials to increase learning opportunities and science vocabulary development.

Extended and improved uses of the laboratory and laboratory methods to encourage scientific concept developments through individual and group activities in experimentation.

The encouragement of science class projects, as clubs and other activities, which will provide added opportunities for all students to enrich their science experiences through both group and individual activities.

The development in students understandings of the significance of knowledge of science in the lives of citizens, its relationship to other learning areas, and the opportunities the fields of science offer to individuals.

Assistance to teachers in their adaptation to, and adoption of, newer methods and practices relative to the enrichment of instruction in science through the media of improved equipment, materials, and aids.

The acceleration of the vertical program in science for the more rapid learners in grades 7, 8, and 9.

Increased supervisory services, and improved equipment and materials in junior high school science will enhance instruction at this level."

## 2. Approved Science Equipment and Materials (Junior High Schools)

Please refer to page 11, "2. Approved Science Equipment and Materials (Senior High Schools)." Here will be found a fairly complete guide for the purchase of science equipment and materials including audio-visual items and printed science materials. To the degree that the units of instruction in junior high school science call for the use of items discussed on pages 11-12, the Department will regard their purchase also for use in the science program in each junior high school provided each such junior high school consists of grades 7, 8 and 9, or grades 7 and 8 which conform to Standard 14, Circular No. 100a; or grades 7, 8 and 9 or grades 7 and 8 which conform to Standard 16, Circular No. 100a as reimbursable.

Printed materials for junior high science pupils will be regarded as reimbursable if selected from sources listed on pages 11-12 for senior high schools provided such materials are selected with regard to the interests and reading level of junior high school pupils. Due to the fact that some junior high school pupils will still be reading at the elementary school level, printed materials regarded as primarily for elementary school pupils will also be regarded as reimbursable if purchased for junior high school pupils.

## C. Senior High Schools

### 1. Purposes

#### "Science in the Senior High School

##### Description of Program:

The following objectives will be pursued for strengthening science instruction at the senior high school level (grades 9-12 or 10-12, depending on the type of organization):

The development of increased depth and breadth of offerings in the senior high school science program to provide maximum learning opportunities for both rapid and slower learners, commensurate with the individual interests, aptitudes, and abilities. Recommended minimum offerings are listed in Circular No. 100b, "Design for and Staffing of a Minimum Program for Secondary Education in Iowa: Grades 9-12," 1958.

The improvement of teaching methods and practices commensurate with the newer concepts and programs in high school science.

The improvement of library and classroom enrichment materials to aid in improving proficiency in scientific concept developments and science language vocabulary growth.

Extended and improved uses of the laboratory and laboratory methods suitable to both individual and group activity.

The addition of needed equipment and materials for enrichment of instruction.

The expansion of activities related to science instruction as science clubs, science fairs, etc., to encourage independent group and individual science learning activities.

The development in students of understandings of the significance of knowledge of the sciences in the lives of citizens, its relationship to other learning areas, and the opportunities the respective areas of science offer to individuals as a career.

Assistance to teachers in making adaptations to, and implementing, newer methods and practices relative to enriching science instruction, and orientation to newer content approaches and developments.

The acceleration of the vertical program in science for the more rapid learners.

Increased supervisory services, and improved and additional equipment, facilities, and materials at the senior high school level will enhance the improvement of the science program."

## 2. Approved Science Equipment and Materials (Senior High Schools)

Circular No. 100c, Science Apparatus, Equipment and Facilities Approved for Iowa High Schools, issued by the Department of Public Instruction, exclusive of items which are supplies (litmus paper, for example), shall be regarded as an approved source for determining the type of science equipment and materials for purchase for senior high school use.

Likewise, materials and equipment listed or cited in Standards for Materials and Equipment for the Improvement of Instruction in Science, Mathematics, and Modern Foreign Languages prepared by the Council of Chief State School Officers, 1201 Sixteenth Street, N. W., Washington, D.C., 1958, shall be regarded as an acceptable guide for making decisions as to the purchase of science equipment, materials and printed materials for science other than textbooks and workbooks. (Circular No. 100c and the publication referred to in the preceding sentence accompany this guide.)

The Department of Public Instruction desires to give special emphasis to equipment and materials for audio-visual instruction in science. Items such as the following shall be regarded as acceptable: projectors (opaque, filmstrip, lantern-slide, overhead, motion-picture, micro-projector), radio receiver, television receiver, record players, recorder (disc or tape), transcribers (disc or tape), camera, films, filmstrips, slides and transparencies, recordings (disc or tape), screens, felt and magnetic board equipment.

Museum and display materials such as those listed below will be acceptable: display cabinet, display rail, prepared exhibits and mounted biological specimens. Other prepared materials which will be regarded as acceptable are: pictures, charts, graphs, maps and models.

Printed materials for senior high school science pupils cover a wide variety of topics and types of materials. They should include books (not textbooks), periodicals, pamphlets, papers, charts and graphs prepared for use by both pupils and teachers. As an alternative to the inclusion herein of an extensive list of acceptable items, the Department will regard as acceptable for reimbursement items selected from authentic sources such as those listed below:\*

American Association for the Advancement of Science and The National Science Foundation. An Inexpensive Science Library: a Selected List of Paperbound Science Books. 1515 Massachusetts Avenue, N.W., Washington 5, D.C.; The American Association for the Advancement of Science, 1958. Pp. 38. \$0.25.

American Association for the Advancement of Science and The National Science Foundation. The Traveling High School Science Library. 1515 Massachusetts Avenue, N. W., Washington 5, D.C.; The American Association for the Advancement of Science, 1958. Pp. 68. \$0.25.

American Library Association. Basic Book Collection for High Schools. Chicago: American Library Association, 1957. Pp. v + 186. \$2.75.

Booklist and Subscription Books Bulletin. Chicago: American Library Association. Subscription, \$6. Published twice each month.

Readers' Guide to Periodical Literature. New York: H. W. Wilson Company. (Subscription basis; write to company for information.)

Science Research Associates, 57 West Grant Avenue, Chicago 10, Illinois.

Standard Catalog for High School Libraries. New York: H. W. Wilson Company. (Subscription basis; write to company for information.)

### III. MATHEMATICS

#### Purposes, Materials and Equipment

The Iowa plan for the implementation of Title III, filed with and approved by the U. S. Office of Education, includes the purposes for the improvement of instruction in mathematics:

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\*This list overlaps to a degree the one appearing in the attached pamphlet on standards prepared by the Council of Chief State School Officers to which reference has already been made herein. Either or both lists are regarded by the Department as acceptable sources of printed materials.

## A. Elementary Schools

### 1. Purposes

#### "Mathematics in the Elementary Schools"

##### Description of Program:

The following objectives will be pursued for strengthening instruction in mathematics at the elementary school level:

Further development of the arithmetic program in elementary schools to provide introduction to the children the great variety of ways mankind has tried to describe in quantities the things he finds in his world.

Emphasis will be placed upon the meaningfulness of our number system and how it works.

The development of improved methods and media to help children discover how to solve problems rather than perform rote operations.

Assist teachers to develop greater facility in understanding and working with number systems.

Assist teachers to achieve the following program goals for elementary arithmetic through: designing richer and more challenging mathematics programs for pupils who are potentially strong in this field; and increasing the use of realistic and concrete learning experiences.

The revision of the mathematics program to provide for the introduction of needed new concepts.

The improvement of the grade placement of numerous skills and concepts.

The development of greater emphasis on the problem solving approach in learning elementary mathematics.

The improvement of resource materials such as enrichment reading materials; adding machines; counting frames; compasses; demonstration boards; other demonstration materials; films; filmstrips; and globes.

Make elementary mathematics an interesting, challenging, and exciting experience through a coordinated program of assistance to local schools.

It is anticipated that with increased supervisory services and improved facilities the elementary mathematics program will show much improvement."

## 2. Approved Mathematics Equipment and Materials (Elementary Schools)

When items of the type included in this section are purchased for exclusive use in the program of instruction in mathematics in each elementary school building of a school system, they will be regarded as reimbursable.

### Types of Acceptable Equipment and Materials

(Asterisks indicate essential or basic items.)

- \*Abacus - pupil and demonstration
- Adding machine
- \*Balances, single beam and weights
- Brush, varnish
- C-clamps, assortment
- \*Chalkboard instruments such as:
  - Compasses, several
  - Protractors, several
  - Meter sticks, several
  - Stencils for geometric figures, several
- Charts, mathematical applications
- Chisel, wood
- \*Compass, magnetic
- Computing machine
- \*Counting blocks
- \*Decimalized tape
- Deeds and abstracts
- \*Display space for books, pamphlets, and models
- \*Drawing board and instruments including T-square
- \*Duplicator (providing for the use of several colors)
- Felt board
- Felt and magnetic board equipment
- File
- Film library equipment
- \*Filmstrips
- \*Flash cards
- Gas and electric meter dials
- Gear sets
- Hammer, claw
- Hinges, assortment
- Historical articles and models, mathematically related
- Household measures
- Knife, utility
- Laboratory space with proper equipment
- Maps drawn to different scales, assortment
- Microfilm projector
- Motion picture camera
- \*Motion picture films
- \*Motion picture projector
- Number games
- Odometer
- \*Opaque projection pictures
- \*Opaque projector
- \*Overhead projector
- \*Pantograph
- Paper cutter

- \*Peg board
  - Pictures, mathematically related
  - Pliers
- \*Plumb bob
  - Posters, mathematically related
- \*Printed materials pertaining to mathematics
  - Projection pointers
- \*Projection tables and stands
- \*Projector screen (a screen permanently installed in each classroom in which mathematics is taught is desirable)
- \*Proportional divider
  - Punch, paper
  - Radio
  - Record and transcription player
  - Records and transcriptions
- \*Rectangular coordinate chalkboard or charts
  - Saw
  - Science demonstration table
  - Screwdrivers
  - Shears, paper and tin
- \*Slated globe
- \*Slide and filmstrip projector
- \*Slides
  - Sound slidefilms and equipment
  - Square, carpenter's
  - Stereographs
  - Stock and bond certificates
- \*Student pencil compasses, one for each student
- \*Student protractor rulers, one for each student
- \*Student rulers, metal edge, one for each student
- Study prints
- Sundial
- Tape recorder and pre-recorded tapes
- Tax forms
- Television receiver
- \*Thermometer for demonstration purposes
- \*Time - teaching clock
- \*Toy money
- Transparencies
- \*Triangle,  $30^{\circ} - 60^{\circ}$
- \*Triangle,  $45^{\circ} - 90^{\circ}$
- \*Typewriter with mathematical keys
- Yardsticks

Printed materials in mathematics for use by pupils and teachers cover a wide variety of topics. Illustrative titles of acceptable titles of printed mathematics materials are given on pages 19-20 of the bulletin on standards released by the Council of Chief State School Officers to which reference has already been made in this guide. (See page 11.)

"The Elementary School Mathematics Library" is a reprint from the February, 1956 issue of the magazine, The Arithmetic Teacher. In order to secure this reprint, write to National Council of Teachers of Mathematics, 1201 Sixteenth Street, N. W., Washington 6, D.C.

Books, pamphlets and periodicals relating to mathematics listed in standard library catalogs and publications and acceptable. (See Department's Circular No. 100d, A Guide for the Development of School Library Services, for a list of these sources.)

## B. Junior High Schools

### 1. Purposes

#### "Mathematics in the Junior High School"

##### Description of Program:

The following objectives will be pursued for strengthening instruction in mathematics at the junior high school level (grades 7, 8, and 9):

More realistic understanding of the need for a varied curriculum in mathematics to meet the increasing range of aptitudes, interests, and abilities of students at this level, including programs for both rapid and slower learners.

The improvement of teaching methods commensurate with newer concepts and ideas developing in mathematics.

The development of more efficient and extensive use of improved equipment and teaching aids available for the enrichment of learning in mathematics.

The improvement of library and reference materials, facilities and equipment, - forward looking in terms of goals, content and methods, of improved mathematics programs adaptable to individual and group learning situations.

The development of proficiency in fundamental skills; the improvement of vocabulary in mathematics; the development of wholesome attitudes towards mathematics from the point of view of its applications, the desirability of a more mathematically literate citizenry, and the study of mathematics for its own sake.

Increased emphases upon ideas, exploration, observation, meanings, experimentation, problem solving, and discovery on the part of students.

Carefully conceived, well planned experimental programs will be encouraged.

It is anticipated that increased supervisory services, and improved equipment and materials will greatly enhance the achievement of improved junior high school mathematics programs in Iowa."

### 2. Approved Mathematics Equipment and Materials (Junior High Schools)

When a junior high school operates as a unit in accordance with one of the definitions of such a school contained in Circular No. 100a, items of the type included in the section following for senior high schools are purchased for use in the mathematics department of each such junior high school in a school system, will be regarded as reimbursable.

The equipment, materials and library items appropriate to senior high schools are appropriate in large measure also for use in junior high schools. Consequently, until such time as it has been possible to prepare a separate list, purchases for junior high schools selected from



items of the type included in the list for senior high schools will be regarded as acceptable.

Illustrative titles appropriate for the junior high school library appear on pages 20-21 of the standards released by the Council of Chief State School Officers. (See page 11 of this guide for complete title of this bulletin.)

The same sources cited as acceptable for the purchase of library items for senior high schools may be used also for junior high school purchases. Materials appropriate for upper elementary grades may also be regarded as acceptable.

## C. Senior High Schools

### 1. Purposes

#### "Mathematics in the Senior High School

##### Description of Program:

The following objectives will be pursued for strengthening instruction in mathematics at the senior high school level (grades 9-12 or 10-12, depending on the type of organization):

The development of increased depth and breadth of offerings in the senior high school mathematics program to provide maximum learning opportunities for both rapid and slower learners, commensurate with individual interests, aptitudes, and abilities.

Recommended minimum offerings are listed in Circular No. 100b, 'Design for and Staffing of a Minimum Program for Secondary Education in Iowa: Grades 9-12,' 1958.

The improvement of teaching methods commensurate with newer concepts and ideas developing in the field of mathematics.

The development of more efficient and extensive use of improved equipment and teaching aids available for the enrichment of learning in mathematics.

The improvement of library and reference materials, facilities and equipment, - forward looking in terms of goals, content, and methods, of improved mathematics programs adaptable to individual and group learning situations.

The development of proficiency in fundamental skills; the improvement of vocabulary in mathematics; the development of wholesome attitudes towards mathematics from the point of view of its applications, the desirability of a more mathematically literate citizenry, the study of mathematics for its own sake, and the relationship of mathematics to other areas of learning.

Emphases will be placed upon encouraging ideas, exploration, observation, meanings, experimentation, problem solving, and discovery on the part of students.

Carefully conceived, well planned experimental programs will be encouraged.

It is anticipated that increased supervisory services, and improved equipment and materials will greatly enhance the achievement of high school mathematics programs in Iowa."

## 2. Approved Mathematics Equipment and Materials (Senior High Schools)

When items of the type included in this section are purchased for exclusive use of the mathematics department of a senior high school of each building of a school system, they will be regarded as reimbursable.

### Types of Acceptable Equipment and Materials

(Asterisks indicate essential or basic items.)

- Abacus
- \*Alidade
- \*Altimeter
- \*Angle mirror
- \*Balances, single beam and weights
- Brush, varnish
- Calculating machine
- \*Calipers, verniers
- C-clamps, assortment
- \*Chalkboard instruments such as:
  - Compasses, several
  - Protractors, several
  - Meter stick, several
  - Stencils for geometric figures, several
- Chartometer
- Charts, mathematical applications
- Chisel, wood
- Circular slide rule
- \*Clinometer
- \*Colored pegs
- \*Compass, magnetic
- Computing machine
- \*Decimalized tape
- Deeds and abstracts
- \*Demonstration slide rule
- \*Display space for books, pamphlets, and models
- \*Drawing board and instruments including T-square
- \*Duplicator (providing for the use of several colors)
- Felt and magnetic board equipment
- Felt board
- File
- Film library equipment
- \*Filmstrips
- Gas and electric meter dials
- Gear sets
- Hammer, claw
- \*Hand level
- Hinges, assortment

Historical articles and models, mathematically related  
 Household measures  
 \*Hypsometer  
 \*Inclined plane  
 \*Jacob's staff  
 Kits for computer instruments  
 Knife, utility  
 Laboratory space with proper equipment  
 Map projector device  
 Maps drawn to different scales, assortment  
 Microfilm projector  
 \*Micrometer, screw  
 Motion picture camera  
 \*Motion picture films  
 \*Motion picture projector  
 Odometer  
 \*Opaque projection pictures  
 \*Opaque projector  
 \*Overhead projector  
 \*Pantograph  
 Paper cutter  
 \*Parallel rulers  
 Pictures  
 \*Plane table  
 \*Planimeter  
 Pliers  
 \*Plumb bob  
 Posters  
 \*Printed materials pertaining to mathematics  
 Projection pointers  
 \*Projection tables and stands  
 \*Projector screen (a screen permanently installed in each  
 classroom in which mathematics is taught is desirable.)  
 \*Proportional divider  
 \*Protractor, circular  
 Punch, paper  
 \*Pythagorean model  
 Radio  
 Record and transcription player  
 Records and transcriptions  
 \*Rectangular coordinate chalkboard or charts and polar  
 coordinate chalkboard or charts  
 Saw  
 \*Scales, architect  
 Science demonstration table  
 Screwdrivers  
 \*Set of transparent mathematics geometric models  
 \*Sextant  
 Shears, paper and tin  
 \*Slated globe  
 \*Slide and filmstrip projector  
 \*Slides  
 Sound slidefilms and equipment  
 Square, carpenter's  
 Stereographs  
 Stock and bond certificates

- \*Stop watch
- \*Storage cabinets
- \*Student pencil compasses, one for each student
- \*Student protractor rulers, one for each student
- \*Student rulers, metal edge, one for each student
- \*Student slide rules, one for each student
- Study prints
- Tape recorder and pre-recorded tapes
- Tax forms
- Television receiver
- Transparencies
- \*Transit-level and rod
- \*Triangles, 30° - 60°
- \*Triangles, 45° - 90°
- \*Typewriter with mathematical keys
- Vector demonstration board
- \*Vernier scale
- Yardsticks

Printed materials in mathematics for use by pupils and teachers in senior high schools are too extensive to be included within the space limitations of this guide. In addition to the standard sources cited in the Department's Circular No. 100d, A Guide for Development of School Library Services, the bulletin on standards published by the Council of Chief State School Officers, pages 21-23, gives illustrative titles on mathematics which are acceptable for senior high school libraries. (See page 11 of this guide for the complete title of this bulletin.)

The following additional sources are approved:

An annotated list of 115 mathematics books on various levels, including a list of periodicals, is available free of charge under the title, Bibliography of Mathematics for Secondary School Libraries. Write to the Department of School Services and Publications, Wesleyan University, Middletown, Connecticut.

"The High School Mathematics Library" is a reprint from the February and March, 1954, issues of the magazine, The Mathematics Teacher. It is available at a price of 20¢. Order from the National Council of Teachers of Mathematics, 1201 Sixteenth Street, N. W., Washington 6, D.C.

Selected Bibliography of Reference and Enrichment Material for the Teaching of Mathematics, gives selected titles in history, teaching, recreation and enrichment of mathematics. Its official designation is 1958, Circular No. 347. It is available free from the Office of Education, U. S. Department of Health, Education, and Welfare, Washington 25, D.C.

#### IV. MODERN FOREIGN LANGUAGES

##### Purposes, Materials and Equipment

The Iowa plan for the implementation of Title III, filed with and approved by the U. S. Office of Education, includes the purposes for the improvement of instruction in modern foreign languages:

## A. Elementary Schools

### 1. Purposes

#### "Modern Foreign Languages in Elementary Schools

##### Description of Program:

Since relatively few elementary schools in Iowa are attempting to teach modern foreign languages, the following objectives will be pursued for strengthening instruction in this field on the elementary level:

The encouragement of pilot studies and programs wherever possible.

The development of programs which will emphasize orientation of children to, and interest them in, the use of a second language rather than stressing functional skills.

Encouragement of the development of exploratory language programs which will provide teaching personnel with opportunities to use and evaluate a variety of approaches and materials prior to any statewide implementations.

The development of programs in elementary schools which will employ the listening and speaking technique, since languages can best be learned using this approach.

The procurement and use of helpful language materials and teaching aids such as: songs, stories, pictures, maps, and other real objects.

Provide assistance to elementary schools in the acquisition of equipment for use in enriching and expediting the teaching of foreign languages, as: tape recorders, record players, records and tapes, specialized films, and related materials necessary to an effective program.

Develop plans for assisting classroom teachers in implementing foreign language programs via the live performance approach.

It is anticipated that progress can be made in the elementary foreign languages program through the program of increased supervisory services and financial assistance for equipment and materials."

### 2. Approved Equipment and Materials for Modern Foreign Languages (Elementary Schools)

When items of the type included in this section are purchased for the exclusive use in connection with the modern foreign languages program of each elementary school building of a school system, they will be regarded as reimbursable.

## Types of Acceptable Equipment and Materials

(Asterisks indicate essential or basic items.)

- \*Charts and graphics
- \*Equipment for local production of audio-visuals
- \*Felt and magnetic board equipment
  - Film library equipment
  - Filmstrip previewers
- \*Filmstrip projectors (remote control)
- \*Filmstrips
- \*Games and pictures
  - Globes
- \*Language laboratory equipment
- \*Library materials for pupil and teacher use
- \*Maps, two for each language
- \*Materials for local production of audio-visuals
  - Microfilm projector
  - Microfilms
  - Motion picture camera
- \*Motion picture films
- \*Motion picture projector
  - Opaque projector
  - Opaque projector pictures
  - Overhead projector
- \*Pre-recorded magnetic tapes
- \*Projection tables and stands
  - Projector pointers
- \*Projector screen (a screen permanently installed in each classroom in which modern foreign language is taught is desirable)
- Radio
- \*Record and transcription player (3 speeds)
- \*Records and transcriptions
- \*Room darkening and light control equipment
- \*Slide projector (may be combination with filmstrip)
- \*Slides
  - Sound slidefilm equipment
  - Sound slide films
- \*Tachistoscopic devices
- \*Tachistoscopic materials
- \*Tape recorder and playbacks (one for each 15 students)
  - Television receiver
  - Transparencies

Library materials may include children's books printed in modern foreign languages and also professional books on the teaching of modern foreign languages. Package Library of Foreign Children's Books, 69-41 Groton Street, Forest Hills 75, New York, is an acceptable source for the purchase of such books. Books in English relating to the cultural aspects of the people whose language is being studied, selected from standard library catalogs and booklists, are also acceptable.\*

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\*See Department's Circular No. 100d, A Guide for Development of Library Services for such standard library catalogs and book lists.

The suggested source references appearing on pages 35-38 of the bulletin on standards published by the Council of Chief State School Officers contain equipment, materials and listings of items which the Department of Public Instruction regards as acceptable. (See page 11 of this guide for complete title of this bulletin.)

## B. Junior and Senior High Schools

### 1. Purposes

#### "Modern Foreign Languages in the Junior and Senior High Schools

##### Description of Program:

Since modern foreign language programs in Iowa are not extensive in junior and senior high schools, the following objectives will be pursued to improve existing programs and to develop new ones:

The determination of existing programs in modern foreign languages in both the junior and senior high schools of Iowa, and the evaluation of such programs.

To foster and engender a concern for, and an appreciation of, the place of modern foreign languages in the total educational program of the schools.

The promotion of expansion and improvement of existing programs.

The development of new programs and experimentation.

The development of workshops, conferences, and other such media for assisting administrators and teachers in the inauguration of new programs and/or the improvement of existing programs through adaptation to and/or the adoption of newer techniques, concepts, equipment and materials for the enrichment of instruction.

The improvement and expansion of teaching equipment, materials, and aids, as: maps, charts, newspapers, periodicals, games, tapes, records, films, tape recorders, record players, projectors, and other audio-visual aids.

The establishment of foreign languages laboratories wherever possible.

The achievement of the following outcomes, among others, on the part of students: ability to listen and understand a basic vocabulary of a language other than English; ability to make oneself understood in a second language; ability to read common materials as newspapers, periodicals, letters, etc.; and ability to write letters, simple explanations, and related items.

It is anticipated that with increased emphasis on modern foreign languages, expanded supervisory services, and the improvement of equipment and materials the following results may be achieved:

the improvement of instruction in present programs; the expansion of present programs; the establishment of new programs; specialized programs for the talented students; progress in the establishment of language laboratories; the number of students taking modern foreign languages will be considerably increased."

2. Approved Equipment and Materials for Modern Foreign Languages  
(Junior and Senior High Schools)

When items of the type included in this section are purchased for the exclusive use of the secondary school modern foreign languages department of each building in a school system housing a junior or senior high school unit, or both as defined in Standards 13, 14, 15, 16, and 17, they will be regarded as reimbursable.

Types of Acceptable Equipment and Materials

(Asterisks indicate essential or basic items.)

- \*Charts and graphics
- \*Dictionaries, modern language, two for each 30 students
- \*Equipment for local production of audio-visuals
- \*Felt and magnetic board equipment
  - Film library equipment
  - Filmstrip previewers
- \*Filmstrip projector (remote control)
- \*Filmstrips
- \*Globes
- \*Language laboratory equipment
- \*Library materials for pupil and teacher use
- \*Magazine subscription, one for each language
- \*Maps, two for each language
- \*Materials for local production of audio-visuals
  - Microfilm projector
  - Microfilms
  - Motion picture camera
- \*Motion picture films
- \*Motion picture projector
- \*Newspaper subscription - one for each language
  - Opaque projector
  - Opaque projector pictures
  - Overhead projector
- \*Pictures
- \*Pre-recorded magnetic tapes
  - Projection pointers
- \*Projection tables and stands
- \*Projector screen (a screen installed in each classroom in which modern foreign language is taught is desirable)
  - Radio
- \*Record and transcription player (3 speeds)
- \*Records and transcriptions
- \*Room darkening and light control equipment
- \*Slide projector (may be combined with filmstrip projector)
- \*Slides
  - Sound slide films
  - Sound slidefilm equipment



\*Tachistoscopic devices  
\*Tachistoscopic materials  
\*Tape recorder and playbacks (one for each 15 students)  
Television receiver  
Transparencies

Library materials may include fiction and non-fiction books (not textbooks) and printed materials all printed in the modern foreign language studied. Books and other printed materials in English may be purchased when they bear on the development of an understanding of the humanistic or cultural aspects of the people whose language is being studied, provided they are selected from lists acceptable to the Department of Public Instruction and from standard library catalogs and book lists.\*

The suggested source references appearing on pages 35-38 of the bulletin on standards published by the Council of Chief State School Officers contain equipment, materials and listings of items which the Department of Public Instruction regards as acceptable. (See page 11 of this guide for complete title of this bulletin.)

#### V. STANDARDS FOR MINOR REMODELING

The approved Iowa plan for Title III contains the following standards for minor remodeling:

##### "Standards for Minor Remodeling

Minor remodeling projects shall comply with all applicable building, fire and other public safety regulations of the State and community.

The remodeling project shall be necessary to make more effective use of equipment acquired through a project approved under the State plan.

Remodeling shall only be applicable to existing space of a building completed before establishing a project.

Applications for minor remodeling projects shall be accompanied by comprehensive plans and descriptions of the proposed projects.

Approximate costs of materials and labor for proposed projects shall be ascertained and submitted by the local agency.

Evidence shall be submitted with applications showing that the project was cooperatively planned, using such personnel as a qualified consultant(s), teacher(s), administrator(s), and students.

Remodeling projects shall provide for adaptability to the instructional program for which designed, and contribute to the achievement of the objectives of the planned program.

Projects shall provide for maximum flexibility as to uses for different areas of the field of instruction, grade levels of students, and ability levels of students.

\*See Department's Circular No. 100d, A Guide for Development of Library Services for such standard library catalogs and book lists.

The project will be considered in the light of its utilitarian value such as improvements related to demonstration teaching, group and individual student experimentations and other student learning activities including the uses of audio-visual equipment and materials.

The following areas, among others, which will be considered in remodeling projects are: electrical, light control, plumbing, storage, rearrangement and/or expansion of present facilities."

## VI. APPLICATION AND APPROVAL PROCEDURE FOR PLANS OF LOCAL EDUCATIONAL AGENCIES

### Application Procedure

It is essential under the purpose of Title III of Public Law 85-864 and the approved Iowa State Plan, that local educational agencies apply for approval to the State Department of Public Instruction of planned programs for strengthening and improving instruction in science, mathematics, and modern foreign languages in the public schools.

#### "Form

Forms will be developed by the Department of Public Instruction for the use of the local school agencies in submitting applications for participating in projects under Title III and this Plan.

Separate applications shall be filed for each elementary school, junior high school, senior high school . . . project, depending on the internal organization of the school system.

Appropriate information will be provided to local agencies for their consideration and planning relative to participation on a matching basis under Title III in programs for acquisition of equipment and materials of instruction, including audio-visual materials, and minor remodeling in the public elementary and/or secondary schools of the State."

The application for program approval forms are available from the State Department of Public Instruction. It is suggested that the application for each program be filled out in quintuplicate. Four copies are to be sent to the State Department for consideration while one copy can remain in the local school files.

It must be emphasized that separate applications must be made for elementary, junior high, senior high, or combined junior-senior high school programs; and separate applications must be made in science, mathematics, and modern foreign languages; and that these several applications for programs must be submitted to the State Department of Public Instruction in quintuplicate.

New applications shall be made for each year of participation.

Upon receipt of the application forms for program approval, the State Department of Public Instruction will process the applications with available personnel as rapidly as possible. The applications will be considered in terms of completeness and appropriateness according to the standards of priority and other standards presented in this guide.

A copy of the planned program, upon completion of processing, will be returned to the local educational agency as approved, modified, or unapproved. A second copy will be mailed direct to the local county superintendent for his file.

#### Deadline for Filing Application

The Iowa State Plan for Title III provides for the establishment of application deadlines.

#### "Time of Submittal

The State agency may establish terminal dates for filing applications by local agencies."

Consequently, it is the responsibility of the Department of Public Instruction to establish and notify all schools of terminal dates for application of programs under this Title. It is contemplated that, with the potential of additional staff and the establishment of a routine for processing applications, these terminal dates will vary from year to year.

#### Deadline for and Methods of Appealing Priority Decisions

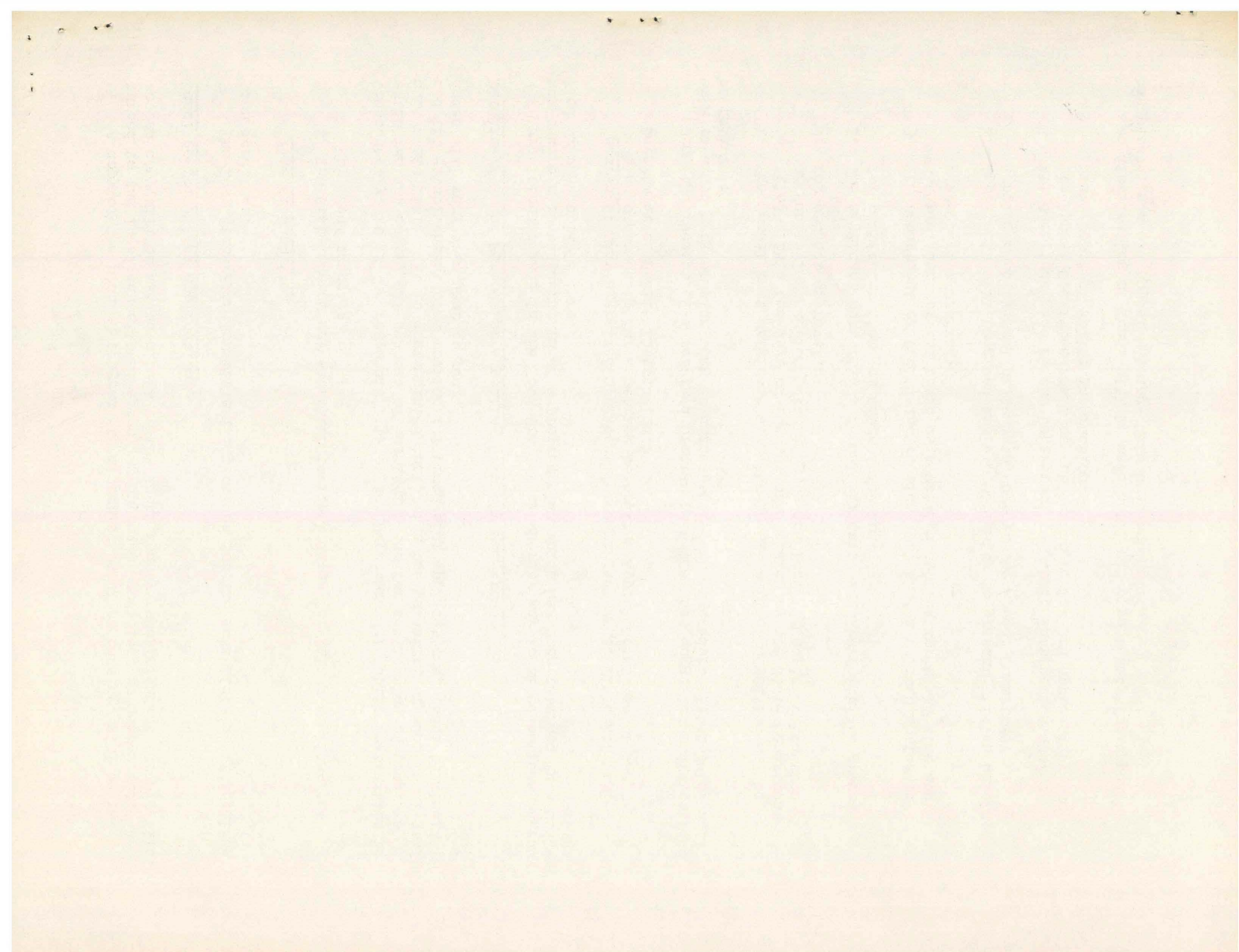
Provision is made in the Iowa State Plan whereby any local educational agency may secure a reconsideration of a program plan which has been returned in a modified or unacceptable form.

"Hearings. Any aggrieved applicant for a project under Title III will have an opportunity for a hearing before the Appeal Committee of the Department of Public Instruction."

Upon the receipt of a returned program plan that has suggested modifications or a returned program plan that is unacceptable, the procedure listed below will be followed:

1. The appeal must originate with the local board of education and be filed within ten days of receipt of decision by the State Department of Public Instruction pertaining to the local agency's application for project approval.
2. The applicant must file a formal affidavit setting forth the grounds for particular items of dissatisfaction.
3. The Department of Public Instruction will send a written notice to the president of the board of education setting forth the time and place of the hearing.
4. Appellants will be given ample opportunity to present written briefs, supplemented by oral statements, before the Appeal Committee.
5. All decisions made by the Department of Public Instruction and/or its Appeal Committee shall be subject to review and approval by the State Board of Public Instruction.

No distribution of funds will be made until all opportunity for appeal has passed, and all appeal hearings have been conducted.



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**Guide for purchase of equipment and  
minor remodeling suitable for the  
improvement of instruction in science,  
mathematics, or modern foreign languages  
in the elementary or secondary schools or  
both**

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