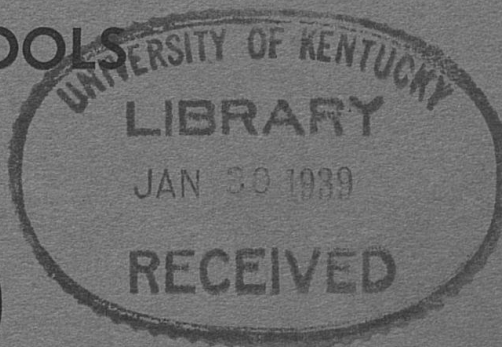


● Commonwealth of Kentucky ●
EDUCATIONAL BULLETIN

Manual of
**ORGANIZATION
AND ADMINISTRATION FOR
HIGH SCHOOLS**



Published By
DEPARTMENT OF EDUCATION

H. W. PETERS
Superintendent of Public Instruction

ISSUED MONTHLY

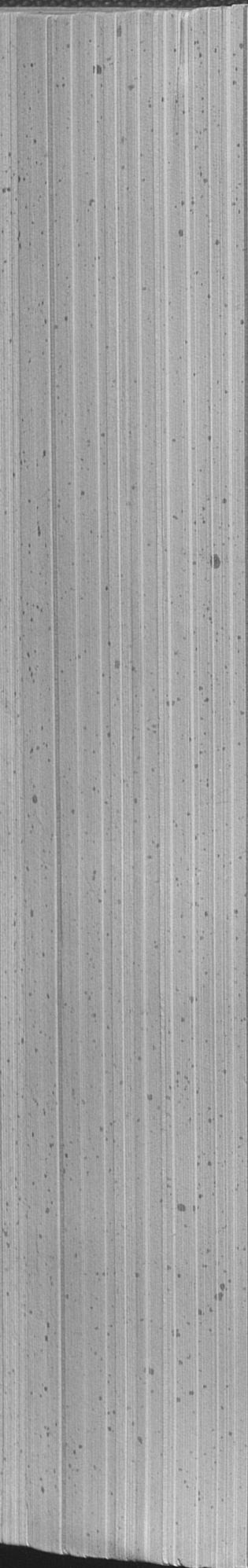
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TABLE OF CONTENTS

	Page
Chapter I. Aims and Objectives of Secondary Education.....	7
Chapter II. Definition of Terms	16
Chapter III. Standard for High Schools	20
Regulations of the State Board of Education Govern- ing the Accrediting of High Schools	20
Standards for Junior High Schools	25
Standards for Senior High Schools and Six-Year High Schools	27
Miscellaneous Regulations of the State Board of Education	27
Admission to High School	27
Correspondence Work and Private Tutoring.....	28
Summer Schools	28
Buildings and Repairs	29
Observance of Holidays	29
Credit in Applied Music	29
Credit for High School Subjects Completed in Civilian Conservation Camps	30
Chapter IV. Curricula for High Schools	32
Curricula for High Schools Employing Fewer Than Six Teachers	32
Four-Year High School—Three Teachers: Academic Curriculum	36
Four-Year High School—Four Teachers: Academic Curriculum	38
Agriculture and Home Economics Curriculum.....	40
Four-Year High School—Five Teachers: Academic Curriculum	42
Agriculture and Home Economics Curriculum.....	44
Commercial Education Curriculum	46
Departmentalized Junior High School—Two Teachers: Three-Year Junior High School Curriculum.....	48
Four-Year Junior High School Curriculum.....	50
Six-Year High School—Four Teachers: Academic Curriculum	52
Six-Year High School—Five Teachers: Academic Curriculum	54
Agriculture and Home Economics Curriculum.....	56
Suggested Programs of Study for High Schools Employing Six or More Teachers	58
Junior High School Program of Studies.....	58
Four-Year High School Program of Studies.....	59
Senior High School Program of Studies	60
Program of Studies for Reorganized Junior-Senior and Six-Year High Schools	62

TABLE OF CONTENTS—Continued

	Page
Chapter V. Extra-Curricular Activities	64
Suggestions Relative to the Organization and Direc- tion of Extra-Curricular Activities	64
Some Activities Which the School Should Provide.....	66
Athletics	66
Assembly	66
Home Room	68
Clubs	70
School Paper	74
Dramatics	76
National Honor Society	76
Chapter VI. The High School Library	77
Regulations of the State Board of Education: High School Libraries	77
Location, Size and Equipment of the Library	79
Training of Pupils in the Use of the Library.....	84
Finding Room for the Library in Small Schools	84
The Book Collection	84
The Librarian	86
Chapter VII. The Science Laboratory and Other Needed Equipment..	88
The Science Laboratory	88
Equipment	88
Laboratory Layout	90
Science Apparatus	95
Science Reference Material	97
Biology	98
Chemistry	103
General Science	110
Physics	116
Physiology and Hygiene	125
Equipment for Vocational Courses	127
Equipment for Treatment in Case of Accidents.....	127
Maps, Charts, Visual Aids, etc.	129
Chapter VIII. The High School Principal and His Work.....	131
The Position of the Principal in the General Organization	131
Functions Which Belong to the Superintendent.....	131
Functions Which Belong to the Principal.....	132
Duties of the Principal	132
Administrative Duties	133
Supervisory Duties	134
Extension or Social Duties	138
The Principal's Office	139
Chapter IX. Miscellaneous	141
Records and Reports	141
Teachers' Marks	143
Public School Music	145
Health and Physical Education	146
The Guidance Program	147
Work Books	150

Page
..... 64
ec- 64
..... 66
..... 66
..... 68
..... 70
..... 74
..... 76
..... 76
..... 77
igh 77
..... 79
..... 84
..... 84
..... 84
..... 86
ent.. 88
..... 88
..... 88
..... 90
..... 95
..... 97
..... 98
..... 103
..... 110
..... 116
..... 125
..... 127
..... 127
..... 129
..... 131
..... 131
..... 131
..... 132
..... 132
..... 133
..... 134
..... 138
..... 139
..... 141
..... 141
..... 143
..... 145
..... 146
..... 147
..... 150

Foreword

This Manual replaces the Manual of Organization and Administration for High Schools published in 1933. The chief aim of this publication is to organize a body of information and interpretation which will be useful to the secondary schools of the state.

The development and improvement of secondary schools must be promoted by both state and local authorities. The law charges the State Board of Education with the responsibility of accrediting high schools. In exercising this duty it is necessary to require some uniformity of practice and to prescribe school procedures necessary to maintain these standards. This the Manual attempts to do.

This Manual was prepared and edited by Mark Godman, Director of Supervision.

H. W. PETERS,
State Superintendent of Public Instruction.

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Chapter I

AIMS AND OBJECTIVES OF SECONDARY EDUCATION

All school activities, including class activities, extra-class activities, guidance and all other experiences provided for the education and development of pupils, should be determined in the light of the accepted aims of education. In planning instructional activities, teachers and administrators should not only have a clear understanding and appreciation of the ultimate aims of education, but should be fully aware of the immediate contribution which the school subjects are expected to make to these ultimate aims.

There is general agreement that the school should function in such a manner as to prepare the individual for sane and successful living and, at the same time, promote the welfare of the democratic society of which he is a part. It is also generally agreed that the high school can best contribute to the betterment of society through the development of socially desirable individuals. This conception of the school was given clear expression by the Commission on the Reorganization of Secondary Education, appointed by the National Education Association, when it declared that :

"The purpose of democracy is so to organize society, that each member may develop his personality primarily through activities designed for the well-being of his fellow members and of society as a whole. . .

Consequently, education in a democracy, both within and without the school, should develop in each individual the knowledge, interests, ideals, habits and powers whereby he will find his place and use his place to shape both himself and society toward ever nobler ends."

In order to realize the goal of education as expressed above, the following objectives were set up by the Commission (Cardinal principles, page 10) :

1. Health
2. Command of Fundamental Processes
3. Worthy Home Membership
4. Vocation
5. Civic Education
6. Worthy Use of Leisure
7. Ethical Character

The above-stated objectives have guided our thinking concerning secondary education for almost a decade. It is now believed that the problems of today make it desirable to add another objective, namely:

8. World-Mindedness

DISCUSSION OF OBJECTIVES

1. **Health—Personal and Public.** Since every other aim of education is dependent for its realization upon good health, the objectives of health may properly be placed as the first objective of secondary education. In order to realize this objective, a number of things must be done:

- a. The school must lead the public to recognize that health needs of young people are of vital importance to society.
- b. Competent teachers must be secured who can ascertain and meet the needs of individual pupils and inculcate in the entire student body a love for clean sport.
- c. Adequate equipment must be provided in every school for health and physical activities.
- d. The school building must conform to the best standards of hygiene and sanitation.

In the high school program of training to secure and maintain a condition of personal good health and physical fitness, the following are some of the immediate objectives and outcomes which it should endeavor to achieve:

- a. Efficient health habits.
- b. Participation in good sports.
- c. Knowledge of disease prevention.
- d. Community sanitation.
- e. Proper food selection.
- f. Ability to administer first aid.
- g. Correction of common physical defects.
- h. Better bodily posture.
- i. Wearing of proper clothing.
- j. Recognition of moral obligation to be healthy.
- k. Habit of observing the rule of "safety first."
- l. Sane sex knowledge.

2. **Command of Fundamental Processes.** During the years in the elementary school, the child gains a certain command of the tools of learning. It is common knowledge, however, that the large majority of pupils who enter high school are deficient in the use of the tool subjects. One function of the high school, therefore, must be that of giving all of its pupils a better command of such knowledges and skills as they will use in everyday life.

In training designed to give the pupils command of the fundamental processes, the following are some of the immediate or specific objectives or outcomes which the school should endeavor to achieve:

- a. Ability to perform with accuracy and reasonable facility the fundamental mathematical operations.
- b. Ability to carry on a conversation and to use language in all other ways required for proper and effective participation in the community life.
- c. Ability to pronounce and spell one's words correctly.
- d. Mastery of the essentials of written composition and grammar, with special reference to letter writing.
- e. Ability to read intelligently.
- f. Ability to write with proper legibility, ease and speed.
- g. Command of an adequate reading, speaking and writing vocabulary.
- h. Ability to address an audience or to conduct a public meeting with proper dignity and formality, but without stiffness or embarrassment.
- i. Ability to use dictionary, encyclopedia, maps, atlases, card catalogs, readers' guides, indexes and other means of finding facts and materials wanted.
- j. Knowledge and understanding of the fundamentals of business practice.
- k. Ability to think clearly and effectively organize and express one's thoughts.

3. **Worthy Home Membership.** The home will always be the first fundamental institution in our civilization. Our schools should accordingly contribute in every worthy way to the best home membership and endeavor to make the home the best place on earth. This objective applies to both boys and girls. It should be one function of

the social studies to deal with the home as a fundamental social institution and to clarify its relations to wider institutions outside.

In training the pupil for worthy home membership, the following are some of the immediate objectives or outcomes that should be achieved by the high school:

- a. Ability to cooperate with members of the family, including the willingness to assume responsibility within the home.
- b. Understanding and appreciation of the home as a fundamental social institution.
- c. Respect for parental authority.
- d. Proper attitude toward the institution of marriage and the rearing of children.
- e. Knowledge of the physical, mental, moral and social qualities necessary for parenthood of desirable type.
- f. Ability to manage a household.
- g. Ability to practice the common household arts.
- h. Knowledge of food values.
- i. Knowledge of the principles of home decoration, including landscaping.
- j. Ability to make a household budget.
- k. Knowledge of the essentials of home nursing and care of the sick.
- l. Knowledge of the proper sanitary conditions that should prevail in the home.
- m. Understanding of the use of inventions in the improvement of home conditions.
- n. Skill in making minor repairs in and around the home.
- o. The will to play the part of the "good neighbor."
- p. The habit of taking care of one's clothing.
- q. Ability to keep the house, premises and equipment clean, orderly and sanitary.

4. **Vocation.** Since the happiness and prosperity of the individual, as well as our national wealth and greatness, depends to a great extent upon the vocational efficiency of our citizens, it is imperative that our high schools relate their subject matter and instruction, at least in a general way, to the training of youth in qualities fitting them for a good beginning in vocational life. The ideal demands that

pupils explore their own capacities and aptitudes to the end that they may select their vocations wisely. The ideal also demands that some definite vocational training be given to all pupils whose formal education will terminate either before the completion of a full high school course or upon graduation.

In training pupils for vocational fitness, the following are some of the immediate objectives or outcomes that the high school should endeavor to achieve:

- a. Vocational information, including knowledge of a large number of vocations and vocational opportunities.
- b. Knowledge of one's aptitudes, likes and dislikes gained through self-analysis and exploration
- c. Proper attitude toward work and respect for the occupations of others.
- d. Knowledge concerning investments and desire for economic independence. Also a desire to save a financial reserve for the unproductive period of life.
- e. Knowledge of labor conditions in various localities.
- f. Pride in one's workmanship.
- g. The habits of orderliness, accuracy, carefulness, thoroughness and punctuality.
- h. Knowledge of the relation between social movements and economic and industrial stability.
- i. Foundation of technical and professional study.
- j. Specific vocational skill for pupils who will not go beyond high school.
- k. Spirit of fairness and honesty of effort and product.
- l. Spirit of cooperation and open-mindedness.
- m. Ability to secure satisfaction in skillful performance and in rendering service through one's vocation.

5. **Civic Education.** Civic education should develop in the individual those qualities whereby he will act well his part as a member of the neighborhood, town or city, state and nation, and also give him a basis for understanding international relations. The whole scheme of individual relationships should be stressed under this objective.

In training the pupils for civic worth and efficiency, the following represent some of the immediate objectives or outcomes that should be achieved by the high school:

- a. Knowledge of citizenship rights, duties and privileges.

- b. Respect for public opinion.
- c. Knowledge of the fundamental laws.
- d. Comprehension of American ideals.
- e. Knowledge of social institutions and their work.
- f. Realization of the value of universal education.
- g. Recognition of the importance of official honesty.
- h. Respect for law and order.
- i. Realization of the necessity of cooperation in social activities.
- j. Knowledge of the relation of information to sound social judgment.
- k. Realization that individuals and social groups are mutually interdependent and have mutual responsibilities.
- l. Proper attitude toward governing authorities.
- m. Appreciation of wise leadership and intelligent followership.
- n. Greater interest in civic problems.
- o. A proper sense of social obligations.
- p. Loyalty to ideals of civic righteousness.
- q. Open-mindedness and tolerance in regard to the rights of others.
- r. Honesty, justice, reverence, purity and love of the beautiful.
- s. Realization that the optimum satisfaction of human wants depends upon the wise use of natural resources.
- t. Acquaintance with the characteristics, customs and problems of the peoples of the other nations.

6. **Worthy Use of Leisure.** In the past many schools have given little conscious thought to this objective. They have seldom treated literature, art and music so as to evoke right emotional responses and to produce enjoyment. Our high schools should set themselves definitely to the task of giving such training as will function in the cultivation of tastes and in setting up such habits of reading and study as will lead to the enjoyment of art, music and literature.

Many schools have also failed to organize the social activities of young people. Education should equip the individual to secure his leisure recreation of body, mind and spirit, and the enrichment and enlargement of his personality.

In training the pupil for the best use and enjoyment of his leisure

life, the following are some of the immediate objectives or outcomes that should be achieved by the high school:

- a. Appreciation of masterpieces of drama, music and art.
- b. Interest in diversified reading.
- c. Habit of reading good literature.
- d. Understanding of the facts and laws of nature essential to an appreciation of the physical environment.
- e. Information concerning travel.
- f. Understanding of the physiological and psychological laws of relaxation.
- g. Realization of the importance of developing and maintaining one or more avocational activities.
- h. Participation in the social life of the community.
- i. Rules of games and sports.
- j. Habit of daily participation in one or more games, sports, or other outdoor activities.
- k. Knowledge of civic, religious and social conditions and activities.
- l. Knowledge of facts from social studies, mathematics, science, manual arts useful in leisure-time situations.
- m. Appreciation and support of artistic enterprises.
- n. Good sportsmanship—interest in play.
- o. Ability to secure recreation and relaxation through wholesome indoor and outdoor sports, games, travel, music, good literature, art, conversation and hobbies such as landscaping, photography, gardening, etc.
- p. Honesty, cheerfulness, purity and reverence.

7. **Ethical Character.** In a democratic society, ethical character becomes paramount among the objectives of the secondary school. Among the means for developing ethical character may be mentioned the wise selection of content and methods of instruction in all subjects of study; the social contacts of pupils with one another and with their teachers; the opportunities offered by the organization and administration of the school for the development on the part of the pupils not only of the sense of personal responsibility and initiative, but also the spirit of service and the principles of democracy.

In training designed to inculcate in the student the finest ethical

conceptions and principles, the following are some immediate objectives or outcomes that should be achieved by the high school:

- a. Moral character.
- b. Sense of personal responsibility for one's own acts.
- c. Purity in motives and conduct and appreciation of ethical character in others.
- d. Knowledge of persons, events, movements, customs and institutions which have determined human uplift and progress.
- e. Due regard for the rights of others in all personal contacts.
- f. Sympathy for those in need or distress.
- g. Recognition of the brotherhood of man.
- h. Habits in harmony with highest ideals.
- i. Ability to be helpful to others through home, church and community activities.
- j. Self-respect, sincerity, trustworthiness, tolerance, courtesy, unselfishness and open-mindedness.
- k. Faithfulness in the performance of one's duties.
- l. Religious observance and reverence for the Divine Being.

8. **World-Mindedness.** All peoples and all nations are now so interdependent that it is no longer possible for any nation or any people to live in isolation. There is at present a distinct need for a type of training that will lead all pupils to appreciate fully the contributions of all nations to the civilization in which we live and to realize the economic interdependence of nations. Such training should make for a greater degree of tolerance on the part of all for the ideas, ideals, institutions, customs and practices of other peoples.

Some of the immediate objectives or outcomes that should be achieved by the high school in this regard are:

- a. A knowledge and appreciation of what other nations have contributed to modern civilization.
- b. The promotion of a spirit of world citizenship.
- c. Promotion of the spirit of universal brotherhood and the decrease of ill-will and hatred.
- d. A more tolerant spirit among nations.
- e. A broader and more open-minded attitude toward world problems.

f. An understanding of the ideals and aspirations of other nations.

g. Lessening of the possibilities of war.

If the above-stated aims and objectives of secondary education are valid, then it is our responsibility to select and use such subject matter and to provide such other experiences for the pupils as will enable us to prepare and send forth from the high schools those who are able to cope with the problems involved in maintaining physical efficiency and personal and public health; trained in civic virtue and possessing an understanding of the problems of local, city, state, national and world government; prepared in a general way, at least, for vocational success and happiness; fitted for worthy home membership, with habits and tastes for the finest use of leisure and for wholesome recreational enjoyment; possessed of the fundamental processes and knowledge essential to the educated person and to civilization.

Chapter II

DEFINITION OF TERMS

1. **Four-Year High School.** A four-year high school is defined as that part of the public school system which has a distinct organization composed of grades nine to twelve, inclusive.

2. **Six-Year High School.** A six-year high school is defined as that part of the public school system which has a distinct organization composed of grades seven to twelve, inclusive.

3. **Junior High School.** A junior high school is defined as that part of the public school system which has a distinct organization composed of grades seven, eight and nine.

4. **Senior High School.** A senior high school is defined as that part of the public school system which has a distinct organization composed of grades ten, eleven and twelve, and which requires graduation from the junior high school for regular entrance.

5. **State Accredited High School.** A state accredited high school is either a public or private four-year, six-year, or senior high school that is accredited by the State Board of Education.

6. **Southern Association High School.** The Southern Association of Colleges and Secondary Schools is a regional organization of colleges and secondary schools which sets up standards for its members. It operates in eleven southern states extending from Virginia to Texas, and includes Kentucky. Membership in this Association is optional.

7. **Program of Studies.** The program of studies refers to all the high school subjects offered in a given school without reference to any principle of organizing these subjects into curricula.

8. **Curriculum.** A curriculum is a sequence of courses, required and elective, set forth by years or terms, so as to show the requirements for advancement and graduation according to different objectives; as a classical curriculum for admission to the traditional classical college; a college preparatory curriculum for admission to an ordinary arts

college; a scientific curriculum when more scientific knowledge and practice than usual are sought in the high school period; a commercial curriculum when preparation is made for business, etc.

9. **Course of Study.** A course of study is defined as the quantity, kind and organization of subject matter of instruction in any secondary school subject, offered within a definite period of time, and for which credit for graduation is granted.

10. **Subject or Subject of Study.** A subject or subject of study is one of the divisions into which knowledge is commonly analyzed, such as biology, physics, French, history. In the cases of mathematics and social studies, it may mean these as a whole, or the word subject may be applied to one of their components—algebra, arithmetic, geometry of the one, or history, civil government, sociology, economics of the other. Besides one may either speak of history as a subject, or of ancient history, modern history, American history as different subjects.

11. **High School Unit Based on Forty-Five Minute Periods.** A high school unit based on the forty-five minute period is the credit obtained by a pupil who has successfully completed a subject which he has pursued for five forty-five minute recitations each week for a school year of not less than thirty-six weeks. Four such units constitute a regular year's work and at least sixteen such units are required for graduation from a four-year high school. For a unit of credit in science, excepting general science, a minimum of 315 minutes a week for a school year is required for class and laboratory work. In typewriting, bookkeeping, mechanical drawing, shop work, home economics and vocational agriculture, a minimum of 450 minutes a week for a school year is required. In the case of home economics and vocational agriculture, the above is true unless the work is organized on the basis of the "lengthened period" which is the next term defined.

12. **Lengthened Period.** A lengthened period is one of more than forty-five minutes with the purpose of arranging for more directed study. These periods should be one hour or more in length. If the periods are lengthened to one hour in the clear, an hour devoted to laboratory work in science will be recognized as meeting the requirement of the double forty-five minute period, provided, of course, that a standard of laboratory work equivalent to that done in the double period is maintained. This also applies to home economics, shop work,

manual arts, bookkeeping, typewriting and art. In vocational home economics a three-year course is required when the lengthened period (minimum of 60 minutes) is used. If the hour period is used for vocational agriculture, at least seven clock hours per week shall be devoted to the course. For vocational unit trade courses, a minimum of three clock hours per day in the shop for five days a week is required.

13. **Teacher Load.** Teacher load is the amount of work required of the teacher, estimated by the day or week. It may be based (a) on the number of hours of instructional duty, (b) the number of hours of total duty, or (c) the number of pupil hours for which the teacher is responsible, that is, the sums of the numbers of pupils in the sections taught or directed by the teacher.

14. **Pupil Load.** The pupil load is defined as the total number of subjects pursued by a given pupil at any one time. It may be interpreted to include also the pupil's non-credit, or extra-curricular work.

15. **Extra-Curricular Activities.** The term extra-curricular activities includes all legitimate activities not provided for in regular classroom work.

16. **Schedule of Recitations.** By schedule of recitations is meant the daily and weekly arrangement of classes designating the time of day, room, frequency of meeting and the teacher in charge.

17. **Academic Subjects.** Academic subjects are such subjects as English, foreign language, social science, mathematics; which are distinguished from arts and practical subjects, such as music, art, physical education, commercial subjects, woodworking, trade subjects, home economics and vocational agriculture.

18. **Required Subject.** A required subject is one that must be taken successfully to complete or to advance in a curriculum.

19. **Constants.** Constants are defined as subjects required of all pupils regardless of the curriculum pursued.

20. **Curricula Variables.** Curricula variables are defined as those subjects which permit specialization within the curriculum.

21. **Free Electives.** Free electives are defined as subjects open to all pupils regardless of the curriculum pursued and which have as their purpose the satisfying of individual needs.

22. **Marks.** Marks are defined as the qualitative estimates of the pupil's work in courses. They constitute the official record of the pupil.

23. **Grade.** The term grade (with the 9th, 10th, etc., attached as 10th grade) is used to distinguish the school class of high school pupils rather than freshman, sophomore, junior and senior.

24. **Alternation.** Alternation is defined as the systematic and regular union of two school subjects, two grades doing the work of one subject while the work of the other subject is omitted. The next year the work omitted is taken up and the first year's work is dropped.

25. **A Standard Day for Teachers.** "Six hours of actual school work shall constitute a school day; and under no circumstances, shall the daily session including recesses and intermissions, exceed nine hours in length." (Section 4363-6 Kentucky Statutes.) This section has been interpreted to mean six hours of actual service by the teacher in the performance of her school duties including periods of supervised play and supervised study and excluding intermissions not devoted to supervised play and study.

Chapter III

STANDARDS FOR HIGH SCHOOLS

1. Regulations of the State Board of Education Governing the Accrediting of High Schools

a. *Course of Study*

(1) A four-year high school (grades 9-12) must maintain an approved four-year program of studies and require at least sixteen units for graduation.

(2) A school organized as a six-year high school (grades 7-12) must maintain an approved six-year program of studies and require at least sixteen units for graduation, all of which must have been earned in grades 9, 10, 11 and 12.

(3) A school organized as a three-year high school (grades 10-12) must maintain an approved three-year program of studies and require at least twelve units for graduation, all of which must have been earned in grades 10, 11 and 12.

b. *School Term*

No school shall be accredited which maintains a school term of fewer than 176 days, exclusive of all vacations and holidays.

c. *Recitation Period*

Recitation periods in credit courses shall be at least forty-five minutes. Unless a period of sixty or more minutes is used, ninety minute laboratory periods shall be given two days each week for courses in biology, physics, and chemistry. Schools organized with periods less than sixty minutes shall give double periods daily in courses in home economics, shop work, bookkeeping, typewriting, and art. In vocational courses supervised by the division of vocational education, the time requirements of that division shall be met.

d. *Pupil Load and Attendance*

(1) The normal pupil load is four credit units, and the maximum is five.

(2) At least one year shall have been spent in an accredited high school, and the semester preceding graduation in the school granting the diploma. A student may, however, gain the last unit in a state approved summer school with the understanding that the diploma will be withheld until the school in which the credit is made certifies to the unit. It is understood that written permission must be gained from the high school principal of the school from which the student expects to graduate before credit for this unit may be granted.

e. *Number of Teachers and Membership*

Class A High Schools

(1) Four-year high schools (grades 9-12) and three-year senior high schools (grades 10-12) shall employ at least five full-time teachers and have a bona fide enrollment of at least one hundred pupils.

(2) Six-year high schools (grades 7-12) shall employ at least seven full-time teachers and have a bona fide enrollment of at least one hundred and fifty pupils, one hundred of which shall be enrolled in grades 9, 10, 11 and 12.

Class B High Schools

(1) Four-year high schools (grades 9-12) shall employ at least three full-time teachers and have a bona fide enrollment of not fewer than sixty pupils.

(2) Six-year high schools (grades 7-12) shall employ at least four full-time teachers and have a bona fide enrollment of not fewer than eighty-five pupils, sixty of which shall be enrolled in grades 9, 10, 11 and 12.

Schools now (1938) accredited with fewer pupils than here required for Class A and Class B ratings will be given until the beginning of the school year 1940-41 to meet the requirements of this section.

f. *Qualifications of Teachers*

(1) Each teacher in public high schools shall hold a certificate legally valid for his position.

(2) All principals and teachers, with the possible exception

of teachers of trades and industrial subjects, shall be graduates of standard four-year colleges.

(3) Each teacher shall be assigned to teach as nearly as possible within the fields of his major and minor training in college.

g. *Teaching Loads*

(1) A teacher's load shall not exceed 750 pupil hours a week except in high schools embracing the seventh and eighth grades, where it shall not exceed 800 hours a week; and a class recitation group shall not exceed 35 pupils.

(2) Six recitation periods shall be the standard load for a teacher. Two periods in laboratory work, in shop, in bookkeeping, in typing, or in supervision of study room shall be counted as the equivalent of one recitation period.

h. *Teaching Equipment*

Adequate teaching equipment must be provided for all courses offered, including maps (geographical and historical), charts and pictures. Laboratory facilities must be adequate for the sciences taught. The laboratory must be in a well lighted, commodious room equipped with tables, cupboards and apparatus. (Consult minimum equipment lists in Chapter VII.)

i. *Library*

(1) Schools with an enrollment of 100 or fewer pupils shall have a minimum of 500 books exclusive of government documents and textbooks. These volumes shall be selected from a state approved list or from the Standard Catalog for High School Libraries (H. W. Wilson Company, New York City). The distribution should be approximately as follows: English (drama, fiction, biography, essays, poetry, travel, current literature)—35%; social studies (history, sociology, economics and government)—25%; science—15%; language—5%; mathematics—2%; general reference—10%; useful and fine arts—8%.

(2) Schools having a greater enrollment shall increase the number of books at the rate of five volumes per pupil enrolled.

(3) An annual appropriation of at least one dollar per pupil shall be spent for books, periodicals, etc.

(4) A librarian or teacher-librarian shall be employed. (Chapter VI outlines recommended training and service of librarian.)

(5) The library shall be satisfactorily located, shelved, cataloged and classified according to the Dewey Decimal System or a simplified form of same. Careful, systematic and thorough instruction in the use of the library shall be given and evidence must appear that the library is being used properly.

j. *Records and Reports*

(1) A permanent record for each pupil must be kept for the entire time spent in high school. This record must show the semester grades by subjects, credits given, and attendance for each semester or part of semester attended by each pupil. These records must be kept on loose-leaf forms or card forms approved by the supervisors.

(2) No credit shall be accepted from another school except on basis of transcript from such other school. The record must show a complete account of all transcribed credits and indicate the school in which they were earned.

(3) The annual high school report must be made to the State Department of Education on or before November 1 of each year.

k. *The Elementary School*

The elementary schools of a district shall not be neglected in maintaining high schools. The length of term should be the same for elementary schools and high schools. No new or increased difference in term length will be permitted. The pupil-teacher ratio shall be approximately the same in elementary and high school. Adequate library service, supplementary readers and teaching materials shall be provided.

l. *The School Spirit*

The efficiency of instruction, the general intellectual and moral tone of the school and the spirit of the school as evidenced by the attitude of pupils and teachers toward their work, toward each other and toward the life of the school in general, are all

matters of prime importance. Pronounced deficiencies in any of these items will be sufficient cause for dropping such a school from the accredited list.

m. *The School Plant*

No school will be accredited when, in the opinion of the supervisor, physical conditions of the building, premises, and equipment are such as to endanger the health of pupils and teachers, or to interfere with instruction.

n. *Budget and Salary Schedule*

All expenditures for school equipment and salaries of teachers in public schools shall be made in accordance with the budget and salary schedule approved by the State Board of Education.

o. *Remedies*

When deficiencies are found wherein these standards are not maintained, it will be the duty of the supervisor to confer with the governing authority of such school or system of schools and set out a program of remedies consistent with these regulations, and no action against such school or system of schools will be taken until the school authorities shall have had opportunity to consider the remedial program proposed.

p. *Contributory High Schools*

A contributory high school (one that is incomplete, not extending through grade twelve) shall maintain the grades that it carries in accordance with high school requirements, with only four units for each grade. It shall have a bona fide membership average of at least fifteen pupils for each high school grade. Two full-time teachers will be required for grades 9-11 inclusive, one for grades 9 and 10, and one additional when grades 7-8 are included. No unaccredited grades shall be maintained and legal provision must be made for the high school grades not included in such school.

q. *Tenure of Rating*

The rating given any school or system of schools will continue in effect until it is changed or discontinued.

2. Standards for Junior High Schools

Local school systems have been given considerable freedom in organizing and administering junior high schools. Little attempt has been made to standardize the practices in the different junior high schools. Standardization has been consciously avoided for fear that the movement for reorganization might be blocked prematurely.

It is felt, however, that at the present time, the naming of certain standards will probably help to bring about a desirable degree of uniformity in junior high school practices and will in no way hinder the progress or stifle the initiative of the local schools. Hence, the following standards will be used by the State Board of Education for the purpose of approving junior high schools:

a. *Organization*

The seventh, eighth and ninth grades shall be organized as a separate unit of the school system with a separate staff of teachers and administrative officials. A modified plan comprising grades seven and eight may be recognized temporarily as a step preparatory to the full adoption of the segregated three-year junior high school. Recognition will also be granted the junior high school of a junior-senior organization, comprising grades seven to twelve.

b. *Number and Qualifications of Teachers*

A minimum of six teachers who devote full time to instruction is recommended.

The instruction shall be departmentalized and the teachers shall be assigned according to their major interests and special academic and professional training relating to the junior high school. All teachers shall hold legal high school certificates. All principals and teachers, with the possible exception of teachers of trades and industrial subjects, must be graduates of four-year standard colleges.

c. *Home Room*

The school shall be organized on a home-room plan with a definite home-room program and a responsible home-room teacher in charge.

d. *Length of Term*

The minimum term in all recognized junior high schools shall be thirty-six weeks (176 days).

e. *Length of Recitation Period*

The minimum length of the recitation period shall be forty-five minutes. The schedule should provide for at least seven periods a day in addition to the period provided for extra-curricular activities. This will allow for rest and study periods for both teachers and pupils. Schools may organize with periods that are sixty or more minutes in length, provided they are properly supervised. Special attention should be given to the direction of study and a conscious attempt should be made to teach pupils to form proper study habits.

f. *Homogeneous Grouping*

In those schools where numbers permit, there should be homogeneous grouping of pupils.

g. *Extra-Curricular Activities*

An activities program shall be provided with competent advisers in charge. At least three activities periods a week shall be provided in the daily schedule.

h. *Size of Classes and Teaching Load*

The class enrollment for recitation purposes should not exceed thirty-five pupils, nor should the teaching load of any teacher exceed 175 pupil hours a day.

i. *Program of Study*

The program of studies shall be adapted to the individual needs of early adolescent pupils, provide exploration in the different fields of work in order to aid pupils in choosing a career suited to their interests, aptitudes, and capacities, and "reveal to the pupils the possibilities in the major fields of learning."

j. *Content of Courses and Methods of Teaching*

The selection and arrangement of the content in the courses of study shall be psychological and the socialized methods of procedure shall be followed.

k. *Guidance*

A definite program of guidance—vocational, educational and social, shall be planned and carried out.

l. *Records and Reports*

Adequate and complete records of the scholarship and attendance of each pupil shall be kept. A fire-proof cabinet, safe, or vault safeguarding these records should be provided. A duplicate of these records shall be kept in the superintendent's office.

m. *Building and Grounds*

Assembly, library, shop and laboratory rooms in addition to classrooms shall be available.

n. *Library*

The library shall be selected especially for junior high school purposes. There shall be at least five books per pupil, provided there are not fewer than five-hundred volumes. The library shall be classified according to the Dewey Decimal System. Either a full-time, trained librarian or a part-time, trained teacher-librarian, depending upon the size of the school, shall be employed to administer the library.

o. *Laboratory*

Laboratory equipment for the sciences taught shall be provided and adequate provision shall be made for its proper care and use.

p. *Promotions*

Promotions in the junior high school shall be by subjects only.

3. **Standards for Senior High Schools and Six-Year High Schools**

Separate standards have not been adopted for these types of high schools. The regulations of the State Board of Education Governing Accrediting of High Schools found at the beginning of this Chapter are sufficient standards for these schools.

4. **Miscellaneous Regulations of the State Board of Education**

a. *Admission to High School*

(1) Pupils shall be admitted to high school on the basis of

any one of the following evidences of ability to do the work therein:

(a) On certificate of promotion from the eighth grade of a recognized public or private school.

(b) On successful entrance examination given by the principal of the high school to which the pupil applies for admission.

(c) On trial, but only when the principal and superintendent are satisfied that such course is advisable. [(b) and (c) apply to pupils who seek entrance without a certificate of promotion from the eighth grade.]

(d) When a pupil transfers from one accredited high school to another, the promotions and credits properly certified from the former school shall be accepted in the latter, but not exceeding eight units from a two-year high school and twelve units from a three-year high school. No credits shall be accepted from an unaccredited high school, but examinations may be given on courses so certified.

b. *Correspondence Work and Private Tutoring*

High schools are not authorized to give courses by correspondence or credit for work done under private coaches or tutors; but the principal of a high school may permit a student who has failed in a course to take it again by examination provided the student has in the meantime pursued that course under a tutor approved in advance by the principal or superintendent, and for the time required for summer school courses.

c. *Summer Schools*

(1) No summer school will be approved which does not employ at least three teachers.

(2) The summer school shall be administered by the regular school authorities and supervised by the principal of the regular school, or by a teacher of the regular school who has been approved by the principal or superintendent.

(3) The qualifications of the teachers in a summer school shall in all respects be the same as for teachers in the regular session.

(4) The summer session shall run for at least seven weeks, five days a week, or six weeks, six days a week, with not less than sixty minute periods.

(5) Each course shall be taught for 120 minutes daily.

(6) Pupils shall be limited to two courses, totaling one unit of credit.

(7) All work required in any course in the regular session (including laboratory work, parallel reading, references, etc.) must be done in summer school.

d. *Buildings and Repairs*

Section 4384-23, Kentucky Statutes, requires that plans and specifications for new public school buildings and for alterations, additions and repairs of old buildings, shall be submitted to the Superintendent of Public Instruction for examination and approval before contracts are awarded and construction begun.

e. *Observance of Holidays*

The State Board of Education has ordered that schools "may observe four (4) holidays by dismissing for the day, and may observe the remainder of the holidays of that year by having appropriate exercises in the schools."

f. *Credit in Applied Music*

Pupils who are receiving systematic instruction in voice, piano, organ, violin, or any band or orchestral instrument, should receive credit toward graduation for such study. To receive credit the following conditions must be met:

(1) The parent of the pupil must make application upon blank forms prescribed by the principal or superintendent. He shall report each month the number of hours spent by the pupil in practice. These forms will be furnished the school by the State Department of Education upon request.

(2) The teacher must likewise file an application with the principal or superintendent for the extension of credit provisions to the pupil. He shall state the grade of work for which the pupil is entering. He shall further report each month the number of lessons taken, the length of these lessons, the pupil's progress,

the compositions and theory studied, and other information as requested. The Department of Education will supply the school with blanks for this purpose.

(3) The monthly reports of the outside teacher shall be carefully reviewed by the high school principal, with the assistance of the music instructors of the school and any such music specialists as may be necessary for the formation of a just valuation. The principal shall report this evaluation to the teacher.

(4) The teacher must hold a certificate from an approved or accredited conservatory or college of music. Credentials evidencing these qualifications must be submitted to the Division of Certification of the Department of Education and a certificate issued thereon before a pupil may receive high school credit under the teacher's instruction.

(5) The pupil must be regularly enrolled in high school and must be making passing grades in at least three subjects which entitle him to three units each year.

(6) Two music lessons of at least thirty minutes each week for thirty-six consecutive weeks plus a minimum of six hours of of practice each week for thirty-six consecutive weeks shall be required for one-half unit of credit.

(7) Before being permitted to carry outside work in music for credit, the pupil must have completed at least two years of study in the branch in which he seeks credit.

(8) Not more than one applied music course may be carried for credit in any one year.

(9) The credit for one year's work shall be one-half unit. No more than two units in music may be offered for graduation. Principals must bear in mind, however, that only one unit may be counted toward college entrance.

(10) Semi-annual examinations shall be given by the examiner appointed by the principal or superintendent. In no case shall the outside teacher examine his own pupils.

g. *Credit for High School Subjects Completed in Civilian Conservation Camps.*

When the educational adviser of any Civilian Conservation

Camp certifies that an enrollee has completed satisfactorily one or more high school subjects, the enrollee may be given credit for same, provided he passes an examination given by the teacher of such subject or subjects in an accredited high school. In the event that the enrollee passes such examinations successfully, the credit or credits given for such subject or subjects may be recognized by the high schools of this Commonwealth.

Chapter IV

CURRICULA FOR HIGH SCHOOLS

1. Curricula for High Schools Employing Fewer Than Six Teachers.

The curricula set forth in this section are suggested for high schools with fewer than six teachers. They will meet the needs of a majority of Kentucky high schools. In high schools having six or more teachers, the needs of such schools are to be met by the addition of new lines of instruction; for example, the introduction of vocational trade and industrial work, music, fine arts and physical education, each calling for a teacher of high special training.

Curricula are outlined for four types of schools: (a) four-year high schools, (b) small three-year, departmentalized junior high schools, (c) small four-year, departmentalized junior high schools, and (d) small six-year high schools.

No curricula are outlined for two-year high schools (grades 9-10) or three-year high schools (grades 9-11). These schools will follow the academic curriculum outlined by years for the three-teacher four-year high schools.

In preparing these curricula, it was necessary to consider three problems in connection with each type of school:

- a. The curriculum
- b. The subject-matter combinations of each teacher
- c. The daily schedule

Certain definite principles run through all of the programs:

- a. No teacher shall teach more than six classes a day.
- b. No teacher shall teach in more than two fields of instruction.
- c. The two fields taught by each teacher shall be logically related; e. g., English and foreign language, mathematics and science, English and social studies, home economics and science, etc.
- d. Definite teaching jobs shall be set up. In connection with each curriculum a desirable organization of the school is

suggested and the teaching jobs in the school are clearly indicated. In this way assignments of subjects to be taught by each teacher are made specific and, at the same time, the teacher training institutions of the state are provided with a definite program upon which to base their teacher training work.

If the above desirable ends are to be attained, it is imperative that the local community, the State Department of Education and the teacher training institutions cooperate in this program. However the main responsibility for effecting this policy rests upon the local employing and administrative agencies.

These agencies are asked to do three things:

a. Adopt, in so far as local conditions permit, one of these curricula. When a curriculum is adopted, keep it in force for a period of time sufficient; first, to justify its merit; second, to guarantee good teachers logical and continuous teaching positions; and third, to permit pupils to follow a consistent and connected program throughout their high school course.

b. In employing new teachers adhere to the policy of securing qualified teachers for the definite teaching jobs set up for them.

c. Gradually reassign the subject-matter fields, so that the experienced teachers will have the desired combinations. This may require further training on the part of some of them.

IMPORTANT SUGGESTIONS AND RECOMMENDATIONS

1. See the next section of this chapter for programs of study for high schools that have six or more teachers.

2. It is not contended that the small junior high schools and six-year high schools, whose curricula are outlined in this section, can enjoy all of the advantages of larger junior, senior and six-year high school organizations. They are not staffed or equipped for the degree of differentiation and general breadth of effort that is possible in these larger schools. However, it is possible for these small organizations to provide many of these advantages, if the teachers are well prepared.

3. English in the seventh and eighth grades includes literature, spelling, composition and grammar.

4. In all curricula, attention is directed to the provision for extra-curricular activities, which includes such work in guidance, teaching of music, fine arts and physical education as the small school can do.

5. The hour for opening school is merely suggestive. The local school authorities can best determine this.

6. High schools which offer two units of only one foreign language should not offer Latin one year and French the next; the language adopted should be continued.

7. Wherever possible all of a particular subject should be taught in the same room. Sufficient supplementary material should be provided. The room devoted to social studies, for example, should be well supplied with maps; the room devoted to English should be supplied with pictures of great writers, etc.

8. Pupils should consult their home-room teachers, principal and parents before electing subjects. This matter requires time and should not be deferred until the opening day of school.

9. Principals should avoid introducing courses which are demanded by only a few pupils. A class of eight takes as much of a teacher's time as a class of twenty-four and is, therefore, three times as expensive. There is the further consideration that placing an additional class in the schedule of a teacher who already has a normal teaching load, tends to weaken her work in all subjects.

10. Limit combinations and alternations of classes to those provided for in the daily schedules that accompany their respective programs of study.

11. Students who expect to count credit in foreign language for college entrance should complete at least two units of a given language. One unit of any language may be counted toward graduation.

12. Students offering credit in Problems of Democracy toward graduation cannot offer credit in economics, sociology or advanced civics and vice versa.

13. Students counting credit in world history may not count credits in Early European History or Modern European History and vice versa.

14. Solid geometry and trigonometry are recommended for the large high schools only.

15. Any subject listed as a unit subject must be completed before any credit will be allowed for that subject. Where one-half units are offered, these must be in subjects listed as one-half unit courses.

16. If unit credit is to be allowed for extra-curricular activities, it shall be given in excess of the sixteen required for graduation.

17. It is recommended that all high school pupils be required to read outside of class each month one carefully chosen book of an attractive and wholesome nature. Books available and acceptable for each year in English should be posted for the guidance of the pupils. Excellent lists from which selections for this individual reading may be made are given in Bulletin 1917, No. 2, of the United States Office of Education on the *Reorganization of English in Secondary Schools*, on pages 49-53 and 76-84 in Division B. The price of this publication is fifteen cents. This bulletin is recommended to teachers of English as a most valuable help in all their work.

18. Definite provision should be made not only to teach the pupils how to study, but to encourage them to do more studying. Teachers and pupils will find excellent suggestions along this line in Kornhauser's *How to Study*, (25c)—University of Chicago Press.

19. Pupils shall be promoted by subjects.

20. The granting of unit credits toward graduation shall be based on achievement in subjects as indicated by class work and examinations combined. The pupil's regular work in class for the semester or year should count at least twice as much as the examination in any given subject. No pupil should be excused from final examinations because of high grades, deportment, or attendance.

21. No pupil should be enrolled in the tenth grade until he has completed three units; in the eleventh grade until he has completed seven units; and in the twelfth grade until he has completed eleven units.

22. Schools may substitute business training for the last half of tenth grade algebra or advanced arithmetic.

TYPE I A

FOUR-YEAR HIGH SCHOOL

(Three Teachers)

Curriculum

(Academic)

Ninth Year

SUBJECTS	Periods Per Wk.	Units
English I	5	1
Composition Literature		
Mathematics I	5	1
Algebra I		
Social Studies I	5	1
Citizenship or Early European History		
Science I	5	1
General Science		

Tenth Year

SUBJECTS	Periods Per Wk.	Units
English II	5	1
Composition Literature		
Mathematics II	5	1
Algebra II or Alg. $\frac{1}{2}$ and Arithmetic $\frac{1}{2}$		
Social Studies II	5	1
World History or Mod. European Hist.		
Science II	7	1
Biology		

Eleventh Year

English III	5	1
Composition Literature		
Mathematics III	5	1
Plane Geometry		
Social Studies III	5	1
American History		

Twelfth Year

English IV	5	1
Composition Literature		
Social Studies IV	5	1
Prob. of Democracy or Adv. Civics; or Econ. $\frac{1}{2}$, Sociology $\frac{1}{2}$		

Elect One

Science III	7	1
Gen. Agriculture or Agri. $\frac{1}{2}$ and Physiology $\frac{1}{2}$		
Foreign Language I	5	1
Latin or Mod. Lang.		

Elect Two

Science IV	7	1
Physics		
Social Studies V	5	1
Com. Geog. or Com. Geog. $\frac{1}{2}$ and Phy. Geog. $\frac{1}{2}$		
Foreign Language II	5	1
Latin or Mod. Lang.		

SUGGESTED ORGANIZATION

TEACHER A	Periods Per Wk.	TEACHER B	Periods Per Wk.
Social Studies I	5	English I	5
Social Studies II	5	English II	5
Social Studies III	5	English III	5
Social Studies IV	5	English IV	5
Social Studies V	5	Foreign Lang. I	5
		Foreign Lang. II	5
Total	25	Total	30

TEACHER C	Periods Per Wk.
Science I or II	5-7
Science III or IV	7
Math. I	5
Math. II	5
Math. III	5
Total	27-29

SUGGESTED DAILY SCHEDULE

Time	Teacher A	Teacher B	Teacher C
8:45-9:30		English IV	Mathematics III
9:30-10:15	Social Stu. II	English III	Mathematics I
10:15-10:30		SUPERVISED PLAY	
10:30-11:15	Social Stu. III	For. Lang. II	Science I or II
11:15-12:00	Social Stu. V	For. Lang. I	Laboratory II T.T.
12:00-1:00		NOON	
1:00-1:30	Activities—Music, Art, Assembly, Clubs, Home Room		
1:30-2:15	Social Stu. I	English II	Science III or IV
2:15-3:00			Laboratory M.W.
3:00-3:45	Social Stu. IV	English I	Mathematics II

TYPE I B

FOUR-YEAR HIGH SCHOOL

(Four Teachers)

Curriculum

(Academic)

Ninth Year

SUBJECTS	Periods Per Wk.	Units
English I	5	1
Composition		
Literature		
Social Studies I	5	1
Citizenship or Early		
European History		
Science I	5	1
General Science		
Mathematics I	5	1
Algebra I		

Tenth Year

SUBJECTS	Periods Per Wk.	Units
English II	5	1
Composition		
Literature		
Social Studies II	5	1
World History or		
Mod. European Hist.		
Science II	7	1
Biology		
Mathematics II	5	1
Algebra II or Alg. $\frac{1}{2}$		
and Arithmetic $\frac{1}{2}$		

Eleventh Year

English III	5	1
Composition		
Literature		
Soc. Studies III	5	1
American History		
Mathematics III	5	1
Plane Geometry		

Twelfth Year

English IV	5	1
Composition		
Literature		
Social Studies IV	5	1
Prob. of Democracy or		
Adv. Civics; or Econ.		
$\frac{1}{2}$, Sociology $\frac{1}{2}$		

Elect One

Foreign Language I	5	1
Latin or Modern		
Language		
Science III	7	1
Gen. Agri. or Agri.		
$\frac{1}{2}$ and Physiology $\frac{1}{2}$		

Elect Two

Foreign Language II	5	1
Latin or Mod. Lang.		
Science IV	7	1
Physics		
Social Studies V	5	1
Com. Geog. or Com.		
Geog. $\frac{1}{2}$ and Phys.		
Geog. $\frac{1}{2}$		

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Time

8:45-9:30
9:30-10:15
10:15-10:30
10:30-11:15
11:15-12:00
12:00-1:00
1:00-1:30
1:30-2:15
2:15-3:00
3:00-3:45

TYPE I B

SUGGESTED ORGANIZATION

TEACHER A	Periods Per Wk.	TEACHER B	Periods Per Wk.
Mathematics I	5	Science I	5
Mathematics II	5	Science II	7
Mathematics III	5	Science III	7
		Science IV	7
Total	15	Total	26

TEACHER C	Periods Per Wk.	TEACHER D	Periods Per Wk.
Social Studies I	5	English I	5
Social Studies II	5	English II	5
Social Studies III	5	English III	5
Social Studies IV	5	English IV	5
Social Studies V	5	Foreign Language I	5
		Foreign Language II	5
Total	25	Total	30

SUGGESTED DAILY SCHEDULE

Time	Teacher A	Teacher B	Teacher C	Teacher D
8:45-9:30		Science II	Soc. Stu. III	English I
9:30-10:15		Lab. T.T.	Soc. Stu. IV	For. Lang. I
10:15-10:30		SUPERVISED PLAY		
10:30-11:15	Math. III	Science IV	Soc. Studies I	English II
11:15-12:00		Lab. M.W.		English III
12:00-1:00	NOON			
1:00-1:30	Activities—Music, Art, Assembly, Clubs, Home Room			
1:30-2:15	Math. I	Science III	Soc. Studies II	English IV
2:15-3:00	Math. II	Lab. III T.T.		For. Lang. II
3:00-3:45		Science I	Soc. Studies V	

FOUR-YEAR HIGH SCHOOL

(Four Teachers)

Curriculum

(Agriculture and Home Economics)

Ninth Year

SUBJECTS	Periods Per Wk.	Units
English I	5	1
Composition		
Literature		
Social Studies I	5	1
Citizenship or Early		
European Hist.		
Mathematics I	5	1
Algebra I		

Elect One

Science I	5	1
General Science		
Agriculture I	10	1
Home Economics I	10	1

Eleventh Year

English III	5	1
Composition		
Literature		
Social Studies III	5	1
American History		
Mathematics III	5	1
Plane Geometry		

Elect One

Foreign Lang. I	5	1
Latin or Mod. Lang.		
Agriculture III	10	1

Tenth Year

SUBJECTS	Periods Per Wk.	Units
English II	5	1
Composition		
Literature		
Social Studies II	5	1
World History or		
Mod. European Hist.		
Mathematics II	5	1
Algebra II or Alg. $\frac{1}{2}$		
and Arithmetic $\frac{1}{2}$		

Elect One

Science II	7	1
Biology		
Agriculture II	10	1
Home Economics II	10	1

Twelfth Year

English IV	5	1
Composition		
Literature		
Social Studies IV	5	1
Prob. of Democracy or		
Adv. Civics; or Econ.		
$\frac{1}{2}$, Sociology $\frac{1}{2}$		

Elect Two

Social Studies V	5	1
Com. Geog. or Com.		
Geog. $\frac{1}{2}$ and Phys.		
Geog. $\frac{1}{2}$		
Foreign Lang. II	5	1
Latin or Mod. Lang.		
Agriculture IV	10	1

***SUGGESTED ORGANIZATION**

TEACHER A	Periods Per Wk.	TEACHER B	Periods Per Wk.
Mathematics III	5	English I	5
Science I	5	English II	5
Science II	7	English III	5
		English IV	5
		Foreign Language I	5
		Foreign Language II	5
Total	17	Total	30

TEACHER C	Periods Per Wk.	TEACHER D	Periods Per Wk.
Mathematics I	5	Home Econ. I or II	10
Mathematics II	5	Social Studies I	5
Agriculture I or II	10	Social Studies II	5
Agriculture III or IV	10	Social Studies III or IV	5
		Social Studies V	5
Total	30	Total	30

* In case Teacher C is employed as principal, Mathematics I and II should be transferred to Teacher A.

SUGGESTED DAILY SCHEDULE

Time	Teacher A	Teacher B	Teacher C	Teacher D
8:45-9:30		Eng. II	Math. I	Soc. Stu. III or IV
9:30-10:15		Eng. I	Math. II	Soc. Stu. V
10:15-10:30	SUPERVISED PLAY			
10:30-11:15	Math. III		Agri. I or II	Home Econ. I or II**
11:15-12:00		Eng. IV	Agri. I or II	Home Econ. I or II**
12:00-1:00	NOON			
1:00-1:30	Activities—Music, Art, Assembly, Clubs, Home Room			
1:30-2:15	Science II	For. Lang. I	Agri. III or IV	Soc. Stu. I
2:15-3:00	Lab. II M.W.	For. Lang. II	Agri. III or IV	
3:00-3:45	Science I	Eng. III		Soc. Stu. II

**Schools that find it difficult to schedule Home Economics classes so as to avoid duplication of work should secure schedule from State Supervisor of Home Economics.

TYPE I D

FOUR-YEAR HIGH SCHOOL

(Five Teachers)

Curriculum
(Academic)

Ninth Year

SUBJECTS	Periods Per Wk.	Units
English I	5	1
Composition		
Literature		
Social Studies I	5	1
Citizenship or Early		
European History		
Mathematics I	5	1
Algebra I		

Elect One

Science I	5	1
General Science		
Latin I	5	1

Eleventh Year

English III	5	1
Composition		
Literature		
Social Studies III	5	1
American History		
Mathematics III	5	1
Plane Geometry		

Elect One

*Science III	7	1
Chemistry		
Latin III	5	1
Modern Language I	5	1

Tenth Year

SUBJECTS	Periods Per Wk.	Units
English II	5	1
Composition		
Literature		
Social Studies II	5	1
World History or		
Mod. European Hist.		
Science II	7	1
Biology		

Elect One

Mathematics II	5	1
Algebra II or Alg. $\frac{1}{2}$		
and Arithmetic $\frac{1}{2}$		
Latin II	5	1

Twelfth Year

English IV	5	1
Composition		
Literature		
Social Studies IV	5	1
Prob. of Democracy or		
Adv. Civics; or Econ.		
$\frac{1}{2}$, Sociology $\frac{1}{2}$		

Elect Two

Science IV	7	1
Physics		
Latin IV	5	1
Modern Language II	5	1
Social Studies V	5	1
Com. Geog. or Com.		
Geog. $\frac{1}{2}$ and Phys.		
Geog. $\frac{1}{2}$		

* Schools may substitute General Agriculture or General Agriculture and Physiology for Chemistry.

SUGGESTED ORGANIZATION

TEACHER A	Periods Per Wk.	TEACHER B	Periods Per Wk.
Math. IA	5	Eng. II	5
Math. IB	5	Eng. III	5
Math. II	5	Eng. IV	5
Math. III	5	Mod. Lang. I	5
		Mod. Lang. II	5

Total 20

Total 25

TEACHER C	TEACHER D
Eng. IA	Soc. Stu. IA
Eng. IB	Soc. Stu. IB
Latin I	Soc. Stu. II
Latin II	Soc. Stu. III
Latin III or IV	Soc. Stu. IV
	Soc. Stu. V

Total 25

Total 30

TEACHER E	Periods Per Wk.
Science I	5
Science II	7
Science III	7
Science IV	7

Total 26

SUGGESTED DAILY SCHEDULE

Time	Teacher A	Teacher B	Teacher C	Teacher D	Teacher E
8:45-9:30	Math. III	Eng. II	Latin I	Soc. Stu. IV	Science I
9:30-10:15		Mod. Lang. II	Latin II	Soc. Stu. IA	
10:15-10:30	SUPERVISED PLAY				
10:30-11:15	Math. IA	Eng. IV	Latin III or IV	Soc. Stu. II	Science II
11:15-12:00		Mod. Lang. I		Soc. Stu. IB	Lab. T.T.
12:00-1:00	NOON				
1:00-1:30	Activities—Music, Art, Assembly, Clubs, Home Room				
1:30-2:15			Eng. IA	Soc. Stu. V	Science II
					Lab. III M.W. Lab. IV T.T.
2:15-3:00	Math. II		Eng. IB		
3:00-3:45	Math. IB	Eng. III		Soc. Stu. II	Science IV

TYPE I E

FOUR-YEAR HIGH SCHOOL

(Five Teachers)

Curriculum

(Agriculture and Home Economics)

Ninth Year

SUBJECTS	Periods Per Wk.	Units
English I	5	1
Composition		
Literature		
Mathematics I	5	1
Algebra I		
Social Studies I	5	1
Citizenship or Early		
European History		

Elect One

Science I	5	1
General Science		
Home Economics I	10	1
Agriculture	10	1

Eleventh Year

English III	5	1
Composition		
Literature		
Social Studies III	5	1
American History		
Mathematics III	5	1
Plane Geometry		

Elect One

Foreign Lang. I	5	1
Latin or Mod. Lang.		
Agriculture III	10	1
Science III	7	1
Chemistry		

Tenth Year

SUBJECTS	Periods Per Wk.	Units
English II	5	1
Composition		
Literature		
Social Studies II	5	1
World History or		
Mod. European Hist.		
Mathematics II	5	1
Algebra II or Alg. $\frac{1}{2}$		
and Arithmetic $\frac{1}{2}$		

Elect One

Science II	7	1
Biology		
Home Economics II	10	1
Agriculture II	10	1

Twelfth Year

English IV	5	1
Composition		
Literature		
Social Studies IV	5	1
Prob. of Democracy or		
Adv. Civics; or Econ.		
$\frac{1}{2}$, Sociology $\frac{1}{2}$		

Elect Two

Social Studies V	5	1
Com. Geog. or Com.		
Geog. $\frac{1}{2}$ and Phys.		
Geog. $\frac{1}{2}$		
Foreign Language II	5	1
Latin or Mod. Lang.		
Agriculture IV	10	1
Science IV	7	1
Physics		

SUGGESTED ORGANIZATION

TEACHER A		Periods Per Wk.	TEACHER B		Periods Per Wk.
Math. (2 Sec.)	.....	10	Eng. I (2 Sec.)	.....	10
Math. II	.....	5	Eng. III	.....	5
Math. III	.....	5	Eng. IV	.....	5
			For. Lang. I	.....	5
			For. Lang. II	.....	5
Total		20	Total		30

TEACHER C		Periods Per Wk.	TEACHER D		Periods Per Wk.
Soc. Stu. III or IV	.....	5	Agri. I or II	.....	10
Soc. Stu. I (2 Sec.)	.....	10	Agri. III or IV	.....	10
Soc. Stu. V	.....	5	Science III or IV	.....	7
Soc. Stu. II	.....	5	Science I	.....	5
Eng. II	.....	5			
Total		30	Total		32

TEACHER E		Periods Per Wk.
Home Economics I	.....	10
Home Economics II	.....	10
Science II	.....	7
Total		27

SUGGESTED DAILY SCHEDULE

Time	Teacher A	Teacher B	Teacher C	Teacher D	Teacher E
8:45-9:30		Eng. IA	Soc. Stu. III or IV	Agri. I or II	Home Econ. II
9:30-10:15		Eng. III	Soc. Stu. IA	Agri. I or II	Home Econ. II
10:15-10:30	SUPERVISED PLAY				
10:30-11:15	Math. IB	For. Lang. I	Soc. Stu. V	Agri. III or IV	Science II
11:15-12:00	Math. IA	For. Lang. II		Agri. III or IV	Lab. T.T.
12:00-1:00	NOON				
1:00-1:30	Activities—Music, Art, Assembly, Clubs, Home Room				
1:30-2:15	Math. III	Eng. IV	Eng. II	Science I	
2:15-3:00	Math. II		Soc. Stu. IB	Sci. III or IV	Home Econ. I
3:00-3:45		Eng. IB	Soc. Stu. II	Lab. M.W.	Home Econ. I

FOUR-YEAR HIGH SCHOOL

TYPE I F

(Five Teachers)

Curriculum
(Commercial Education)

Ninth Year			Tenth Year		
SUBJECTS	Periods Per Wk.	Units	SUBJECTS	Periods Per Wk.	Units
English I	5	1	English II	5	1
Composition			Composition		
Literature			Literature		
Social Studies I	5	1	Social Studies II	5	1
Citizenship or Early			World Hist. or Mod.		
European Hist.			European Hist.		
Science I	5	1	Science II	7	1
General Science			Biology		
Mathematics I	5	1	*Mathematics II	5	1
Algebra I			Algebra II or Alg.		
			½ and Arith. ½		
Eleventh Year			Twelfth Year		
English III	5	1	English IV	5	1
Composition			Composition		
Literature			Literature		
Social Studies III	5	1	Social Studies IV	5	1
American History			Prob. of Democracy or		
			Adv. Civics; or Econ.		
			½, Sociology ½		
<i>Elect Two</i>			<i>Elect Two</i>		
¹ Mathematics III	5	1	Foreign Language II	5	1
Plane Geometry			Latin or Mod. Lang.		
² Science III	7	1	Science IV	7	1
Chemistry			Physics		
Foreign Language I	5	1	Social Studies V	5	1
Latin or Mod. Lang.			Com. Geog. or Com.		
Com. Education I	10	1	Geog. ½ and Phys.		
Typewriting			Geog. ½		
Com. Education II	5	1	Com. Education III	10	1
Shorthand			Bookkeeping and		
			Acct.		
			Com. Education IV	5	1
			Shorthand and Office		
			Practice		

* School may elect to teach Business Training for one-half year and Commercial Arithmetic for one-half year.

¹ Pupils anticipating college entrance should elect Plane Geometry.

² Schools may substitute General Agriculture or General Agriculture and Physiology for Chemistry.

TYPE I F

SUGGESTED ORGANIZATION

TEACHER A		Periods Per Wk.	TEACHER B		Periods Per Wk.
Math. I (2 Sec.)	.....	10	Eng. I (2 Sec.)	.....	10
Math. II	.....	5	Eng. II	.....	5
Math. III	.....	5	Eng. IV	.....	5
			For. Lang. I	.....	5
			For. Lang. II	.....	5
Total		20	Total		30
TEACHER C			TEACHER D		
Soc. Stu. I (2 Sec.)	.....	10	Science I (2 Sec.)	.....	10
Soc. Stu. II	.....	5	Science II	.....	5
Soc. Stu. III or IV	.....	5	Science III or IV	.....	7
Soc. Stu. V	.....	5			
Eng. III	.....	5			
Total		30	Total		22
TEACHER E			Periods Per Wk.		
Com. Edu. I	.....	10			
Com. Edu. II	.....	5			
Com. Edu. III	.....	10			
Com. Edu. IV	.....	5			
Total		30			

SUGGESTED DAILY SCHEDULE

Time	Teacher A	Teacher B	Teacher C	Teacher D	Teacher E
8:45-9:30	Math. IB		Soc. Stu. IA	Sci. III or IV	Com. Edu. I
9:30-10:15		Eng. IA	Soc. Stu. II	Lab. T.T.	Com. Edu. I
10:15-10:30	SUPERVISED PLAY				
10:30-11:15		Eng. IB	Eng. III	Science II	Com. Edu. III
11:15-12:00	Math. III	For. Lang. II		Lab. M.W.	Com. Edu. III
12:00-1:00	NOON				
1:00-1:30	Activities—Music, Art, Assembly, Clubs, Home Room				
1:30-2:15		Eng. II	Soc. Stu. III or IV	Science IB	
2:15-3:00	Math. IA	Eng. IV	Soc. Stu. IB		Com. Edu. II
3:00-3:45	Math. II	For. Lang. I	Soc. Stu. V	Science IA	Com. Edu. IV

TYPE II

THREE-YEAR JUNIOR HIGH SCHOOL (GRADES 7-9)

(Departmentalized Two-Teacher School)

Curriculum**Seventh Year**

SUBJECTS	Periods Per Wk.
English 7	5
Mathematics 7	5
Science 7	5
El. Science (3)	
Health and Phys. Ed. (2)	
*Social Studies 7	5

Eighth Year

SUBJECTS	Periods Per Wk.
English 8	5
Mathematics 8	5
Science 8	5
El. Science (3)	
Health and Phys. Ed. (2)	
*Social Studies 8	5

Ninth Year

SUBJECTS	Periods Per Wk.	Units
English I	5	1
Composition		
Literature		
Mathematics I	5	1
Algebra I		
Science I	5	1
General Science		
Social Studies I	5	1
Citizenship		

* Includes work in Geography, History and Civics whether in separate or integrated courses.

TYPE II

SUGGESTED ORGANIZATION

TEACHER A	Periods Per Wk.	TEACHER B	Periods Per Wk.
English 7	5	Mathematics 7	5
English 8	5	Mathematics 8	5
English I	5	Mathematics I	5
Social Studies 7	5	Science 7	5
Social Studies 8	5	Science 8	5
Social Studies I	5	Science I	5
Total	30	Total	30

SUGGESTED DAILY SCHEDULE

Time	Teacher A	Teacher B
8:45-9:30	English 7	Mathematics 8
9:30-10:15	English 8	Science I
10:15-10:30	SUPERVISED PLAY	
10:30-11:15	Social Studies I	
11:15-12:00	Social Studies 7	Science 8
12:00-1:00	NOON	
1:00-1:30	Activities—Music, Art, Assembly, Clubs, Home Room	
1:30-2:15	English I	Mathematics 7
2:15-3:00	Social Studies 8	Mathematics I
3:00-3:45		Science 7

TYPE III

FOUR-YEAR JUNIOR HIGH SCHOOL (GRADES 7-10)

(Two Teachers)

Curriculum

(Academic)

Seventh Year

SUBJECTS	Periods Per Wk.	Units
English 7	5	
Mathematics 7	5	
Science 7	5	
El. Science (3)		
Health and Phys.		
Ed. (2)		
*Social Studies 7	5	

Eighth Year

SUBJECTS	Periods Per Wk.	Units
English 8	5	
Mathematics 8	5	
Science 8	5	
El. Science (3)		
Health and Phys.		
Ed. (2)		
*Social Studies 8	5	

Ninth Year

English I	5	1
Composition		
Literature		
Mathematics I	5	1
Algebra I		
Science I	5	1
General Science		
Social Studies I	5	1
Citizenship		

Tenth Year

English II	5	1
Composition		
Literature		
Mathematics II	5	1
Algebra II or Alg. $\frac{1}{2}$		
and Arith. $\frac{1}{2}$		
Science II	7	1
Biology		
Social Studies II	5	1
World History or		
Mod. European Hist.		

* Includes work in Geography, History and Civics whether in separate or integrated courses.

SUGGESTED ORGANIZATION

TEACHER A	Periods Per Wk.	TEACHER B	Periods Per Wk.
English 7	5	Mathematics 7	5
English 8	5	Mathematics 8	5
English I	5	Mathematics I	5
English II	5	Mathematics II	5
Soc. Studies 7 or 8.....	5	Science 7 or 8	5
Soc. Studies I or II.....	5	Science I or II	5-7
Total	30	Total	30 or 32

SUGGESTED DAILY SCHEDULE

Time	Teacher A	Teacher B
8:45-9:30	English 7	Mathematics 8
9:30-10:15	English 8	Science I or II
10:15-10:30	SUPERVISED PLAY	
10:30-11:15	Social Studies I or II	
11:15-12:00	English II	Science 7 or 8
12:00-1:00	NOON	
1:00-1:30	Activities—Music, Art, Assembly, Clubs, Home Room	
1:30-2:15	English I	Mathematics 7
2:15-3:00	Social Studies 7 or 8	Mathematics I
3:00-3:45		Mathematics II

TYPE IV A

SIX-YEAR HIGH SCHOOL

(Four Teachers)

Curriculum

(Academic)

Seventh Year			Eighth Year		
SUBJECTS	Periods Per Wk.	Units	SUBJECTS	Periods Per Wk.	Units
English 7	5		English 8	5	
Mathematics 7	5		Mathematics 8	5	
Science 7	5		Science 8	5	
El. Science (3)			El. Science (3)		
Health and Phys.			Health and Phys.		
Ed. (2)			Ed. (2)		
*Social Studies 7	5		*Social Studies 8	5	
Ninth Year			Tenth Year		
English I	5	1	English II	5	1
Composition			Composition		
Literature			Literature		
Mathematics I	5	1	Mathematics II	5	1
Algebra I			Algebra II or Alg. $\frac{1}{2}$		
Science I	5	1	and Arithmetic $\frac{1}{2}$		
General Science			Social Studies II	5	1
Social Studies I	5	1	World Hist. or Mod.		
Citizenship			European Hist.		
			Science II	7	1
			Biology		
Eleventh Year			Twelfth Year		
English III	5	1	English IV	5	1
Composition			Composition		
Literature			Literature		
Social Studies III	5	1	Social Studies IV	5	1
American History			Prob. of Democracy or		
Mathematics III	5	1	Adv. Civics; or Econ.		
Plane Geometry			$\frac{1}{2}$, Sociology $\frac{1}{2}$		
Foreign Lang. I	5	1	Social Studies V	5	1
Latin or Mod. Lang.			Com. Geog. or Com.		
			Geog. $\frac{1}{2}$ and Phys.		
			Geog. $\frac{1}{2}$		
			Foreign Lang. II	5	1
			Latin or Mod. Lang.		

* Includes work in Geography, History and Civics whether in separate or integrated courses.

TYPE IV A

SUGGESTED ORGANIZATION

TEACHER A (Principal)	Periods Per Wk.	TEACHER B	Periods Per Wk.
Math. 7	5	Eng. 7	5
Math. 8	5	Eng. I	5
Math. I	5	Eng. II	5
Math. III	5	Eng. III or IV	5
		For. Lang. I	5
		For. Lang. II	5
Total	20	Total	30
TEACHER C		TEACHER D	
Soc. Stu. 7	5	Science 7	5
Soc. Stu. 8	5	Science 8	5
Soc. Stu. I or II	5	Science I	5
Soc. Stu. III or IV	5	Science II	7
Soc. Stu. V	5	Math. II	5
Eng. 8	5		
Total	30	Total	27

SUGGESTED DAILY SCHEDULE

Time	Teacher A	Teacher B	Teacher C	Teacher D
8:45-9:30		Eng. III or IV	Soc. Stu. I or II	Science 7
9:30-10:15	Math. 8	Eng. II	Soc. Stu. III or IV	
10:15-10:30	SUPERVISED PLAY			
10:30-11:15		Eng. I		Science 8
11:15-12:00	Math. I	Eng. 7	Soc. Stu. 8	Math. II
12:00-1:00	NOON			
1:00-1:30	Activities—Music, Art, Assembly, Clubs, Home Room			
1:30-2:15			Soc. Stu. 7	Science I
2:15-3:00	Math. 7	For. Lang. I	Soc. Stu. V	Lab. T.T.
3:00-3:45	Math. III	For. Lang. II	English 8	Science II

SIX-YEAR HIGH SCHOOL

TYPE IV C

(Five Teachers)

Curriculum

(Academic)

Seventh Year			Eighth Year		
SUBJECTS	Periods Per Wk.	Units	SUBJECTS	Periods Per Wk.	Units
English 7	5		English 8	5	
Mathematics 7	5		Mathematics 8	5	
Science 7	5		Science 8	5	
El. Science (3)			El. Science (3)		
Health and Phys.			Health and Phys.		
Ed. (2)			Ed. (2)		
*Social Studies 7	5		*Social Studies 8	5	
Ninth Year			Tenth Year		
English I	5	1	English II	5	1
Composition			Composition		
Literature			Literature		
Mathematics I	5	1	Social Studies II	5	1
Algebra I			World Hist. or Mod.		
Social Studies I	5	1	European History		
Citizenship or Early			Science II	7	1
European Hist.			Biology		
<i>Elect One</i>			<i>Elect One</i>		
Science I	5	1	Mathematics II	5	1
General Science			Alg. II or Alg. $\frac{1}{2}$ and		
Latin I	5	1	Arith. $\frac{1}{2}$		
			Latin II	5	1
Eleventh Year			Twelfth Year		
English III	5	1	English IV	5	1
Composition			Composition		
Literature			Literature		
Social Studies III	5	1	Social Studies IV	5	1
American History			Prob. of Democracy or		
Mathematics III	5	1	Adv. Civics; or Econ.		
Plane Geometry			$\frac{1}{2}$, Sociology $\frac{1}{2}$		
<i>Elect One</i>			<i>Elect Two</i>		
**Science III	7	1	Social Studies V	5	1
Chemistry			Com. Geog. or Com.		
Latin III	5	1	Geog. $\frac{1}{2}$ and Phys.		
Mod. Lang. I	5	1	Geog. $\frac{1}{2}$		
			Science IV	7	1
			Physics		
			Latin IV	5	1
			Mod. Lang. II	5	1

* Includes work in Geography, History and Civics whether in separate or integrated courses.

** Science III may be General Agriculture or General Agriculture and Advanced Physiology.

SUGGESTED ORGANIZATION

TEACHER A		Periods Per Wk.	TEACHER B		Periods Per Wk.
Math. 7	.....	5	Soc. Stu. 7	.....	5
Math. 8	.....	5	Soc. Stu. 8	.....	5
Math. I	.....	5	Soc. Stu. I	.....	5
Math. II	.....	5	Soc. Stu. II	.....	5
Math. III	.....	5	Soc. Stu. III or IV	.....	5
			Soc. Stu. V	.....	5
Total		25	Total		30

TEACHER C		Periods Per Wk.	TEACHER D		Periods Per Wk.
Science 7	.....	5	Eng. 7	.....	5
Science 8	.....	5	Eng. 8	.....	5
Science I	.....	5	Eng. I	.....	5
Science II	.....	7	Eng. II	.....	5
Science III or IV	.....	7	Eng. III	.....	5
			Eng. IV	.....	5
Total		29	Total		30

TEACHER E		Periods Per Wk.
Latin I	.....	5
Latin II	.....	5
Latin III or IV	.....	5
Mod. Lang. I	.....	5
Mod. Lang. II	.....	5
Total		25

SUGGESTED DAILY SCHEDULE

Time	Teacher A	Teacher B	Teacher C	Teacher D	Teacher E
8:45-9:30		Soc. Stu. I	Sci. 7	Eng. III	Mod. Lang. II
9:30-10:15	Math. I	Soc. Stu. III or IV	Sci. 8	Eng. II	
10:15-10:30	SUPERVISED PLAY				
10:30-11:15		Soc. Stu. II	Sci. III or IV	Eng. I	
11:15-12:00	Math. 8		Lab. T.T.	Eng. 7	Latin III or IV
12:00-1:00	NOON				
1:00-1:30	Activities—Music, Art, Assembly, Clubs, Home Room				
1:30-2:15	Math. II	Soc. Stu. 7	Sci. I	Eng. 8	Latin II
2:15-3:00	Math. 7	Soc. Stu. 8	Lab. M.W.	Eng. IV	Mod. Lang. I
3:00-3:45	Math. III	Soc. Stu. V	Sci. II		Latin I

SIX-YEAR HIGH SCHOOL

TYPE IV D

(Five Teachers)

Curriculum

(Agriculture and Home Economics)

Seventh Year

SUBJECTS	Periods Per Wk.	Units
English 7	5	
Mathematics 7	5	
Science 7	5	
El. Science (3)		
Health and Phys.		
Ed. (2)		
*Social Studies 7	5	

Ninth Year

English I	5	1
Composition		
Literature		
Mathematics I	5	1
Algebra I		
Social Studies I	5	1
Citizenship or Early		
European History		

Elect One

Science I	5	1
General Science		
Agriculture I	10	1
Home Economics I	10	1

Eleventh Year

English III	5	1
Composition		
Literature		
Social Studies III	5	1
American History		
Mathematics III	5	1
Plane Geometry		

Elect One

Foreign Language I	5	1
Latin or Mod. Lang.		
Agriculture III	10	1

Eighth Year

SUBJECTS	Periods Per Wk.	Units
English 8	5	
Mathematics 8	5	
Science 8	5	
El. Science (3)		
Health and Phys.		
Ed. (2)		
*Social Studies 8	5	

Tenth Year

English II	5	1
Composition		
Literature		
Mathematics II	5	1
Algebra II or Alg. ½		
and Arith. ½		
Social Studies II	5	1
World Hist. or Mod.		
European History		

Elect One

Science II	7	1
Biology		
Agriculture II	10	1
Home Economics II	10	1

Twelfth Year

English IV	5	1
Composition		
Literature		
Social Studies IV	5	1
Prob. of Democracy or		
Adv. Civics; or Econ.		
½, Sociology ½		

Elect Two

Social Studies V	5	1
Com. Geog. or Com.		
Geog. ½ and Phys.		
Geog. ½		
Foreign Language II	5	1
Latin or Mod. Lang.		
Agriculture IV	10	1

* Includes work in Geography, History and Civics whether in separate or integrated courses.

PE IV D

*SUGGESTED ORGANIZATION

TEACHER A		Periods Per Wk.	TEACHER B		Periods Per Wk.
Math. I		5	Eng. 8		5
Math. II or III		5	Eng. II		5
Soc. Stu. 7		5	Soc. Stu. I		5
Soc. Stu. 8		5	Soc. Stu. II		5
			Soc. Stu. III or IV		5
			Soc. Stu. V		5
Total		20	Total		30
TEACHER C			TEACHER D		
Eng. 7		5	Agri. I or II		10
Eng. I		5	Agri. III or IV		10
Eng. III		5	Math. 7		5
Eng. IV		5	Math. 8		5
For. Lang. I		5			
For. Lang. II		5			
Total		30	Total		30
TEACHER E			Periods Per Wk.		
Home Econ. I or II					10
Science 7					5
Science 8					5
Science I					5
Science II					7
Total					32

SUGGESTED DAILY SCHEDULE

Time	Teacher A	Teacher B	Teacher C	Teacher D	Teacher E
8:45-9:30			Eng. 7	Agri. I or II	Home Econ.** I or II
9:30-10:15		Soc. Stu. III or IV	Eng. IV	Agri. I or II	Home Econ.** I or II
10:15-10:30	SUPERVISED PLAY				
10:30-11:15	Math. II or III	Soc. Stu. V	Eng. I	Math. 8	Science 7
11:15-12:00	Math. I	Eng. II		Math. 7	Science 8
12:00-1:00	NOON				
1:00-1:30	Activities—Music, Art, Assembly, Clubs, Home Room				
1:30-2:15	Soc. Stu. 8	Soc. Stu. II	Eng. III		Science I
2:15-3:00	Soc. Stu. 7	Eng. 8	For. Lang. II	Agri. III or IV	Lab. II
3:00-3:45		Soc. Stu. I	For. Lang. I	Agri. III or IV	Science II

* In case Teacher D is employed as principal, Mathematics 7 and 8 should be transferred to Teacher A.

** Schools that find it difficult to schedule Home Economics classes so as to avoid duplication of work should secure schedule from State Supervisor of Home Economics.

2. Suggested Programs of Study for High Schools Employing Six or More Teachers

a. JUNIOR HIGH SCHOOL PROGRAM OF STUDIES

Seventh Year	Periods a Wk.	Eighth Year	Periods a Wk.	Ninth Year	Periods a Wk.
English Literature Composition Grammar & Spelling	5	English Literature Composition Grammar & Spelling	5	English Literature Composition	5
*Social Studies	5	*Social Studies	5	Social Studies Citizenship or Early Europ'n Hist.	5
Mathematics General Mathematics	5	Mathematics General Mathematics	5	General Science	5
Health & Physical Ed.	2	Health & Physical Ed.	2	Health & Physical Ed.	2
Elementary Science	3	Elementary Science	3	Activities Clubs (1) Assembly (1) Home Room (1)	3
Study	10	Study	10		
Activities Clubs (1) Assembly (1) Home Room (1)	3	Activities Clubs (1) Assembly (1) Home Room (1)	3	Study	10-15
				Electives	5-10
Guidance Orientation in Junior H. S.	1	Guidance Vocations— General Survey	2	(Pupils select 1 or 2) General Math. or **Algebra (5) Foreign Language (5) Fine Arts (5) Music Art	
Practical Arts Ind. Arts (Boys) Home Ec. (Girls)	3	Electives (Pupils select 1) Ind. Arts (5) Home Economics (5) Fine Arts (5) Music Art	5	Home Economics (10) Agriculture (Vocational) (10) Commercial Studies (5) or (10) de- pending on course Ind. Arts (10)	
Fine Arts Music (1) Art (1)	2	Elementary Agr. (5) Jr. Bus. Train. (5) Gen. Language (5)			
Library Instruction	1				
No Electives					
Total Number 45- Minute Periods a Wk.	40		40		40

* Includes work in Geography, History and Civics whether in separate or integrated courses.

** Pupils anticipating college entrance should select this course.

b. FOUR-YEAR HIGH SCHOOL PROGRAM OF STUDIES

Ninth Year	Periods a Wk.	Tenth Year	Periods a Wk.	Eleventh Year	Periods a Wk.	Twelfth Year	Periods a Wk.
English Literature Composition	5	English Literature Composition	5	English Literature Composition	5	English Literature Composition	5
Social Studies Citizenship or Early Europ'n Hist.	5	Social Studies World History or Mod. European History	5	Social Studies American History	5	Social Studies Prob. of Dem. or Adv. Civics; or Econ. ½, Sociology ½	5
General Science	5	Physical Ed.	2	Physical Ed.	2	Physical Ed.	2
Health and Phys. Ed.	2	Activities Clubs (1) Assembly (1) Home Rm. (1)	3	Activities Clubs (1) Assembly (1) Home Rm. (1)	3	Physical Ed.	2
Activities Clubs (1) Assembly (1) Home Rm. (1)	3	Study	5-15	Study	5-15	Activities Clubs (1) Assembly (1) Home Rm. (1)	3
Study	10-15	Study	5-15	Electives	10-20	Study	5-15
Electives	5-10	Electives	10-20	(Pupils select 2)		Electives	10-20
(Pupils select 1 or 2)		(Pupils select 2)		*Pl. Geom. (5)		(Pupils select 2)	
Gen. Math. or		Algebra or		For. Lang. (5)		For. Lang. (5)	
*Algebra (5)		Alg. ½; Arith. ½ (5)		Physics or Chemistry (7)		Physics or Chemistry (7)	
For. Lang. (5)		For. Lang. (5)		Home Ec. (10)		Home Ec. (10)	
Fine Arts (5)		Biology (7)		Ind. Arts (10)		Ind. Arts (10)	
Music		Home Ec. (10)		Voc. Agr. (10)		Voc. Agr. (10)	
Art		Ind. Arts (10)		Fine Arts		Solid Geom. ½; Trig. ½ (5)	
Home Ec. (10)		Voc. Agr. (10)		Music (5)		Home Ec. (10)	
Agriculture (Vocational) (10)		Fine Arts		Art (10)		Ind. Arts (10)	
Com. Studies ((5) or (10) periods depending on course)		Music (5)		Com. Studies ((5) or (10) depending on course)		Voc. Agr. (10)	
Ind. Arts (10)		Art (10)				Fine Arts	
		**H. S. Geog. (5)				Music (5)	
		Com. Stu. ((5) or (10) depending on course)				Art (10)	
						Com. Studies ((5) or (10) depending on course)	
Total No. 45-Minute Periods a Wk.	40		40		40		40

* Pupils anticipating college entrance should select this course.

** This is a general course in geography covering economic, physical and regional geography. Students offering credit in Commercial Geography should not select this course.

c. SENIOR HIGH SCHOOL PROGRAM OF STUDIES

Tenth Year	Periods a Wk.	Eleventh Year	Periods a Wk.	Twelfth Year	Periods a Wk.
English Literature Composition	5	English Literature Composition	5	English Literature Composition	5
Social Studies World History or Mod. Europ'n Hist.	5	Social Studies American History	5	Social Studies Prob. of Dem. or Adv. Civics; or Econ. $\frac{1}{2}$, Sociology $\frac{1}{2}$	5
Physical Education	2	Physical Education	2	Physical Education	2
Activities Clubs (1) Assembly (1) Home Room (1)	3	Activities Clubs (1) Assembly (1) Home Room (1)	3	Activities Clubs (1) Assembly (1) Home Room (1)	3
Study	5-15	Study	5-15	Study	5-15
Electives	10-20	Electives	10-20	Electives	10-20
(Pupils select 2)		(Pupils select 2)		(Pupils select 2)	
Algebra or Alg. $\frac{1}{2}$; Arith. $\frac{1}{2}$ (5)		*Plane Geometry (5)		Foreign Langs. (5)	
Foreign Langs. (5)		Foreign Langs. (5)		Physics or	
Biology (7)		Physics or		Chemistry (7)	
Home Econ. (10)		Chemistry (7)		Solid Geom. $\frac{1}{2}$; (5)	
Ind. Arts (10)		Home Econ. (10)		Trigonometry $\frac{1}{2}$ (5)	
Voc. Agr. (10)		Ind. Arts (10)		Home Econ. (10)	
Fine Arts		Voc. Agr. (10)		Ind. Arts (10)	
Music (5)		Fine Arts		Voc. Agr. (10)	
Art (10)		Commercial Studies		Fine Arts	
**High Sch. Geog. (5)		((5) or (10) de- pending on course)		Music (5)	
Commercial Studies				Art (10)	
((5) or (10) de- pending on course)				Commercial Studies	
				((5) or (10) de- pending on course)	
Total Number 45- Minute Periods a Wk.	40		40		40

* Pupils anticipating college entrance should select this course.

** This is a general course in geography covering economic, physical and regional geography. Students offering credit in Commercial Geography should not select this course.

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d. PROGRAM OF STUDIES FOR REORGANIZED

Seventh Year	Periods a Wk.	Eighth Year	Periods a Wk.	Ninth Year	Periods a Wk.
English Literature Composition Grammar & Spelling	5	English Literature Composition Grammar & Spelling	5	English Literature Composition	5
*Social Studies	5	*Social Studies	5	Social Studies Citizenship or Early Europ'n Hist.	5
Mathematics General Mathematics	5	Mathematics General Mathematics	5	General Science	5
Health & Physical Ed.	2	Health & Physical Ed.	2	Health & Physical Ed.	2
Elementary Science	3	Elementary Science	3	Activities Clubs (1) Assembly (1) Home Room (1)	3
Study	10	Study	10		
Activities Clubs (1) Assembly (1) Home Room (1)	3	Activities Clubs (1) Assembly (1) Home Room (1)	3	Study	10-15
Guidance Orientation in Junior H. S.	1	Guidance Vocations— General Survey	2	Electives	5-10
Practical Arts Ind. Arts (Boys) Home Ec. (Girls)	3	Electives (Pupils select 1)	5	(Pupils select 1 or 2)	
Fine Arts Music (1) Art (1)	2	Ind. Arts (5) Home Economics (5) Fine Arts (5) Music Art		General Math. or **Algebra (5) Foreign Language (5) Fine Arts (5) Music Art Home Economics (10) Agriculture (Vocational) (10) Commercial Studies ((5) or (10) de- pending on course) Ind. Arts (10)	
Library Instruction	1	Elementary Agr. (5) Jr. Bus. Train. (5) Gen. Language (5)			
No Electives					
Total Number 45- Minute Periods a Wk.	40		40		40

* Includes work in Geography, History and Civics whether in separate or integrated courses.

** Pupils anticipating college entrance should select this course.

JUNIOR-SENIOR AND SIX-YEAR HIGH SCHOOLS

	Periods a Wk.	Tenth Year	Periods a Wk.	Eleventh Year	Periods a Wk.	Twelfth Year	Periods a Wk.
	5	English Literature Composition	5	English Literature Composition	5	English Literature Composition	5
Hist.	5	Social Studies World History or Mod. Europ'n Hist.	5	Social Studies American History	5	Social Studies Prob. of Dem. or Adv. Civics; or Econ. $\frac{1}{2}$, Sociology $\frac{1}{2}$	5
	5	Physical Education	2	Physical Education	2	Physical Education	2
al Ed.	2	Activities Clubs (1) Assembly (1) Home Room (1)	3	Activities Clubs (1) Assembly (1) Home Room (1)	3	Activities Clubs (1) Assembly (1) Home Room (1)	3
1)	3	Study	5-15	Study	5-15	Study	5-15
	10-15	Electives (Pupils select 2)	10-20	Electives (Pupils select 2)	10-20	Electives (Pupils select 2)	10-20
1 or 2)	5-10	Algebra or Alg. $\frac{1}{2}$; Arith. $\frac{1}{2}$ (5) Foreign Lang. (5) Biology (7) Home Econ. (10) Ind. Arts (10) Voc. Agr. (10) Fine Arts Music (5) Art (10) **H. S. Geog. (5) Commercial Studies (5) or (10) de- pending on course)		*Plane Geometry (5) Foreign Lang. (5) Physics or Chemistry (7) Home Econ. (10) Ind. Arts (10) Voc. Agr. (10) Fine Arts Music (5) Art (10) Commercial Studies (5) or (10) de- pending on course)		Foreign Lang. (5) Physics or Chemistry (7) Solid Geom. $\frac{1}{2}$; (5) Trigonometry $\frac{1}{2}$ (5) Home Econ. (10) Ind. Arts (10) Voc. Agr. (10) Fine Arts Music (5) Art (10) Commercial Studies (5) or (10) de- pending on course)	
		40		40		40	

* Pupils anticipating college entrance should select this course.

** This is a general course in geography covering economic, physical and regional geography. Students offering credit in Commercial Geography should not select this course

Chapter V

EXTRA-CURRICULAR ACTIVITIES

By the expression "extra-curricular activities" is meant those legitimate activities of the school which are not otherwise provided for in the regular curriculum. Most of these activities are included under the following general headings: school publications, school athletics, social functions, home-room activities, honor societies, clubs, class organizations, pupil participation in government, and such supplementary agencies as the Junior Red Cross, Boy Scouts, Campfire Girls, etc. The number of such activities in a given school will, of course, depend upon the school's attitude toward their creation, the number of pupils enrolled and the number of teachers employed.

Progressive schools realize that these activities are of sufficient importance to entitle them to a regular period in the daily program. Naturally, these activities must be restricted in number in proportion to the limitations of enrollment and teachers available. The following weekly program for the extra-curricular activities period is suggested for the small high schools:

Monday—Home-room meetings (guidance should be emphasized).

Tuesday—Such work in physical education as the small high school can do.

Wednesday—Assembly.

Thursday—Clubs.

Friday—Class meetings, committee meetings, special assemblies and such work in music and art as the small high school can do.

1. **Suggestions Relative to the Organization and Direction of Extra-Curricular Activities.**

a. Each activity should contribute to one or more of the objectives of secondary education.

b. Avoid emphasizing one kind of activity, such as athletics, debating or dramatics to the neglect of other forms of activities.

c. The principal should have general control of extra-curricular activities and should require that no activity be organized without his approval.

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d. All extra-curricular activities sponsored by the high school should be under the supervision of some teacher employed in the school. This does not mean that the services of outside people should not be used, but that the responsibility for sponsoring any activity should be placed on some teacher in the school.

e. Activities should be sufficient in number to provide opportunities for all pupils desiring to participate.

f. Meetings should be held in the school building unless permission is secured to meet elsewhere.

g. The school should limit the number of organizations to which a pupil may belong. This will prevent overburdening the more resourceful pupils with work other than that connected with their regular school studies.

h. All money handled by organizations should be checked by the principal or a central auditing committee. These funds are semi-public funds and the board of education should hold the principal strictly accountable for them.

i. No activity should be organized that requires excessive expenditure on the part of pupils.

j. The school should guarantee absolute democracy as to admissions and requirements for all organizations.

k. Provision should be made for the guidance of pupils in making their selection of activities.

l. Teachers should be employed with the understanding that they are to direct some activity in addition to their regular class work.

m. Membership should be (1) restricted to pupils in good standing; (2) regulated by rules which prevent monopoly of activities by the more able or popular pupils; (3) determined on the basis of the pupil's interest and ability in the work of the organization.

n. The type of organization should be adapted to the school. It is a mistake for small high schools to undertake an extensive program of extra-curricular activities.

o. Each pupil on those days in which he is not engaged in an activity should report to the study hall.

p. All organization meetings should employ the entire period. This calls for careful planning of the work.

q. The school should attempt to extend the influence of the extra-curricular activities program to the home and community.

2. Some Activities Which the School Should Provide.

It is obvious that not all of the many types of extra-curricular activities can be discussed in this chapter. It is believed that the following should be provided in all high schools: (a) athletics, (b) assembly, (c) home room, (d) clubs, (e) school paper, (f) dramatics. Large high schools can and should provide for such activities as the student council, band, orchestra, glee club, etc.

a. *Athletics.*

A reasonable amount of athletics should appear in every program of extra-curricular activities. There is real danger, however, that schools will overemphasize this activity. The principal should remember that the school should control its athletics; athletics should not control the school.

In arranging interscholastic schedules, it is highly desirable that all games be scheduled to come on Friday or Saturday. Observation convinces one that scholastic standards are seriously affected where games are permitted in the middle of the school week. Not only the members of the team, but the pupils who attend the game are frequently in no condition to do satisfactory work the following day. Principals should take a firm stand in this matter even if it means going contrary to the wishes of the school's best supporters. It is also very desirable that the coach be a member of the teaching staff. If this is the case, much friction is usually avoided and sports assume their right relation to other school activities.

b. *Assembly.*

The assembly offers the one occasion when the school is conscious of itself as a group. It furnishes a sure index to the quality of the school's life.

(1) Purposes of the Assembly

(a) To develop in the pupils initiative, leadership, cooperation and intelligent obedience to authority.

(b) To create unity and good school spirit in the student body.

(c) To create proper public opinion.

(d) To cultivate power of expression before larger groups.

(e) To foster a spirit of patriotism and appreciation for the best in music, art and literature.

(f) To work for intelligent social behavior by building up proper habits and attitudes in audience situations.

(g) To explore and vitalize classroom work through programs that grow out of it.

(h) To add dignity to service in student organizations by appropriate public recognition of their work through the installation of officers and presentation of insignia.

(2) Suggestions Concerning Assembly Programs

(a) The assembly activity should be placed under the general supervision of an assembly committee composed of faculty members and pupils. This committee should be selected by the principal. It should make out a program for each week that covers at least a month or even a semester in advance.

(b) Principal and teachers should not dominate assembly programs. The program should feature pupil activity.

(c) A majority of the assembly programs should grow out of the class or extra-curricular activities and in turn should be made to motivate and enrich them.

(d) At least a part of each production intended for the assembly that grows out of class or extra-curricular activities should be rehearsed and criticised before being presented. This adds interest in the production as well as motivates and adds interest to the regular class or extra-curricular work.

(e) Effort should be made to bring the public, especially the parents of pupils into the audience. This might be done through sending written invitations to the parents of the pupils having a part on the program.

(f) Outside speakers and entertainers should be used when they can contribute to the problems and interests of the school. Protect the school from "exploiters," however.

(g) The assembly is no place to scold or preach. All unpleasant things should be avoided as much as possible.

(h) Every assembly program should "move." That is, it should begin on time, move toward a definite goal, and end on time.

(i) It is suggested that during the assembly period, the pupils be seated in home-room groups under the direction of the home-room teacher.

(j) Assembly programs should be free to the pupils. Avoid taking up collections.

(k) Center the responsibility for each program. Be sure that the program is worth while.

(l) Give the pupils as much responsibility for the program as possible. Planning the program is a valuable part of their training.

c. *Home Room*

The home room is the place where the pupil reports to the teacher at a designated time during the school day, usually the first period in the morning and the first period after lunch. Each week one of the activity periods should be devoted to programs given by the pupils in the home room.

The home room is the logical unit of extra-curricular activities because it affords close, personal contacts. Groups are already organized and of workable size. They contain two required elements—pupils needing guidance and inspiration, and a teacher trained to give both. Probably the best way to organize the home room in a school of average size is according to classes.

(1) Purposes of the Home Room

(a) To provide a "home" for the pupils where intimate associations are made and used for individual and social growth.

(b) To furnish a unit sufficiently small for the teacher to give vocational, educational and personal guidance.

(c) To acquaint the pupils with the policies and regulations of the school.

(d) To provide opportunities to develop the personal qualities of the pupil.

(e) To form a basis for development of mass opinion.

(f) To administer all routine matters of the group and the school.

(2) Programs

Programs and program material may come from a variety of sources. Programs on such topics as good speech, courtesy, thrift, loyalty, contests, drives, etc., may come from a central source and be

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carried on by all home groups at the same time. Programs on such topics as how to study, leadership, special songs, etc., may be the work for only one home room. Much time and effort must be put upon the preparation of the program. Work must not be done by halves. Those who are to perform must give their best. It is well to plan the home-room programs at least one semester in advance. Some do it for the entire year. Planning in advance gives an opportunity to gather interesting material. It will also give time and opportunity to place in the library such material as may be purchased for use in preparing programs.

Topics may be worked out in considerable detail and the outlines mimeographed. This is very advantageous if several of the home rooms are studying the same topic.

(3) Organization of the Home Room

The home room provides the pupil with an excellent opportunity "to practice the qualities of the good citizen" and to develop such desirable characteristics as initiative, leadership, cooperation and intelligent obedience to authority. To train pupils in citizenship, it is necessary that they be given freedom to share in the organization of their home room.

The pupils should elect their own officers. These officers should be elected for each semester and should consist of a president, vice president, secretary and treasurer. The president should assume formal control of the meeting. The teacher's function is to act as a guide. The secretary records the minutes of the meeting, reports them to the principal, council or whatever higher authority is designated. He finds out what other home rooms are doing and reports to his own home room. The treasurer serves as financial agent for the home room, turning all money collected over to the principal or school treasurer. Certain committees are needed. Care should be exercised in deciding what committees there shall be and in the selection of the personnel. The following committees may be found of distinct service.

(a) Program Committee. It is the duty of the program committee to arrange programs for the meetings. The student body of the room will be surveyed to find the interests, abilities and special talent of each member. Assignments will be made in accordance with the findings.

(b) Scholarship Committee. The objective of the scholarship committee is the raising of the general scholarship of the group. It will find what other groups are doing. It will find weaknesses in its own group and suggest remedies.

(c) Attendance Committee. The attendance committee takes charge of the routine matters of attendance and makes reports to the teacher. The teacher must carefully supervise the work of this committee. It may also assume the work of a welfare committee; visit the sick, help the needy, and do many things to encourage those in distress.

(d) Housekeeping Committee. The housekeeping committee encourages respect for the room. Its members do not do the janitor's work, but in keeping the room tidy and in decorating it, they demonstrate neatness and good housekeeping. This committee discourages the cutting, carving or other mutilation of desks or furniture.

These committees should probably be the standing committees. There will be a need from time to time for special committees to perform special functions, such as socials, supplies, publicity, etc. When the work of the committee is done, it should be discharged so that its members are then ready for other assignments.

d. Clubs

Fretwell, a pioneer thinker in the field of extra-curricular activities, says, "clubs exist in the school to find or follow up an interest in company with others of the same mind." Club life is mainly justified on the side of the leisure objectives of education. Wise use of leisure depends on interests—their variety, depth and extent. The variety of worth while club activities which the average high school can provide makes it possible for the school to aid the individual in exploring, deepening and widening the interests which should abide.

Fretwell also contends that "wherever possible, club activities should grow out of the curriculum and return to the curriculum to enrich it." In other words, clubs should help in motivating and enriching the work of the classroom. Wherever possible, a club should be linked up with a course in the school. The Nature Study Club can grow out of the course in biology, the Latin Club out of the work in Latin, the Radio Club out of the work in physics, the Shakespeare

Club out of the course in English literature, and the Safety club out of the work in health and physical education. Under wise leadership and direction, the results of the activities of such organizations can be made to return to the classroom to supplement and enrich the courses out of which they grow.

(1) Organizing a Club Program

The following is suggested as a desirable procedure for establishing a club program in small high schools:

The principal through interviews discovers the particular club interests of his teachers by having them express their first, second and third club choices. He now prepares a list of the clubs for which he has sponsors. The pupils are provided with this list. The principal in the assembly and the teachers in the home rooms talk to the pupils about initiating a club program in the school and in a general way discuss the purposes and nature of the clubs for which the school has sponsors. The pupils are given a few days to think over this list of clubs before they are asked to make their choice of these activities. One of the home-room periods can be used for club enrollment. This period should be at least sixty minutes in length on the day that the enrolling is done. At this period the home-room teachers give the pupils directions as to where the sponsors of the various clubs are located in the building. The pupils are told that the period has been divided into four sessions; that when the first bell rings they are to go to the room of the sponsor of the club of their first choice; when the second bell rings they are to go to the club of their second choice for the same length of time; then to the club of their third choice, and then to return to their home room for the last session of fifteen minutes. The sponsors, during each of the first three sessions, explain and answer the questions regarding the purposes, the anticipated values, and the general nature of the clubs they are sponsoring. When the pupils return to their home rooms they are asked to write the clubs of their first and second choice and to write their reasons for making their first choice.

Occasions may arise when it is found that more pupils have expressed a performance for a given club than can be accommodated. In such a case, those who have given the best reasons for selecting this club should be enrolled, while the others should go to the club of their second choice. This does create an unfortunate situation for those

who must take a club of their second choice, still in schools with few teachers, this seems the only alternative.

The procedure here outlined, or any similar procedure, should result in the pupils having a fairly intelligent understanding of the interests and purposes that the various clubs in the school are seeking to meet.

(2) Questions Concerning the Administration of Clubs

(a) *What should be the internal organization of a club?*

If pupils are to be educated in the intelligent selection of leaders and in the obligation of intelligent obedience to authority, they should have a voice in the selection of their own leaders. These selections should not be made until the pupils have had an opportunity to discuss freely and thoroughly the qualities which officers for certain positions should possess. The pupils should feel that they belong to a club that is their "very own." Club meetings should be conducted by the student officers in parliamentary fashion. No officer should be elected until a definite job has been found for him. Have few standing committees. The program committee should, of course, be one of these committees. It is better organization to appoint most of the committees as they are needed and then to discharge them after they have performed their duties.

(b) *Should pupils be required to belong to a club?*

Signing for a club should not be compulsory. It should be the ideal of the school to have every pupil from his own choice, based on his interest, become a member of some club activity.

(c) *What should be the program of a club?*

Club programs should grow out of the interests of the pupils. Each club must make its curriculum as it develops. Throughout the building of the program of a club, the sponsor should keep in mind that "the pupil's point of view must be the starting point. Sponsors must so arrange and guide the situation that the pupils will go from where they are to where they ought to be."

Club programs should have variety and not be too formal. Social, recreational, humorous, and other types of programs should be interspersed with the regular activities of the club.

The program committee, of which the sponsor is a member, should

exercise care and thought in planning and preparing the programs of the club. The fact that clubs should grow out of the spontaneous interests of pupils does not mean that reliance can be placed upon spontaneity to shape the program of the club after its meetings begin. Each program must be planned beforehand in line with the interests of the group. In order to have this preparation and to prevent a club's meetings from degenerating into uninteresting routine, some schools have the meetings of a club two weeks apart. This means that one group of clubs meets at the club period one week and another group of clubs meets at this period the next week.

(d) *Should a limit be placed upon the number of clubs to which a pupil may belong?*

It is doubtless a wise policy to limit pupils participations to two clubs. Exceptions might be made in behalf of those pupils who are high in scholarship and who show a variety of interests.

(e) *How long should a pupil be a member of a particular club?*

When a pupil joins a club it should be with the understanding that he will continue as a member until the end of the semester. This requirement will work for the general good of the club program of the school and will tend to cause the pupil to consider such membership seriously.

(f) *Who should be sponsors?*

Members of the faculty.

(g) *Who should appoint them?*

The principal.

(h) *How many clubs should a teacher be expected to sponsor?*

Not over two clubs should be sponsored by a teacher unless allowance is made in her teaching schedule. It is difficult to conceive of a teacher who would not be genuinely interested in at least two of the following types of club activities, whose names usually indicate their purpose: Hiking Club, Nature Study Club, Bird Club, Glee Club, Orchestra, Short Story Club, Garden Club, Literary Club, Latin Club, Radio Club, History Club, Home Beautiful Club, Community Beautiful Club, Dramatic Club, Wild Flowers' Club, Canning Club, Art Club,

Camera Club, Booklovers' Club, Nursing Club, Travel Club, Star Study Club. The following is an illustration of how the clubs in one five-teacher school have been distributed among the teachers:

Teacher A—Debating Club and Community Beautiful Club.

Teacher B—Guidance Club and Dramatic Club.

Teacher C—Short Story Club and Art Club.

Teacher D—Nature Study Club and Canning Club.

Teacher E—Poultry Club and Travel Club.

(i) *For how long a time should sponsors be appointed?*

As long as their interest and enthusiasm in the club and its activities last.

Club life must be a happy life—a life of enjoyment. Sponsors must be interested in and enthusiastic about the activities of the club because interest and enthusiasm are at the heart of successful club life.

e. *School Paper.*

(1) The purposes of the school paper are:

(a) To give authentic school news to the school, parents and community.

(b) To build up the morale of the school.

(c) To furnish the pupils a motive for writing. The newspaper should be regarded as laboratory work in English.

(d) To advertise the school in the home, and give the people of the community "more progressive ideas of education and a better understanding of local school needs."

(2) Types of school papers:

(a) Mimeographed. Some of our smaller Kentucky high schools have creditable papers of this character.

(b) Section in local paper. Great care should be exercised with the personal news in these columns, because the newspaper goes into nearly every home.

(c) Paper published outside of school. This paper would contain only accounts of school activities.

(d) Published in school.

(3) Suggestions:

(a) Every high school should have some form of newspaper if it is nothing more than several pages written in longhand pinned on the bulletin board.

(b) Advertisements should not be solicited unless the paper has distinctive advertising value. If advertisements are sold, the customers should not be allowed to regard it as charity.

(c) The paper should contain wholesome news, free from faculty dominance. Emphasis should be placed on news value.

(d) The paper should be free from cheap humor.

(e) A teacher of English is the logical sponsor for this activity.

(f) The editorial and business staff should be named by the faculty adviser and his choice should be approved by the principal.

(g) Definite duties should be assigned each staff worker and he should be held strictly accountable for the performance of these duties.

(h) The school paper should be regular in its publication—probably biweekly or monthly.

(4) Standards used in judging high school papers:

(a) Newsiness.

(b) Standard of news. Writing of news must be of high standard. It must have clearness and be readable.

(c) The size of the first page.

(d) Inside pages: These should rank with the front page in quality.

(e) Editorials and humor column.

(f) Headlines, makeup.

(g) General considerations.

(h) Size. A first class paper need not necessarily be a large one.

The term "school paper" as used here is broad, purposely including publications which appear twice a week, weekly, or biweekly, and the monthly magazines that are sometimes published in the larger schools. Annuals or yearbooks do not come under this classification, because it is felt that they do not have sufficient educational value to justify the incidental and necessary time and expense. The final issue of the monthly magazine or of the newspaper might appropriately be a "graduation number" containing material pertaining to the outgoing class, together with a group picture and other appropriate cuts.

The whole graduation number might be the production of the senior class and be devoted exclusively to the class history and achievements.

f. *Dramatics.*

The aim of dramatics is to afford the pupil the benefit derived from participation. Pupils are interested in dramatics. Most of them desire to act. Through dramatics, the adolescent receives a type of training which he especially needs. This type of activity is also especially desirable as a means of bringing parents and people of the community into closer contact with the school.

The common dramatic activities are: (1) plays, (2) pageants, (3) circuses, (4) fairs, (5) puppet shows, (6) pantomimes.

(1) The high school play:

(a) The play should be carefully selected:

1) Be sure that the play is within the ability of the pupils.

2) Do not choose plays with questionable ideals.

3) One-act plays offer greater educational opportunity than the longer plays.

(b) All pupils should be encouraged to take some part. Double casts should be assigned if possible.

(c) The admission price should be reasonable. Making money is not a valid purpose for dramatics. The production of plays should be kept simple. Long rehearsals should be avoided.

g. *National Honor Society.*

The National Honor Society is the best known organization which takes cognizance of the scholarship of high school pupils. It has many advantages:

(1) It has definite, clear-cut standards of scholarship.

(2) Eligibility of a student is determined by rank rather than by marks.

(3) It is national and is fostered by the National Association of Secondary School Principles.

The Department recommends that where possible a chapter of this organization be organized in each high school. To get in touch with the organization write H. V. Church, Cicero, Illinois.

Chapter VI

THE HIGH SCHOOL LIBRARY

The school library should be a service center and unifying agency of the school. As such, it demands major consideration on the part of school authorities, teachers and pupils. Some of the chief purposes of the school library are: (1) enrichment and vitalization of the school's program of work, (2) provision for the avocational interests of pupils and teachers, (3) provision for the acquisition of independent habits of study, and (4) some provision for valuable exploratory experiences.

1. Regulations of the State Board of Education: High School Libraries

a. *Books*

High Schools with an enrollment of 100 or fewer pupils shall have a minimum of 500 well selected books, exclusive of government documents and textbooks, selected to meet the needs for reference, supplementary and recreational reading. Schools having a greater enrollment shall increase the number of books at the rate of five volumes per pupil enrolled.

b. *Appropriation*

An annual appropriation of at least one dollar per pupil shall be spent for books, periodicals, etc.

c. *The Librarian*

The amount of service of the librarian shall be:

(1) A full-time librarian shall be provided in schools that have an enrollment of 500 or more pupils. The professional preparation of the librarian should include a four-year college course. The library training shall consist of one year of work in an accredited library school.

(2) A part-time librarian (who teaches not more than three classes) shall be provided in schools that have an enrollment of from 300 to 500 pupils. A minimum of twelve semester hours' training in library science is required.

(3) A part-time librarian (who teaches not more than four classes) shall be provided in schools that have an enrollment of from 100 to 300 pupils. A minimum of at least six semester hours' training in library science is essential.

(4) A part-time librarian (who teaches not more than five classes) shall be provided in schools that have an enrollment of less than 100 pupils. A minimum of at least six semester hours' training in library science is essential.

d. *Organization*

The library shall be satisfactorily located, shelved, cataloged and classified by a simplified form of the Dewey Decimal system. Careful, systematic and thorough instruction in the use of the library must be given and evidence must appear that the library is being used properly.

Successful administration of the high school library necessitates the keeping of business-like records. The following records are required in high school libraries: (See Directions for Keeping Library Records Prescribed for High Schools by Regulations of the State Board of Education, pp. 17-23, *The High School Library: A Handbook*, January, 1936, published by the State Department of Education, Frankfort, Kentucky.)

(1) **An up-to-date accession record.** Every high school library shall be required to maintain an up-to-date accession record of books purchased or acquired for the school library.

(2) **Records of the book collection:** additions, discards, losses. Records of the book collection, i. e., additions, discards, losses, etc., shall be maintained by classes of books in every high school library.

(3) **Circulation records maintained by use of a card system.** Records of the circulation of books shall be maintained by means of a card system. This circulation shall be interpreted as covering the home use of library materials by teachers and pupils.

(4) **Inventory:** taken annually or semi-annually. An inventory of books in the high school library shall be taken annually or semi-annually.

(5) **Card shelf-list.** An up-to-date card shelf-list shall be maintained in schools having a librarian devoting four periods or more to library work.

(6) **An approximate record of the number of pupils using library material daily.** An approximate record of the number of pupils using library materials daily shall be kept in each high school.

2. Location, Size and Equipment of the Library

a. Location

It is usually contended that the general high school library is most satisfactorily located in the central part of the building, near the study hall, but separate from it.

Many high schools cannot provide a separate library room. It is possible for many of these schools to have the library and study hall adjoining and provided with a large opening between, so that the teacher in charge of the study hall may exercise proper supervision of the library. Accessibility of the library to pupils in the study hall is especially desirable. Frequently there is much unused space in the study hall that can be set apart and used for the library.

b. Size

The size of the library quarters is determined by the probable size of the book collection and the number of pupils to be accommodated at the tables. Shelf capacity is figured at eight volumes to the running foot. The number of tables and chairs should be sufficient to take care of approximately fifteen per cent of the enrollment. Due allowance should be made for growth. A workroom with running water should open from the reading room; and storage space should be provided for back numbers of magazines.

c. Lighting and Finish

The quarters provided for the library must have plenty of light. It is desirable to have windows on more than one side of the room. If artificial lighting is necessary, it should be provided by means of electric ceiling fixtures of an indirect or semi-direct type. Wall lighting fixtures should be avoided. Table light fixtures are unnecessary. They seriously hamper the free use of the table space and prevent the easy arrangement of tables for various uses to which the quarters should be put.

Experience has proved that white ceilings and light buff colored walls are best for the library room. Dark colors in woodwork and

trim should be avoided, so as not to absorb the light. Woodwork should be finished with flat varnish.

d. *Furnishings*

Furniture of quarter-sawed white oak, finished in light natural color, is most satisfactory. The light finish, except in unusual cases, have better wearing qualities than the dark finish. If constructed locally, furniture should be made according to specifications. Tables, three by five feet, accommodating six students, are generally recommended. This seating arrangement allows for sufficient elbow room. The rows of tables should be so placed that the fewest possible readers have to face the windows. If pupils can be seated five at a table, leaving vacant the end which would, if occupied, force one reader to face the light, such an arrangement will be an excellent one.

A space of five feet should be allowed between the rows of tables and between the tables and the adjacent walls. Crowded conditions invite problems of discipline.

If the floor is not covered with cork carpet or linoleum, the chairs should have rubber tips to lessen the noise.

The library should be made attractive to high school pupils.

Items of furniture:

Chairs

These should be light and comfortable.

Tables

Corners and edges should be rounded.

Charging desk

Three by five feet is a satisfactory size.

Should contain the proper circulation

files, drawers, cupboards, and a space

for returned books. In larger schools,

one or more flat-top desks for the use of

the librarian and her professional assist-

ants should be provided. In small

schools one desk will suffice for all pur-

poses if built with a pull-shelf for re-

turned books and the proper drawer

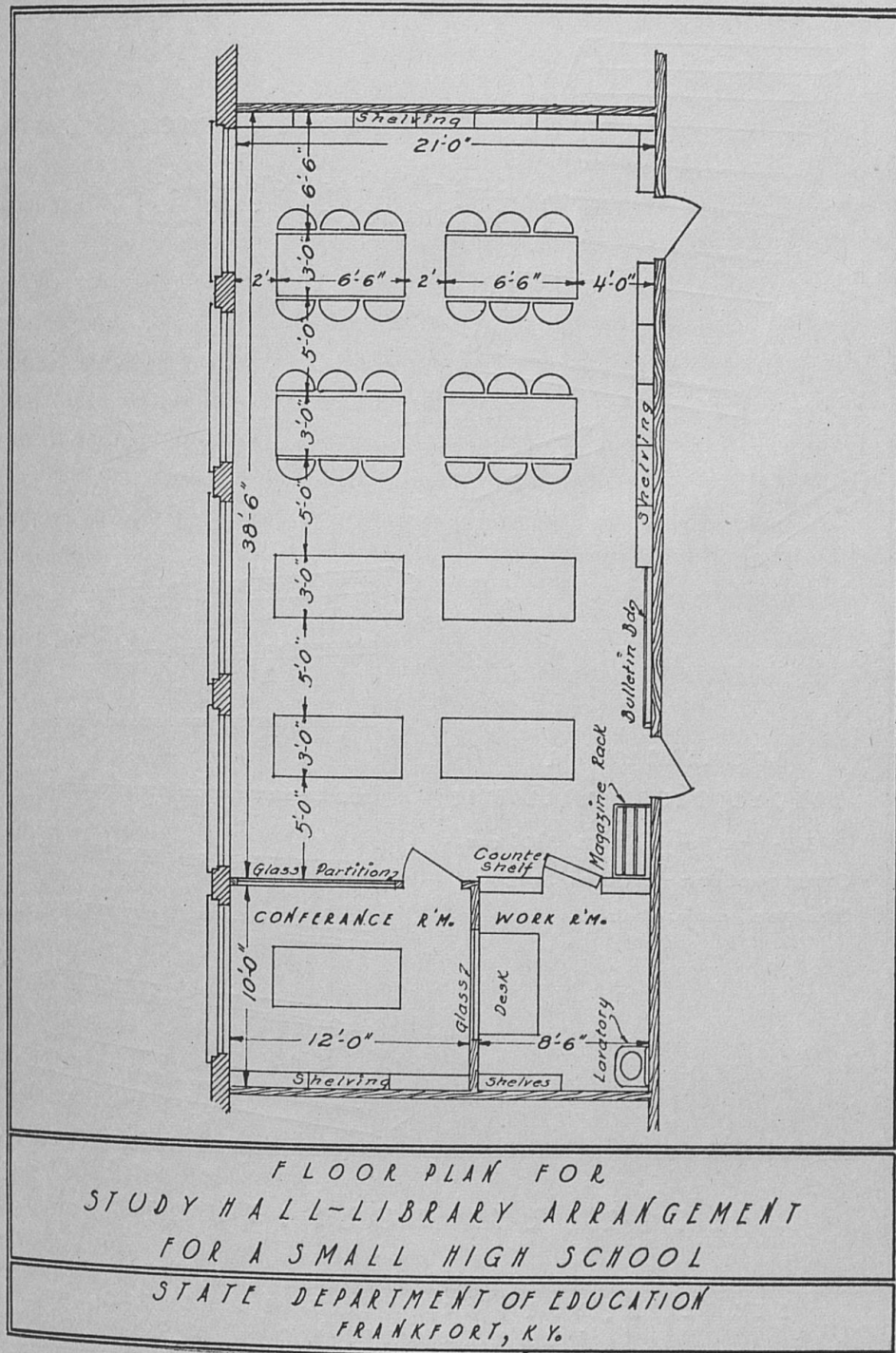
space.

Vertical files for housing
pamphlets, clippings and
pictures.

The legal size, with drawers $10\frac{1}{2}$ inches

high by $15\frac{1}{4}$ inches wide, is preferred.

Files should be sectional, in one or more





Dictio
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Syrac
Inc.,
firms
of the
book.

Dictionary stands	units, and with ball-bearing slides.
Magazine case or rack	Various types can be secured.
Cabinet and stand for card catalog case, large enough to accommodate shelf-list and catalog.	See illustration on page 82.
	Should by all means be purchased from library supply house, since cards for the catalog are cut in centimeter size to agree with the dimensions of Library of Congress cards. If this is not done, the school is likely to find that cards and catalog case do not function efficiently.
Bulletin boards	A satisfactory bulletin board can be made inexpensively.
e. <i>Shelving</i>	
Position	Against the walls.
Type	Open shelves are recommended. The shelves should be adjustable.
Height	Not over 7 feet, accommodating 6 or 7 shelves. The stationary shelf should be 4 to 6 inches above the floor.
Length	Three feet.
Depth	Eight inches. A few sections of 10-inch or deeper shelving should be provided for over-sized books.
Thickness	Seven-eighths of an inch.
Distance between shelves	Ten inches.

f. *Supplies and Library Supply Houses*

Accession book, book pockets, book cards, David's white letterine, black India ink, bowl pointed pens, paste, paste brush, date guides, charging tray, band dater, stamp pad, catalog cards, catalog guides, date due slip, and rubber stamp bearing the name of the school library are necessary library supplies.

The following library supply houses are generally recommended: Demco Library Supplies, Madison, Wisconsin, Gaylord Brothers, Inc., Syracuse, New York, Library Bureau Division of Remington Rand, Inc., Chicago, Illinois. The librarian should get in touch with these firms for prices and recommended amount of supplies to meet the needs of the library. (See pp. 13-16, *The High School Library: A Handbook*.)

3. Training of Pupils in the Use of the Library

Like any other tool to be used in learning, the library cannot serve its purpose adequately unless the pupils are instructed in its use. Every school should instruct the pupils in the use of the library. It not only assists the pupil in solving his present school problems, but also encourages him to look to the library for avocational and leisure time activities. The time and place for providing such instruction in the school curriculum varies with the type of organization used in the school and should be determined independently in each school. Instruction should be started in the intermediate grades and continue through senior high school. A study of the dictionary and encyclopedia in its alphabetical arrangement is good practice for intermediate grades. In the high school the pupils should be instructed in the system and methods of filing and cataloging as well as in the use of reference materials.

4. Finding Room for the Library in Small Schools

Inadequate building space for the library in small systems which are over-crowded can be solved in many instances. Take, for example, a four-teacher high school which has available only four classrooms and is confronted with the necessity of scheduling the classes of four different grades, and in addition, providing for a library. If this school were to schedule on the following basis there would be no difficulty arising from lack of space: In room number one, teach the four classes of English and two of foreign language, total six classes; in room number two, teach the three classes of mathematics and four of social studies, total seven classes; in room number three, have recitations and laboratory work for the sciences (equip with tables and chairs or stools, not desks or armchairs); in room number four, have the library and study room (provide standard shelving, tables and chairs, not desks).

5. The Book Collection

See accrediting regulations for the number of books required in various types of high schools.

A school library book collection should be a living and vital thing. The pupils' interest in the library is deadened by the sight of books that are dry and forbidding; and interest is a necessary factor in any

development of the reading habit. The library environment should also be a changing one; static collections of books soon cease to attract.

Other important considerations have a bearing upon the situation. If books are adult in viewpoint to a degree that unfits them for secondary school use, if they are texts that do not contribute to curriculum enrichment, if they are completely out of date, they are relatively useless as material for the high school library. It is a misguided policy which fills the library shelves with volumes whose only recommendation is that they are "good books."

In selecting books for the school library, the curriculum, the judgment of the librarian, and the opinions and advice of the teaching staff should be considered.

It is usually better not to expend funds for extensive sets along certain lines, such as a ten volume set in history, a twenty-four volume set in literature or complete sets of works of an author. It is usual that only a few volumes of such sets will ever be needed or used by the school. Single volumes or small sets are of more service to schools. This, of course, does not apply to the purchase of a general encyclopedia.

The book collection should provide for:

- a. Reference books.
- b. Books supplementing all classroom assignments.
- c. Books for general reading.
- d. Magazines.

(1) At least 5 periodicals for schools with less than 100 pupils.

(2) At least 10 periodicals for 100 to 500 pupils.

(3) At least 20 periodicals for 500 or more pupils.

(4) The "Reader's Guide to Periodical Literature".

e. Clippings, bulletins, pictures, posters, etc., should be kept in the library in a vertical file.

Books should be kept in good condition and rebound when needed. It is an excellent practice to purchase books of fiction, biography and popular travel in reinforced editions.

- f. State Approved List.

The state approved list of library books for secondary schools is

The Standard Catalog for High School Libraries, published by H. W. Wilson Company, 950-972 University Avenue, New York City. The price of this publication is \$4.00 for schools having an enrollment of 100 or less. This amount may be paid in two payments if necessary. (Sold on service basis: cost greater for larger schools.)

Although the Wilson Company is responsible for publishing the Catalog, the books included have been selected by librarians, educators and specialists along various lines. Books for first purchase are starred; especially desirable titles are double starred; and a "j" or "s" designates titles of particular value for junior or senior high schools. Books suitable for both have no mark. In addition, a great deal of information useful in classifying and cataloging books is included.

Purchase of the Catalog includes not only the main volume, but also four annual cumulated supplements sent as published without additional charge.

Encyclopedias and other sets of books are very often sold by traveling representatives who visit the school in person. If the books in question are not listed in the Standard Catalog for High School Libraries, and are not known to be approved, they should be investigated before being purchased. Any reputable publication will bear investigation.

6. The Librarian

"The librarian in the high school should combine the good qualities of both the librarian and the teacher and must be able to think clearly and sympathetically in terms of the needs and interests of high school pupils."

The faculty of a high school should be so selected that one of the teachers will have had some training in library science. In small high schools this teacher will give part time to the library. She should not be asked to do outside work, such as supervision of the assembly room or coaching. She should train one or more reliable pupils to assist her in order that the library may be open all day.

A full-time librarian, with the professional training of a one-year course in an accredited school for librarians, is the ideal. If college training is essential for the high school teacher, then college and technical training are essential qualifications for the librarian. The librarian should have a wide knowledge of books, ability to organize

material for efficient service and should have had a successful experience in reference work.

A good school librarian :*

- a. Stimulates in boys and girls a desire to read and possess books.
- b. Develops reading habits and encourages reading for pleasure and profit.
- c. Gives pupils systematic instruction in the use of books and libraries.
- d. Renders intelligent and professional service to teachers and administrators.
- e. Makes the library the center of school activities.
- f. Knows and makes use of public library, state library, and other available library organizations.

The salary of the librarian should be the same as that paid high school teachers where qualifications are equal.

* From the Indiana Library Manual for Secondary Schools, 1935.

Chapter VII

THE SCIENCE LABORATORY AND OTHER NEEDED EQUIPMENT

1. The Science Laboratory

Due to the rapid growth of high schools and the difficulty of providing adequate housing facilities for ever increasing enrollments, it is not surprising that the special facilities needed for the teaching of the sciences are often lacking. The chief sciences taught in the high schools of Kentucky are general science, biology, physics and chemistry. Usually one of these sciences is required for graduation. It is the purpose of this section to offer suggestions pertaining to the basic essentials of a laboratory in which these and related subjects are taught. This section is divided into two parts; the first deals with the equipment layout, meaning the more or less stationary and permanent layout; and the second, with apparatus, meaning material which is movable and which must be renewed from time to time.

a. *Equipment.*

(1) The Science Room. The number of rooms required depends upon the size of the school. In the average small high schools in Kentucky all the sciences may be taught in one room which serves as both recitation room and laboratory, provided there is an adjoining room of ample size to be used as a workshop, dark room and storage room. This adjoining room is essential to good science teaching and is a feature often overlooked in schoolhouse planning. The science room should be unilaterally lighted. The orientation of science rooms is not of great importance, but under no circumstances should a room be selected unless sunlight enters some time during the day. For sciences requiring growing plant or animal life, southern exposure is preferable. The room should be at least twenty-one feet wide and long enough to accommodate the desired enrollment. A room twenty-one feet wide and thirty-two feet long will accommodate twenty-four pupils at a time for laboratory work and thirty or more pupils for recitation purposes when the room is not in use as a laboratory. For each additional four pupils in laboratory class, four feet six inches additional length is necessary.

(2) Laboratory Furniture. The type and location of the furniture needed for the science room should be determined at the time the school building is planned in order that proper provision may be made for the necessary service outlets. Laboratory furniture may be planned by the architect and built into the building by the contractor or it may be purchased from factories specializing in laboratory furniture. The best results occur when school officials, architects and manufacturers of laboratory furniture cooperate to get a laboratory layout well adapted to local needs. Storage shelving and cabinets, germinating beds and other accessories may often be secured more economically if included in the general contract for the building. On the other hand, laboratory tables and chairs, fume hoods, instructors' desks, aquariums, etc., should be purchased from manufacturers who specialize in laboratory furniture and consequently are in a position to furnish a better made and more convenient product.

Experience has shown that ordinary furniture will not stand up under the abuse which laboratory furniture is sure to get, consequently laboratory furniture should be constructed of heavy material and strategic points should be reinforced with steel bolts. The tops of science tables should be treated on the under sides with a paint capable of resisting acid and moisture, and on the upper side with a standard, acid-proof finish which leaves a surface that furnishes a high degree of resistance to heat, acids and alkali. Plumbing fixtures for laboratories should be much harder and stronger than are ordinarily used. Laboratory sinks should be made of a special chemical stoneware or of soapstone.

Every laboratory should have a teacher's demonstration table. This table should be approximately sixty inches long, thirty inches wide and thirty-four inches high. It should contain at least four drawers, a cupboard, a stone sink, a set of metal uprights with cross-bar, and gas, water and electric outlets. It is also highly desirable to have an aquarium adjacent to the instructor's desk.

In general, there are two types of student's tables; one type seats two pupils facing in the same direction; the other type seats four pupils in pairs, facing each other. For small high schools in which the laboratory must also serve as a recitation room the smaller tables seating two pupils is to be preferred since it permits proper seating and lighting. Experience has shown that a table sixty inches long,

twenty-two inches wide and thirty inches high will adequately accommodate two pupils. Each table should have two and preferably four drawers, a double cupboard, metal uprights with cross-bar, and should be provided with gas and electric outlets. If chemistry is taught, there should be a sink between every two tables, and adequate fume hoods to carry off obnoxious gases. Chairs, rather than stools are recommended.

Additional equipment needed varies with the sciences offered. Cupboard storage, germinating beds, sinks and additional shelving, should be provided where needed. The science room windows should be equipped with black shades, boxed in, so that the room may be quickly darkened for the use of projection screen and lantern, or motion pictures.

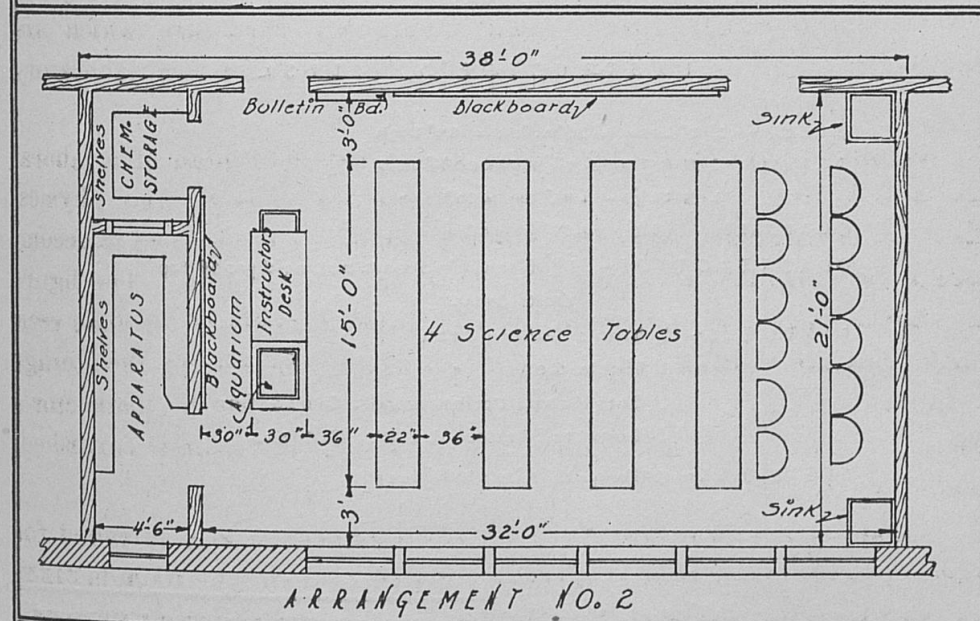
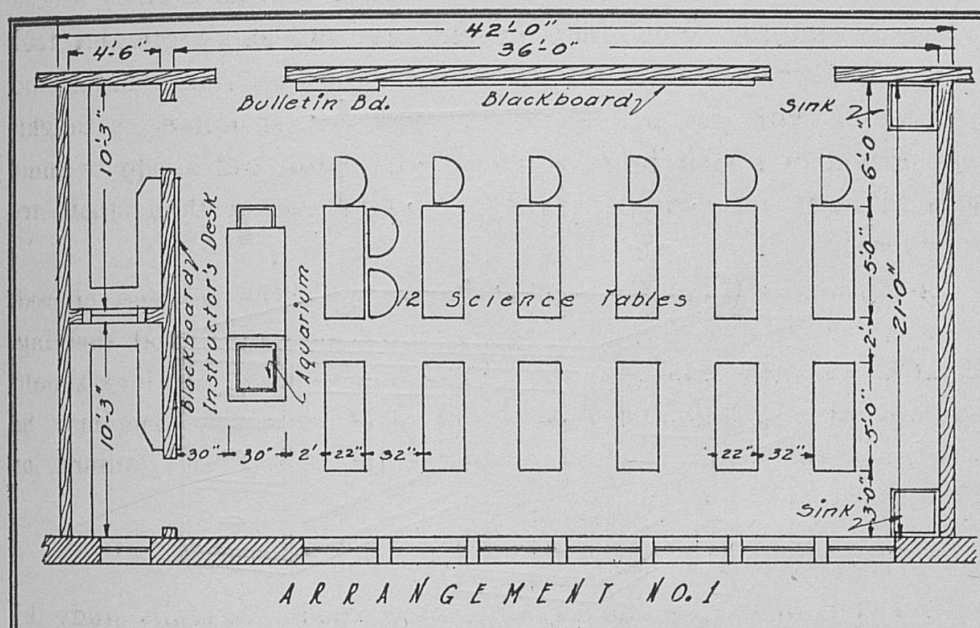
b. *Laboratory Layout.*

Teachers of science and administrators should carefully study the illustrated laboratory layouts and laboratory furniture which are depicted in the following pages. A brief discussion of each laboratory layout follows:

Arrangement Number 1. This shows the floor plan of a laboratory 21x36 feet, intended for general science, biology and physics. The room is furnished with 12 students' tables, each designed to accommodate two pupils for laboratory or recitation purposes. The figure also shows suggestive placement of additional armchairs for class recitation. Small rooms at the front of the classroom are for the storage of apparatus and equipment. Separate drawings of the instructor's desk and student's table Number 2, with which this room is furnished, are also shown.

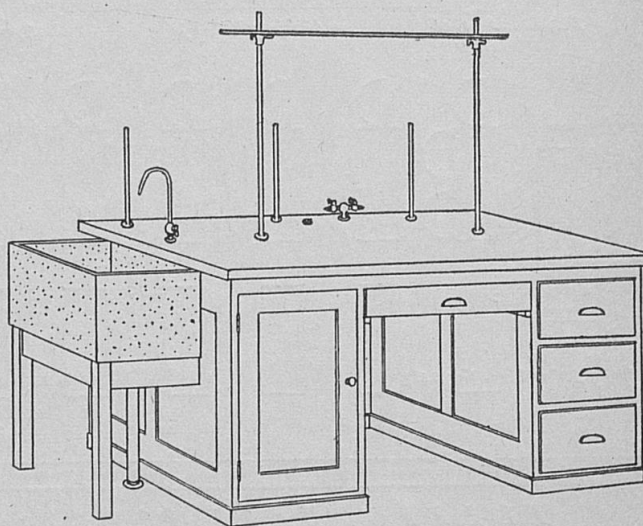
Arrangement Number 2. This arrangement is also intended for general science, biology and physics. In this layout the room is 21x32 feet, and is furnished with four tables, each accommodating six pupils for laboratory work. Additional tablet-armchairs may be placed in this room for class recitation. Separate drawings of the instructor's desk and student's table Number 1, with which this room is furnished, are also shown.

Each of these arrangements may also be used for chemistry work by providing additional sinks. In Arrangement Number 1, the sinks would be placed between every other pair of students' tables. If



COMBINATION SCIENCE LABORATORIES
FOR GEN. SCIENCE, BIOLOGY, PHYSICS, & H.S. RECITATION.
Capacity - 24 Pupils for laboratory
30 Pupils for recitation

STATE DEPARTMENT OF EDUCATION
FRANKFORT, KY.



INSTRUCTOR'S DESK

SIZE ~ 5'-0" Long x 30" Wide x 34" High

DRAWERS ~ 3 @ 13 $\frac{1}{4}$ " Wide x 7 $\frac{5}{8}$ " High x 20 $\frac{3}{4}$ " Deep

1 @ 22 $\frac{1}{2}$ " " x 4 $\frac{1}{4}$ " " x 20" "

CUPBOARD 14 $\frac{3}{4}$ " x 26 $\frac{5}{8}$ " x 24 $\frac{1}{2}$ "

CONSTRUCTION ~ 1 $\frac{5}{8}$ " Birch. finished black acid proof top
Oak Body.

FIXTURES ~ 1 Single Pantry Cock

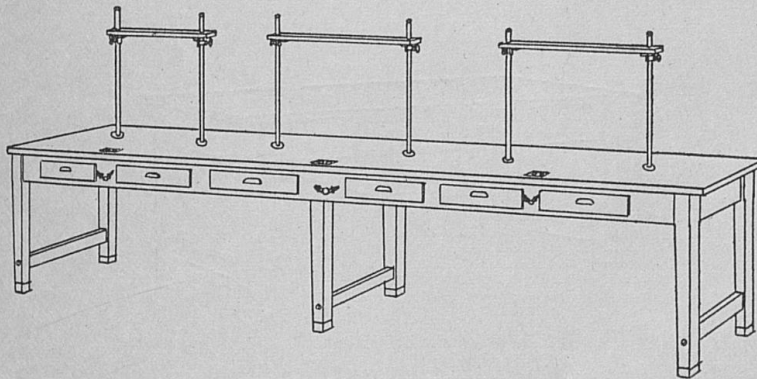
1 Double Gas "

1 Set Metal Uprights With Cross Bar

3 Burette Rods. 1 Elec. Outlet.

STONE SINK ~ 18" Long x 15" Wide x 12 $\frac{3}{4}$ " Deep

LABORATORY FURNITURE
STATE DEPARTMENT OF EDUCATION
FRANKFORT, KY.



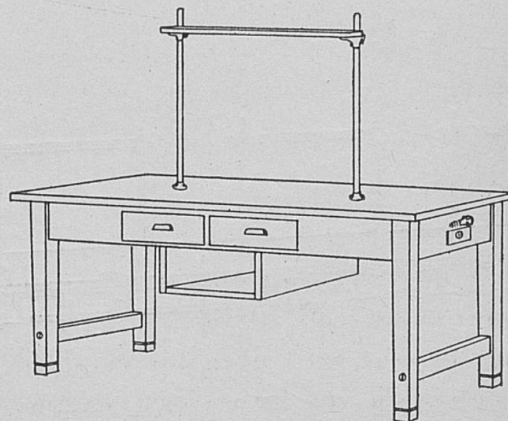
STUDENT'S TABLE NO. 1

SIZE ~ 15'-0" Long x 22" Wide x 30" High

CONSTRUCTION ~ 1-5/8" Birch - Black Acid-Proof Finish Top.
White Oak Body.

FIXTURES ~ 3 Double Gas Cocks
3 " Electrical Outlets
3 Sets Metal Uprights with adjustable wood cross bars.

LABORATORY FURNITURE
STATE DEPARTMENT OF EDUCATION
FRANKFORT, KY.



STUDENT'S TABLE NO. 2

SIZE - Top 5'-0" Long x 22" Wide x 30" High

CONSTRUCTION-

Top- Birch, Black acid resistant - Alternate pressedwood
Body- White Oak " Pine

FIXTURES- 2 single gas & 2 Electric Outlets, Metal uprights & crossbars

2 DRAWERS

OPEN SHELF 8" x 20" x 20"

LABORATORY FURNITURE
STATE DEPARTMENT OF EDUCATION
FRANKFORT, KY.

chemistry is also taught and Arrangement Number 2 is desired, students' tables should be used which provide built-in sinks.

c. *Science Apparatus.*

Adequate apparatus is necessary for satisfactory results in science. It is better to limit the number of courses offered and secure adequate apparatus for each course than to attempt to give a greater number of courses with inadequate apparatus. Science cannot be satisfactorily taught merely as a textbook subject.

There should be an annual appropriation for laboratory purposes in order to maintain the standards for laboratory apparatus. Before the close of each school year, the instructor should be required to check and make an inventory of the laboratory equipment and apparatus according to the standard lists contained in this chapter. A copy of this inventory should be kept on file in the principal's office and used as a guide in ordering new supplies. The instructor who has just gone through the course knows best what is needed. These supplies should be ordered for August delivery immediately after the close of school. Fall dating of bills can usually be obtained by this method which avoids delays often experienced when orders are placed in September. The person who places the order should specify exactly what is needed. Economy and utility of materials should always be considered. Apparatus should not be purchased unless its use is definitely planned.

In connection with this general discussion of science apparatus, there are two general requirements that are essential before any worthwhile attempt can be made to give courses in science. Unless they are provided, the science courses will simply become textbook courses or degenerate to the level of grade school science. These two requirements are:

(1) A source of heat. The only really satisfactory source of heat is gas, either artificial or natural, and bunsen burners. If your school is located in a community which is not supplied with municipal gas, then the only satisfactory substitute is the compressed gases supplied in tanks and piped into the science rooms. These compressed gas outfits are not expensive. They can be obtained for from \$25 up. They go under such trade names as Skelgas, Pyrofax, etc. Any such gas on which adequate service for refills can be gotten in your territory will be satisfactory. Alcohol lamps are not a very satisfactory source

of heat. Any school using only alcohol lamps should put in the budget an item for providing for an adequate installation of compressed gas for heating.

(2) Running water and drain. The only satisfactory arrangement is a faucet connected to a municipal water supply system from which an abundant supply of water can be drawn and a sink connected to sewer which drains away the excess. In case a municipal water system and sewer connections are not available, a makeshift is sometimes used by providing the so-called bubbling fountains with faucet at the bottom and a large waste jar beneath to catch the surplus and the waste materials. This makeshift arrangement is not a satisfactory substitute and should only be tolerated until such time as running water and sewer connections can be made.

In visiting high school laboratories, one is frequently impressed with the careless way in which the apparatus is kept. In most cases, this condition is due to a lack of storage space. As nearly as possible, there should be closed storage for all the apparatus. Expensive apparatus such as microscopes and balances should be protected from dust. Cases with glasses in the doors are best (except for certain chemicals) because the articles can be quickly located. It is best to have a place for each article or class of articles and have a label or number by which each may be instantly located, even by an individual not familiar with the laboratory.

The careful and successful science teacher will keep an orderly laboratory. The science department should not be cluttered with useless material. It should have a complete house cleaning once or twice a year. The teacher will enlist the cooperation of the pupils in cleaning up the laboratory, throwing away useless and broken apparatus, cataloging that which is in good condition and putting each piece in its proper place. The training of boys and girls in the proper care of apparatus should be a part of the laboratory course.

Every container in use in the science room should be labeled to identify its contents. Labels on containers may be protected from corrosion by being covered with shellac or a thin film of paraffin. Acid-proof desk tops should be washed frequently and treated occasionally. Acid-proofing materials can be secured from the apparatus supply houses. For keeping acid-proof desk tops, which are made of wood, in a polished and attractive condition, the following formula is recom-

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mended: one pint of raw linseed oil, two and one-half pounds of beeswax, and two quarts of turpentine.

All science apparatus should be kept in good working order. Barometers, static machines, galvanometers, microscopes, etc., are worthless unless kept in perfect working condition. There is little or no excuse for a dilapidated microscope, broken air pump, unadjusted barometer, and other signs of an instructor's indifference.

d. *Science Reference Material.*

The library should contain suitable reference material for each science course offered. One of the objectives of good science teaching is the stimulation of the use of reference material. Selecting and reading reference material should become the habit of every science student. Some reference books, pamphlets, and magazines should be checked out of the library and be placed on a shelf or table in the laboratory. Such materials, of course, should be returned to the main library as soon as they have accomplished their purpose. It is not within the province of this bulletin to list reference books for the various science subjects. Many good lists are already available. Perhaps one of the most outstanding is that published by Professor H. A. Webb, of George Peabody College, Nashville, Tennessee. This list contains approximately a thousand titles of science books for use in high school. The titles are organized according to subjects, and the list will prove valuable in the selection of science books for the high school library. Every high school should secure a copy of this list. It costs twenty cents. Professor Webb has also listed a large number of magazines, classified according to topics, which may be had for fifteen cents. Lists of government publications may be obtained by writing to the Superintendent of Documents, Washington, D. C. The government publishes a number of circulars of great interest to science teachers. These publications include such topics as fishes, birds, insects, plants, etc.

An examination of the following lists of apparatus recommended for the various sciences will show duplications. If the same room is used for two or more sciences, it is unnecessary to provide this duplicate apparatus.

A summary of the approximate cost of the apparatus is given at the end of each list. It must be remembered that the justification for the expenditure of considerable money for laboratory equipment

and apparatus in high school depends somewhat upon the use to be made of this material. Frequently it is used only to develop techniques of specialization. Such use is questionable and the objection to providing elaborate laboratories is probably justified if the laboratory equipment and apparatus are so used. The cost of laboratory equipment and apparatus in high school must be justified on the basis of usefulness in helping boys and girls adjust and readjust themselves to their environment and not on the basis of attempting to develop them into highly specialized investigators.

The following lists of apparatus and supplies are not to be taken as arbitrary standards, but as general indications of the minimum amount of apparatus which will be considered satisfactory for efficient science instruction.

The basal texts adopted for the various science subjects have been kept in mind in preparing the following lists.

Biology

Biology has become increasingly popular during the last ten years and has practically replaced botany and zoology in most high schools. Emphasis is placed upon the interrelation of living things.

The ideal biology laboratory is found out-of-doors. Living things, to be appreciated, should be studied alive in their native habitat. In general, it is best to study the plants and animals found in the immediate environment of the school. Many field trips should be taken. Provision should be made for the care of living things in the laboratory. An aquarium, breeding cages, battery jars, window boxes, flower pots, etc., are indispensable in a biology laboratory.

Pupils can often be interested in projects which will result in adding useful materials to the museum. High school pupils can be encouraged to make valuable insect collections, life history mounts of insects, models, charts, and skeleton mounts of animals.

There are numerous government bulletins published relating to plant and animal life that will be helpful to teachers of these courses. A list of such publications may be secured by addressing your request to the Bureau of Biological Survey, United States Department of Agriculture, Washington, D. C.

The Forest Service of the United States Department of Agriculture also has a list of bulletins relative to plants and trees. On request,

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the Bureau of Fisheries of the Department of Commerce, Washington, D. C., will supply schools with a list of its publications relating to fish.

Only one compound microscope is named in the list. An ideal equipment would provide at least one compound microscope for each two students and one dissecting microscope for each student. It should be considered that a minimum satisfactory requirement is one microscope for each 4 students in the class. It will be found very difficult to arrange for all students in a large class to have an opportunity to see the wonders of life as revealed in the field of the microscope if only one or two instruments are available. A good grade of microscope should be selected, full size, in a case if separate storage cabinets are not provided.

The equipment is listed in 4 groups below:

LIST A—STUDENT APPARATUS—Required. One set for each student or group of students working together.

LIST B—GENERAL APPARATUS—Required. One set for the entire class. This list contains the apparatus, materials and supplies for the demonstrations by the teacher, the permanent displays and additional quantities of the most breakable items.

LIST C—LIVING AND PRESERVED MATERIAL—Required. One set for the entire class—to be purchased yearly or collected locally if local conditions permit and if such responsibility is assumed by the teacher.

LIST D—ADDITIONAL RECOMMENDED APPARATUS—Not Required, but recommended to be added to whatever extent funds will permit, as soon as the minimum required equipment is provided.

LIST A—STUDENT APPARATUS

Minimum—One set for each student or each group of students working together.

Quantity Required	Name of Item	Quantity Required	Name of Item
1	Beaker, Pyrex, with lip, 250 cc.		(If gas is not available, omit
2	Bottles, wide mouth, 8 oz.		Bunsen Burner and Rubber
1	Bunsen Burner, with both gas		Tubing and order one Alcohol
	and air adjustment.		Lamp, pyrex, polyhedral base,
			6 oz.

Quantity Required	Name of Item	Quantity Required	Name of Item
3	ft. Rubber Tubing, hand made, 1/4" diameter.	1	Dissecting Pan, aluminum, with wax.
1	Support, single stand, with 3 rings.	1	Dissecting Set, including scalpel, forceps, scissors, two dissecting needles, in metal handles, and 6" ruler in leatherette case.
1	Test Tube Support, for 13 tubes.	1	Insect Killing Bottle, 8 oz., with cyanide preparation.
1	Tripod Magnifier, double lens, wide field. (Or 1 Dissecting Microscope.)		

Approximate Cost \$6.00

LIST B—GENERAL APPARATUS—Required

Minimum—One set for the entire class.

Items marked (*) may be deferred to a later purchase when making original installation.

Quantity Required	Name of Item	Quantity Required	Name of Item
1	Meter Stick, graduated in mm and 1/8".	1	pkg. Filter Paper, 11 cm. diameter.
1	Osmosis Apparatus, thistle tube type, with membrane.	1	Funnel 3".
1	Battery Jar, 6x8".	1	Funnel, 4".
1	sq. ft. Rubber Dam.	10	Thistle Tubes, 30 cm long.
12	Lung Demonstration Model, with bell jar.	1	Hot Water Funnel, for hot fil- tering.
12	Rubber Balloons, small, with valve.	1	Wire Gauze, 5x5", asbestos center.
2	Dry Cells.	6	Glass Plates, 3x3".
1	Electrolysis Apparatus, battery jar type, with battery jar.	1	lb. Glass Tubing, 6 mm.
1	Balance, triple beam trip, capacity 610 grams without extra weights, sensibility .05 grams.	1	Graduate, 100 cc, graduated up and down.
1	Snellens Eye Test Chart.	1	box Labels, No. 205.
12	Beakers, Pyrex, 250 cc.	12	Medicine Droppers, straight.
1	Brush, test tube, radial tip.	12	ft. Rubber Tubing 1/4".
1	Clamp, Bunsen.	1	Support, for test tubes, wire.
1	Clamp, Burette.	12	Test Tubes, 6x3/4".
1	Clamp Holder.	12	Test Tubes, Pyrex, 150x18 mm.
1	Pinch Clamp, Mohr's.	1	Thermometer, double scale, 12",—10° to 110° C, 10° to 220° F.
144	Corks, assorted, sizes 0-11.	1	Pneumatic Trough, 4x7x10", tapered to nest.
6	Evaporating Dishes, Coors, 00A, 75 mm dia.	1	Y Tube, 1/4", glass.
		12	Watch Glasses, Syracuse, with beveled writing surface.

Quantity Required	Name of Item
1 set	Small Botany Charts, 30 charts on tripod.
1 set	*Smallwood Zoology Charts, 30 charts on tripod.
1 set	Physiology Charts, W. & A. K. Johnston, 12 charts on tripod.
1	Microscope, 2 objectives, 1 eye-piece, in case.
72	Microscopic Slides, 3x1".
1/2 oz.	Cover Glasses, 18 mm round.
1	Platinum Wire, in glass handle.
1	Aquarium, with living material, 6 gal. size.
1 pkg.	Insect Pins, No 2, 100 per package.
1	Aquarium, globe form, 1 gallon size.
6	Specimen Mounts, 6 1/2 x 8 1/2".
1 set	*Botany Microscopic Slides, 25 to set.
1 set	*Physiology Microscopic Slides, 25 to set.
1	Microscopic Slide, 3 types of Bacteria.
1 set	Zoology Microscopic slides, 25 to set.
1	*Classroom Jar, life history of frog.
12	Petri dishes, Pyrex 100x15 mm.
1	*Model, ear.
1	Model, eye.

Quantity Required	Name of Item
12 vials	Litmus Paper, red.
12 vials	Litmus Paper, blue.
1x1 lb.	Acid, Boric, cryst. pure.
1x1 lb.	Acid, Carbolic, U. S. P., crystals.
1x1 lb.	Acid, Hydrochloric, C. P., concentrated.
1x1 lb.	Acid, Nitric, C. P., concentrated.
1x1 lb.	Acid, Sulphuric, C. P., concentrated.
6 tubes	Agar Culture Media.
1x1 lb.	Ammonium Hydroxide, C. P., concentrated.
1x4 oz.	Cotton, Absorbent.
1x1 oz.	Diatase of Malt, U. S. P.
1x1 lb.	Ether, Sulphuric, pure.
1x4 oz.	Fehling's Solution A.
1x4 oz.	Fehling's Solution B.
2x1 lb.	Formaldehyde, U. S. P., 40% solution.
1x1 lb.	Glycerine, C. P.
1x4 oz.	Iodine Solution in Potassium Iodide and Water.
1x1 lb.	Manganese Dioxide, native, powder.
1x1 oz.	Pepsin, powder, pure.
1x1 oz.	Peptone, dry, from meat.
1x1 lb.	Potassium Chlorate, crystal, pure.
1x4 lb.	Potassium Cyanide, pure, granular.
1x10 g.	Stain, Methylene blue.

Approximate Cost—\$250.00

LIST C—LIVING AND PRESERVED MATERIAL—Required

Minimum—One set for the entire class

Quantity Required	Name of Item
12	Preserved Grasshoppers, Rhombalia.
12	Preserved Honey Bees.
12	Preserved Larva of Monarch butterfly.

Quantity Required	Name of Item
12	Preserved Pupae of Monarch butterfly.
12	Preserved Adult of Monarch butterfly.
12	Preserved Frogs, medium.

Quantity Required	Name of Item	Quantity Required	Name of Item
12	Preserved Starfish, small.	12	Living Amoeba, culture for 12.
12	Preserved Clams, medium pegged.	12	Living Paramecium, culture for 12.
12	Preserved Crayfish, large.	12	Living Hydra, culture for 12.
12	Preserved Perch, medium.	Approximate Cost—\$13.00	

LIST D—ADDITIONAL RECOMMENDED APPARATUS

Quantity Required	Name of Item	Quantity Required	Name of Item
1	Binocular, bird or nature study glass, wide field, with shoulder strap and case.		forceps, scissors, needles and holders, and metric ruler, in leatherette case.
1	Dessicator, Scheibler's dia. 10 cm.	1	Plant Press, with 6 sheets absorbent paper, 12"x16".
1	Audubon Bird Chart, 26 com- mon birds.	1	pkg. Plant Press Paper, felt, 12"x16", per package of 25 sheets.
1	Audubon Bird Chart, 26 add. common birds.	2	Collecting Cases, Vasculum, metal, 5"x5 $\frac{7}{8}$ "x15 $\frac{3}{4}$ ".
1	Audubon Bird Chart, 20 winter birds.	2	Collecting Trowels, curved steel blade.
1	Audubon Bird Chart, 23 Migrants.	1	Germinating Box, with glass side, 7 $\frac{1}{2}$ "x5 $\frac{1}{4}$ "x5".
3	Dish, crystallizing, glass, 100x50 mm.	2	Breeding Cages, all metal, fold- ing, 12"x12"x16".
1	Magnifier 14x.	1	pkg. Insect Pins, for mounting insects, 100 per package, size No. 0.
1	Microtone, hand.	1	pkg. Insect Pins, for mounting insects, 100 per package, size No. 4.
1	Micro Projector, triple pur- pose, for slides living material and making drawings, with lamp.	1	Insect Net, seamless, 48" handle.
1	box Slide Labels, square 100 in box.	1	Mount, of protective color- ation of insect.
1	Slide Box, grooved, capacity 100 slides.	1	Mount, of Monarch Butterfly.
2	Forceps, cover-glass, Stewart's, 100 mm long.	1	Mount, of Cotton Boll Weevil.
1	Forceps, dissecting, bone.	1	Mount, of Tobacco or Potato Sphinx.
1	Forceps, dissecting, artery, 60 mm long.	1	Mount, of Cabbage Butterfly.
1	Bone Saw, with nickel-plated steel blade.	1	Mount, of Silk Worm.
1	Cartilage Knife, scalpel shape, all steel.	1	Mount, of Peach Borer.
1	Dissecting Set, including pipette, scalpel section razor,	1	Mount, of Tent Caterpillar.
		1	Bottle, balsam, with dropper and cap, capacity 60 cc.

Quantity Required	Name of Item	Quantity Required	Name of Item
2	Dish, Stender, No. 1.	12	Saucers, for flower pots.
1	Staining Jar, Coplin's.	1	Insect Spreading Board, adjustable for all size insects, length 13".
12	Microscopic Slides for Bacteriology, set of 12.	1	Auxanometer, plant growing apparatus, scale in .01 divisions.
1	Model, of Amphixus Development, 20 pieces mounted separately.		
12	Flower Pots, earthenware, diameter 6".		

Approximate Cost—\$240.00

Chemistry

The equipment is listed in 4 groups below:

LIST A—STUDENT APPARATUS—Required. One set for each student or each group of students working together. As many multiples of this list should be provided as there are groups of students doing laboratory work.

LIST B—GENERAL APPARATUS—Required. One set for the entire class. This list contains the equipment for the demonstrations to be done by the teacher and additional quantities of the breakable items in the student apparatus list.

LIST C—CHEMICALS—Required. One set for the entire class. Where several classes are taught, it may be necessary to increase the quantities of some of the items but they are listed in the smallest economically purchasable quantities.

LIST D—ADDITIONAL RECOMMENDED APPARATUS—Not Required, but recommended to be added as far as possible as soon as funds permit.

LIST A—STUDENT APPARATUS—Required

Minimum—One set for each student or each group of students working together.

Quantity Required	Name of Item	Quantity Required	Name of Item
1	File, triangular, 4".	4	Bottles, wide mouth, 8 oz.
2	Beakers, Pyrex, with lip, capacity 100 cc.	1	Brush, test tube, plain.
1	Beaker, Pyrex, with lip, capacity 400 cc.	1	Bunsen Burner, with gas and air adjustment (specify kind of gas when ordering). (If no gas is available, omit Bunsen
1	Blow Pipe, brass, plain, 8".		

Quantity Required	Name of Item	Quantity Required	Name of Item
	Burner, Wing Top and Rubber Tubing and specify:	1	Graduate, graduated up and down, 100 cc.
1	Alcohol Lamp, Pyrex, poly- hedral base, 6 oz.	1	Jar, waste, stoneware, 2 gal- lon size.
1	Wing Top, brass.	1	Ring, iron, 3" dia., for Ring stand.
1	Clamp, burette.	3	ft. Rubber Tubing, white, $\frac{1}{4}$ " dia., 1/16" wall.
1	Clamp, Stoddard's test tube.	1	Support, iron, No. 2, base 5"x7", rod $\frac{3}{8}$ "x20".
1	Clamp, Mohr's brass, for bu- rettes, 2 $\frac{3}{4}$ ".	1	Support, test tube, 13 tube.
1	Crucible, Coors porcelain, No. 1, cap. 30 cc.	6	Test Tubes, 6x $\frac{3}{4}$ ".
1	Crucible Cover, Coors porce- lain, No. 1, dia. 47 mm.	1	Test Tube, Pyrex, 150x18 mm, heavy wall, without lip.
1	Deflagrating Spoon, brass.	1	Triangle, iron wire, 2 $\frac{1}{2}$ " long, with pipestem.
1	Dish, evaporating, Coors porce- lain, No. 00A, capacity 70 cc.	1	Pneumatic Trough, 4x7x10", tapered to nest.
1	pkg. Filter Paper, 100 sheets, 11 cm. diameter.	1	vial Test Paper, Litmus, red, 100 strips per vial.
1	Flask, flat bottom, Pyrex, 250 cc capacity.	1	vial Test Paper, Litmus, blue, 100 strips per vial.
1	Flask, flat bottom, Pyrex, 500 cc capacity.	4	Reagent Bottles, 4 oz., glass stoppered; name blown in glass;—Sulphuric Acid, Hy- drochloric Acid, Nitrate Acid, Ammonium Hydroxide.
1	Forceps, steel, 5" long.		
1	Funnel, glass, 75 mm diameter.		
1	Funnel Tube, thistle top, straight stem, 30 cm. long.		
1	Gauze, iron wire, asbestos cen- ter, 5x5".		
2	Glass Plates, 4x4".		

Approximate Cost—\$10.00

LIST B—GENERAL APPARATUS—Required

Minimum—One set for the entire class.

Quantity Required	Name of Item	Quantity Required	Name of Item
1	Meter Stick, graduated to both mm and $\frac{1}{8}$ ".		nier, mercury column entirely exposed.
1	Hydrometer, for light liquids, 30 cm long.	2	Horseshoe Magnets, 7.5 cm long.
1	Hydrometer, for heavy liquids, 30 cm long.	1	Electrolysis Apparatus, after Brownlee and others.
1	Barometer Tube, with mercury cup and pipette.	1	box Christmas Candles, col- ored, 24 in box.
1	Barometer, mercurial, metric and English scales with ver-	1	Balance, Triple Beam, Harvard trip construction, bakelite pan,

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Quantity Required	Name of Item
	agate bearings, capacity 610 grams, sensibility .05 gram. No additional weights needed.
3	Hand Balances, stainless steel pans.
3	sets Weights, metric, in wood block, 1 cg to 100 g, including 1 cg, (2) 2 cg, 5 cg, 1 dg, (2) 2 dg, 5 dg, 1 g, (2) 2 g, 5 g, 10 g, (2) 20 g, 50 g, and 100 g.
12	Beakers, Pyrex, with lip, 100 cc.
6	Beakers, Pyrex, with lip, 400 cc.
12	Bottles, wide mouth, 8 oz.
2	Glass Plates, blue cobalt, 2x2".
2	Burettes, Mohr's, with glass stopcock, capacity 50 cc, graduated to 0.1 cc.
1	Chart of the Atoms, litho- graphed in six colors, showing 40 atomic properties, includ- ing atomic symbol, atomic weight, atomic number; size 42"x64".
2	Pinchcocks.
1	pkg. Corks, quality XX, as- sorted 1 gross, Nos. 0 to 11, 3/8" to 1/16" diameter.
1	Cork Borers, set of 6.
6	Crucibles, Coors porcelain, No. 1, cap. 30 cc.
6	Crucible Covers, Coors porce- lain, No. 1.
3	Dishes, evaporating, Coors porcelain, No. 00A, capacity 70 cc.
1	Dish, lead, 100 mm dia.
1	Cork Borer Sharpener.
1	qr. Filter Paper, 48x48 cm.
6	Flasks, flat bottom, Pyrex, 250 cc.
6	Flasks, flat bottom, Pyrex, 500 cc.

Quantity Required	Name of Item
2	Flasks, volumetric, capacity 1000 cc.
1	Funnel, separatory, 60 cc capacity.
1	lb. Glass Tubing, outside diam- eter, 1/4".
1	lb. Glass Rod, 1/8".
2	Graduates, cylindrical, gradu- ated up and down, 100 cc by 1 cc.
1	Graduate, cylindrical, gradu- ated up and down, 500 cc by 5 cc.
1	box Labels, Dennison's No. 201.
1	box Labels, Dennison's No. 213.
1	box Labels, Dennison's No. 223.
1	Mortar, procelain, with pestle, No. 1, capacity 135 cc.
12	Pipettes, medicine droppers.
1	Platinum Wire, in glass handle.
1	Retort, glass, Pyrex, tubulated, capacity 4 oz.
72	Test Tubes, soft glass, 6x3/4".
2	Pipettes, volumetric, capacity 50 cc.
12	Test Tubes, Pyrex, 150x18 mm, heavy wall, without lip.
12	ft. Rubber Tubing, machine made, 1/4".
2	Funnels, glass 75 mm diameter.
12	Funnel Tubes, thistle top, 30 cm long.
12	Glass Plates, 4x4".
2	lb. Rubber Stoppers, assorted 2-hole to fit W. M. bottles; 1-hole to fit Pyrex Test Tubes; 2-hole to fit 500 cc Flasks.
2	Burette Clamps, medium size.
1	Right Angle Clamp.
1	Condenser, with molded rub- ber caps, 400 mm.
2	Sand Baths, iron, 3" diameter.

Quantity Required	Name of Item
12	Test Tubes, 8x1".
2	Thermometers, engraved scale, —10 to 110°C, length 12".
1	Thermometer, engraved scale, —10 to 220°C, length 14".
1	Tongs, crucible 20" long.
12	Watch Glasses, 2½" diameter.
6	pkg. Splints, 400 in package.
1	pkg. Picture Wire, No. 1, 25 yard package.

Quantity Required	Name of Item
1	spl. Steel Wire, 4 oz. spool, No. 20.
1	sht. Asbestos 'WX' Paper, 36"x36".
12	Asbestos Sheets, 4"x4".
1	box Rubber Bands, assorted.
1	Label Book, over 600 labels, Univ. of Chicago and American Chem. Society revision.

Approximate Cost—\$95.00

LIST C—CHEMICALS—Required

Minimum—One set for the entire class.

Quantity Required	Name of Item
1x1 lb.	Acid, Acetic, C. P. glacial.
1x1 lb.	Acid, Boric, U. C. P., crystals.
1x4	Acid, Citric, U. S. P., crystals.
1x1 lb.	Acid, Formic, pure, 90%.
1x6 lb.	Acid, Hydrochloric, C. P., concentrated.
1x7 lb.	Acid, Nitric C. P., concentrated.
1x1 oz.	Acid, Pyrogalllic, pure.
1x9 lb.	Acid, Sulphuric, C. P., concentrated.
1x1 gal.	Alcohol, Ethyl, denatured.
1x1 qt.	Alcohol, Methyl, synthetic, absolute.
1x1 lb.	Aluminum Metal, Mossy.
1x1 lb.	Aluminium Pottasium Sulphate, pure, cryst.
1x1 lb.	Aluminum Sulphate, C. P., crystals.
1x1 lb.	Ammonium Bichromate, C. P.
1x1 lb.	Ammonium Carbonate, C. P., lumps.
1x5 lb.	Ammonium Chloride, pure, white, granular.
1x4 lb.	Ammonium Hydroxide, C. P., concentrated.

Quantity Required	Name of Item
1x1 lb.	Ammonium Molybdate, C. P., solution in Nitric Acid.
1x1 lb.	Ammonium Nitrate, pure, granular.
1x4 oz.	Ammonium Oxalate, C. P.
1x1 lb.	Ammonium Sulphate, C. P.
1x1 oz.	Aniline Dye, green malachite.
1x1 oz.	Aniline Dye, red congo.
1x1 oz.	Aniline Dye, red Fuchsine, Acid.
1x4 oz.	Aniline Dye, intermediate—Alizarine paste.
1x4 oz.	Antimonyl Potassium Tartrate, U. S. P.
1x4 oz.	Baking Powder (Cream of Tartar) Royal.
1x4 oz.	Baking Powder (Phosphate) Rumford.
1x4 oz.	Baking Powder (Phosphate—Sodium Aluminium Sulphate) Calumet.
1x1 lb.	Barium Chloride, C. P., granular.
1x1 lb.	Barium Nitrate, C. P., crystals.
1x1 lb.	Bromine, C. P.
1x4 oz.	Cadium Chloride, C. P.

Item	Quantity Required	Name of Item
4 oz. spool,	1x12 oz.	Calcium Hypochloride, (Bleaching Powder).
WX Paper,	1x4 oz.	Calcium Metal.
4"x4".	1x1 lb.	Calcium Carbide, technical.
is, assorted.	1x5 lb.	Calcium Carbonate, Marble Chips.
r 600 labels,	1x5 lb.	Calcium Carbonate, U. S. P., precipitated.
and American	1x5 lb.	Calcium Chloride, pure, anhydrous, 4-mesh.
revision.	1x1 lb.	Calcium Fluoride, tech- nical, powder.
Cost—\$95.00	1x5 lb.	Calcium Hydroxide, tech- nical.
	1x4 oz.	Calcium Nitrate, C. P.
	1x5 lb.	Calcium Oxide, technical, lumps.
Item	1x1 lb.	Calcium Phosphate, Mono- basic, pure.
Molybdate,	1x1 lb.	Calcium Phosphate, tri- basic, pure.
Nitric Acid.	1x5 lb.	Calcium Sulphate, calcined, (Plaster of Paris).
Nitrate, pure,	1x1 lb.	Carbon Bisulphid, pure.
	1x1 lb.	Carbon Tetrachloride, pure.
Oxalate, C. P.	1x1 lb.	Charcoal, Animal, powder.
ulphate, C. P.	12	Charcoal Blocks, 4"x1"x $\frac{3}{4}$ ".
green mala-	1x1 lb.	Charcoal Wood, lumps.
	1x1 lb.	Charcoal Wood, powder.
ed congo.	1x4 oz.	Chloroform, U. S. P.
red Fuchsine,	1x4 oz.	Chromium Potassium Sul- phate, pure, lumps.
intermediate	1x1 oz.	Cobalt Chloride, C. P.
stassium Tar-	1x4 oz.	Cobalt Nitrate, C. P.
er (Cream of	1x1 lb.	Copper Metal, rivets.
der (Phos-	1x1 lb.	Copper Metal, s h e e t, B. and S. gauge 30.
der (Phos-	1x1 lb.	Copper Carbonate, basic, (cupric), technical, green.
umnum Sul-	1x1 lb.	Copper Oxide, (cupric), technical, powder.
ide, C. P.,	1x4 oz.	Copper Oxide, (cuprous), C. P., red.
e, C. P., cry-	1x1 lb.	Copper Sulphate, C. P., crystals.
ide, C. P.		

Quantity Required	Name of Item
1x5 lb.	Copper Sulphate, technical, crystals.
1x1 lb.	Dextrose, pure, granular.
1x1 lb.	Ether, Sulphuric, U. S. P.
1 set	Fehling's Solution, tablets.
1x1 lb.	Formaldehyde, U. S. P., 40% solution.
1x1 lb.	Glass Beads.
1x1 lb.	Hydrogen Peroxide, U. S. P., 3%.
1x1 oz.	Iodine, U. S. P., resub- limed.
1x1 lb.	Iron Metal, filings, fine.
1x1 lb.	Iron Metal, pure, powder, 80 mesh.
1x1 lb.	Iron Ammonium Sulphate, (ferric), C. P.
1x1 lb.	Iron Ammonium Sulphate, (Ferrous), C. P.
1x1 lb.	Iron Chloride, (ferric), C. P.
1x1 lb.	Iron Sulphate, (ferrous), C. P., crystals.
1x1 lb.	Iron Sulphide, (ferrous), sticks.
1x1 lb.	Kaolin Powder, (China Clay).
1x1 lb.	Lead Metal, foil.
1x1 lb.	Lead Carbonate, basic, powder.
1x1 lb.	Lead Metal, pure, silver, free, granular, (Test lead).
1x1 lb.	Lead Nitrate, technical.
1x1 lb.	Lead Monoxide, yellow, (Litharge).
1x4 oz.	Lead Dioxide, technical, brown.
1x1 lb.	Lead Tetraoxide, pure, red.
1x1 oz.	Lithium Chloride, C. P.
1x1 oz.	Litmus Cubes, blue.
4x1 oz.	Magnesium Metal, ribbon.
1x4 oz.	Magnesium Oxide, U. S. P., light.
1x1 lb.	Magnesium Sulphate, U. S. P., crystals.

Quantity Required	Name of Item
1x1 lb.	Manganese Dioxide, native, powder.
1x4 oz.	Mercury Metal, virgin grade.
1x4 oz.	Mercury Chloride, (mercuric), C. P.
1x1 oz.	Mercury Iodide, (Mercuric), C. P., red.
1x1 lb.	Mercury Oxide, (Mercuric), C. P., red.
1x1 oz.	Methyl Orange, indicator, dry.
1x4 oz.	Mercury Nitrate, (Mercurous), C. P.
1x4 oz.	Methyl Salicylate, (Oil Wintergreen, Syn.).
1x4 oz.	Nickel Nitrate, C. P.
1x1 oz.	Phenolphthalein, U. S. P.
1x4 oz.	Phosphorus, red, amorphous.
1x1 lb.	Potassium Bichromate, technical, crystals.
1x1 lb.	Potassium Bitartrate, U. S. P., powder.
1x1 lb.	Potassium Bromide, U. S. P., granular.
1x1 lb.	Potassium Carbonate, pure, crystals.
1x5 lb.	Potassium Chlorate, U. S. P., crystals.
1x1 lb.	Potassium Chloride, pure.
1x1 lb.	Potassium Chromate, C. P.
1x4 oz.	Potassium Cyanide, pure, granular.
1x1 lb.	Potassium Hydroxide, C. P., sticks.
1x1 oz.	Potassium Iodide, C. P.
1x1 lb.	Potassium Nitrate, pure.
1x1 lb.	Potassium Permanganate.
1x1 lb.	Potassium Sulphate, pure, white.
1x1 lb.	Rosin, lumps.
1x1 lb.	Sand, white, fine.
1x4 oz.	Shellac, Orange, dry.
1x4 oz.	Silver Nitrate, C. P.

Quantity Required	Name of Item
1x1 lb.	Soap, Castile, bars, pure.
1x4 oz.	Sodium Metal.
1x4 oz.	Sodium Acetate, C. P., fused, crystals.
1x4 oz.	Sodium Ammonium Phosphate, C. P.
1x1 lb.	Sodium Borate, U. S. P., crystals.
1x1 lb.	Sodium Calcium Hydroxide, 8 mesh.
1x1 lb.	Sodium Carbonate, C. P., anhydrous.
1x1 lb.	Sodium Chloride, C. P.
1x1 lb.	Sodium Hydroxide, C. P., sticks.
1x1 lb.	Sodium Hyposulphite, pea size, crystals.
1x1 lb.	Sodium Nitrate, pure.
1x1 lb.	Sodium Nitrite, pure, crystals.
1x1 lb.	Sodium Perborate, U. S. P.
1x1 lb.	Sodium Prosphate, dibasic, C. P.
1x1 lb.	Sodium Potassium Tartrate, U. S. P., powd.
1x1 lb.	Sodium Sulphate, C. P., crystals.
1x4 oz.	Strontium Chloride, pure.
1x4 oz.	Strontium, Nitrate, pure.
1x1 lb.	Sucrose, pure.
1x1 lb.	Sulphur, sublimed, flowers.
1x1 lb.	Sulphur, roll.
1x4 oz.	Thermit, black.
1x8 oz.	Ignition Mixture for thermit.
1x4 oz.	Tin Metal, pure, foil.
1x4 oz.	Tin Chloride, (Stannous), C. P.
1x4 oz.	Tin Oxide, (Stannic), C. P.
1x1 oz.	Wood's Metal, sticks.
1x1 lb.	Zeolite, for softening water.

Quantity Required	Name of Item
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Quantity Required	Name of Item	Quantity Required	Name of Item
2x1 lb.	Zinc Metal, technical, mossy.	1x4 oz.	Zinc Oxide, pure, dry.
1x1 lb.	Zinc Metal, technical, powder.	1x1 lb.	Zinc Sulphate, pure, crystals.
1x1 lb.	Zinc Metal, sheet, 30 gauge.	Approximate Cost—\$85.00	

LIST D—ADDITIONAL RECOMMENDED APPARATUS

Quantity Required	Name of Item	Quantity Required	Name of Item
1	Metric Chart, mounted on plain rollers, 25"x41".	2	Crucibles, assay, round, 2 1/4"x4", No. D.
12	Rules, wood, metric, 30 cm.	1	Oven, drying, for gas heat, 6x8x6" or 1 Oven, electric, three-heat, 12x12x17 1/2".
1	Pliers, side-cutting.	1	Eudiometer, Bunsen, capacity 50 cc, graduated in 0.1 cc.
1	Shears, metal-cutting.	1	Filter Pump, aspirator.
1	Boyle's Law Apparatus and Air Thermometer Combined. Boyle's law set-up can be made an air thermometer by opening a stopcock.	1	Filter Pump Coupling, to connect with smooth faucet.
1	Aneroid Barometer, Metric and English scales, for altitudes up to 3,500 feet.	1	Fire Extinguisher Model.
1	Copper Plating Outfit, complete.	2	Flasks, Pyrex, distilling, 250 cc, cap.
1	Conductivity Tester.	1	Kipp's Gas Generator, 1000 ml.
1	Laboratory Balance, Analytical, in mahogany case with leveling screws, and outside rider control with slate base, sensibility 0.1 mg.	5	Gas-Measuring Tubes, 50 cc, grad. to 1/10 cc.
1	set Weights, analytical, brass, in hardwood case, 1 mg to 100 g, including 1 mg, (2)2 mg, 5 mg, 10 mg, (2)20 mg, 50 mg, 100 mg, (2)200 mg, 1 g, (2)2g, 5 g, 10g, (2)20g, 50 g and 100 g.	2	Jars, Nessler's for ammonia tests in water, graduated 50 cc.
2	Brushes, beaker, wood handle.	1	Milk Tester, Babcock, four bottles size.
1	Burner, Fisher.	6	Milk Test Bottles, 6", 10% grad. to 0.2.
6	Calcium Chloride Tubes, with side neck, 15 cm long.	6	Cream Test Bottles, 6" 50% grad. to 0.5.
1	Chart of Electrochemical Series, 16x41".	2	Pipettes, milk and cream, 17.6 and 18 cc.
1	Chart of the Metals, 28x42".	2	Acid Measures, cylindrical jar with lip, 17.5 cc.
1	Combustion Tube, Pyrex, 30x1.5 cm.	2	Rubber Stoppers, 1-hole, to fit combustion tube.
		1	Spinthariscopes, 4 cm long, direct vision.
		1	Radio-Active Ore Specimen.
		1	Still, Peerless, automatic, 1 gal. capacity.
		1	Lactometer, Quevennes', combined with thermometer.

Quantity Required	Name of Item	Quantity Required	Name of Item
1	First Aid Outfit, with emergency supplies.	1x1 lb.	Gypsum, lump.
5	shts. Sandpaper, No. 1.	1x1 lb.	Lignite.
1	Microscope FB4, compound, 2 eyepieces, 2 objectives, double circular nosepiece, magnifications of 50, 100, 215, and 430 diameters.	1x1 lb.	Magnesite, lump.
1x1 lb.	Calcite.	1x1 lb.	Orthoclase.
1x1 lb.	Chalcopyrite.	1x1 lb.	Phosphate Rock.
1x4 oz.	Chrysocolla.	1x1 lb.	Pyrite.
1x1 lb.	Galena.	1x4 oz.	Rhodonite.
		1x1 lb.	Siderite.
		1x1 lb.	Sphalerite.
		1x1 lb.	Calcium Carbide, technical.

Approximate Cost—\$285.00

General Science

General science is offered in most high schools in Kentucky. It is usually taught to ninth grade students for five forty-five minute periods a week, with a decrease of student experimentation, an increase of teacher demonstrations, and more demonstrations by the pupils under the direction of the teacher. Good results have been obtained where much of the laboratory work has been demonstrated. It seems desirable, however, occasionally to have experiments performed by the pupils, especially in cases where the apparatus needed is inexpensive and where the manipulations are not complicated. This Department does not insist on individual laboratory work in general science, but strongly recommends some student experimentation.

The Equipment is listed in 3 groups below:

LIST A—GENERAL APPARATUS—Required. Minimum—One set for the entire class. Where individual or group student experiments are given, those items marked with an asterisk (*) must be provided in as many multiples as there are groups of students working separately. The items marked with a double asterisk (**) may be deferred until all others are on hand. The items not marked ** will make possible a satisfactory beginning of the course.

LIST B—CHEMICALS—Required. Minimum—One set for the entire class.

LIST C—ADDITIONAL RECOMMENDED APPARATUS—Not Required. For the purpose of increasing the effectiveness of the classroom

demonstrations and providing for additional student activities, it is desirable to have more equipment than just the minimum to meet approval. List C gives additional suggestions of very desirable equipment from which selection should be made, to whatever extent funds will permit as soon as the minimum required equipment is provided.

LIST A—GENERAL APPARATUS—Required

Minimum—One set for the entire class.

Quantity Required	Name of Item	Quantity Required	Name of Item
2	Meter Sticks, inches and mm.		Motor Driven vacuum pump, with plate.)
2	Metric Rulers, Maple, 12".	1	Pump Plate, 27 cm diameter, with stopcock.
1	Protractor, brass, 2½" dia- meter.	100	Weather Maps, blank.
1	set Capillary Tubes, mounted, set of 7.	1	sq. ft. Rubber Dam.
1	Osmose Apparatus, simple form, animal bladder with glass tube attached.	1	Weight of Air Cylinder.
1	Demonstration Balance, sup- port, with lever clamp.	1	Lung Demonstration Appara- tus, with bell jar.
2	Pulleys, single, bakelite.	12	Rubber Balloons, with valves.
2	Pulleys, double, bakelite.	1	Air Thermometer Bulb, 5 cm diameter.
1	crd. Pulley Cord, 25 yards.	1	Conductivity Apparatus, 4 rods of different material on holder.
1	Liquid Pressure Gauge, com- plete.	1	Ball and Ring, to demonstrate expansion.
1	Cartesian Diver, complete with jar.	1	Compound Bar, to demonstrate expansion.
1	Lift Pump, glass model.	1	Calorimeter, aluminium.
1	Force Pump, glass model.	1	Convection of Gases Appa- ratus.
1	Student's Battery, with 13 ele- ments.	1	Convection of Liquids Appa- ratus, flask and bottle form.
1	Hydrometer Jar, 15x2", with lip.	1	Cloud Forming Apparatus.
1	Wood Block, water proofed and loaded.	1	Radiometer, Crooke's.
3	Battery Jars, 5x7", round, clear glass.	2	Bar Magnets, 6x1x¼".
1	Barometer Tube, with mercury cup and pipette.	1	Magnet, 15x1x1 cm.
1	Aneroid Barometer, Metric and English scales, 15" diam- eter.	1	pkg. Darning Needles, 20 in a package.
1	Air Pump, for pressure and vacuum. (Or Direct Drive	1	Horseshoe Magnet, 7.5 cm long.
		1	lb. Iron Filings, in sifter top can.
		1	Blue Print Paper, 8½x11, 24 sheets.

Quantity Required	Name of Item	Quantity Required	Name of Item
1	Compass, Magnetic, 38 mm dia., agate bearings.	2	Beakers, Pyrex, with lip, 600 cc.
1	Glass Rod, hollow, for frictional electricity.	1	Blow Pipe, brass, 8".
1	Hard Rubber Rod, for frictional electricity.	12	Charcoal Blocks, 4x1x $\frac{3}{4}$ ".
1	Silk Pad, 20x20 cm.	4	*Bottles, 8 oz., wide mouth.
1	Flannel Pad, 20x20 cm.	12	Bottles, 4 oz., narrow mouth.
6	Pith Balls, on silk cords.	1	doz. Vials, shell type, 100x18 mm.
6	Dry Cells or 1 Battery Substitute, operates on 110 volts A. C., delivers D. C. to 10.5 V. D. C. and 6 to 22 V. A. C.	1	Aspirator Bottle, with tubulature, 2 gal.
2	Coils for Induction.	1	*Brush, test tube.
1	Galvanometer, inclined form, bakelite can.	1	*Bunsen Burner, with gas and air adjustment. Specify kind of gas when ordering. If gas is not available, omit Bunsen Burner and Rubber Tubing and order Pyrex Alcohol Burner, 6 oz., polyhedral base.
1	Switch, knife, S. P. S. T.	1	*Burette Clamps.
1	Electric Bell, 2 $\frac{1}{2}$ " long.	1	*Clamp, Stoddard's, test tube.
1	Push Button, metal.	1	*Pinch Clamp, Mohr's.
1	Tuning Fork, alloy, 256 V. P. S.	1	Condenser, Leibig, with moulded rubber and caps, 400 mm.
1	set Sonometer Wires, set of 4.	1	gross Corks, assorted, (0-11).
1	Violin Bow.	2	*Dish, evaporating, Coors, No. 00A.
2	Mirrors, plane, 4x15 cm.	1	pkg. *Filter Paper, 11 cm, 100 sheets per pkg.
12	Candles, twelves.	2	*Flask, Florence, Pyrex, 250 cc.
6	Tumblers.	2	Flasks, Florence, Pyrex, capacity 500 cc.
1	Lens, double convex, 50 mm dia., 50 cm focus.	2	Flasks, distilling, Pyrex, 250 cc.
1	set Demonstration Lenses, 6 in set.	1	*Forceps, 5".
1	Prism, equilateral, 25x75 mm.	4	*Funnels, 75 mm diameter.
1	set. Glass Plates, colored, seven colors, 10x10 cm.	1	*Funnel Tube, thistle top, 30 cm.
1	Balance, triple beam, Harvard trip construction, bakelite pans, weighs to 610 grams, without extra weights, sensibility .05 g.	1	Funnel Support, wood for 4 funnels.
3	Spring Balances, 2000 g.	1	Funnel, 100 mm diameter.
1	set Weights, slotted, 10 g to 500 g, in holder.	1	*Wire Gauze, Asbestos center, 6x6".
2	*Beakers, Pyrex, with lip, 250 cc.	4	Glass Plates, 4x4".
2	Beakers, Pyrex, with lip, 400 cc.		

Quantity Required	Name of Item
1 lb.	Glass Rod, 5 mm diameter.
1 lb.	Glass Tubing, 6 mm diameter.
2	Graduates, cylindrical, capacity 250 cc, graduated up and down.
3	Mason Jars, 1 pint.
1 box	Dennison's Labels, No. 213.
1	Mortar and Pestle, No. 1, porcelain.
12	Pipettes, (Medicine droppers).
1 *	Rubber Stoppers, two hole, to fit wide mouth bottles.
1 lb.	Rubber Stoppers, assorted sizes, solid, 1 hole and 2 hole.
3 ft.	*Rubber Tubing, white, $\frac{1}{4}$ " dia.
12 ft.	Rubber Tubing, red, medium wall, $\frac{1}{4}$ " dia.
1 *	Support, ring stand, with 2 rings.
1 *	Support, test tube, six tube.
12 *	Test Tubes, $6 \times \frac{3}{4}$ ", soft glass, well annealed.
6	Test Tubes, 8×1 ", soft glass, well annealed.
6	Test Tubes, Pyrex, 150×18 mm, without rim, heavy wall.
1	Thermometer, clinical.
2	Thermometers, 12", engraved stem, -10 to 110°C and -10 to 220°F.
1	Crucible Tongs, 9".
1	Tripod, 5" diameter.
1 *	*Pneumatic Trough, $4 \times 7 \times 10$ ", tapered to nest.
10	Watch Glasses, 3" diameter.
2	Chimney.
1	pkg. Punk.
1	pkg. Splints (500 per package).
8 oz.	Fuse Wire, 5 ampere capacity.
25 yds.	Picture Wire.

Quantity Required	Name of Item
12	Watch Glasses, Syracuse, 65 mm diameter.
1	pkg. Wax Tapers.
1 lb.	Annunciator Wire, No. 18.
1 spl.	Copper Wire, No. 20, 4 oz., D. C. C.
1 spl.	Steel Wire, No. 18, bare.
12	Asbestos Sheets, 4×4 inches.
1 sq. ft.	Copper Sheet, No. 28 B. S. gauge.
1 **	Hall's Tellurian, showing time, seasons, and astronomical phenomena.
1 **	Pocket Planetarium, Kennon's, 26 panels of constellations and current visible planets.
1 set	Smallwood Botanical Charts, 30 charts on tripod.
1 set **	Smallwood Zoology Charts, 30 charts on tripod.
1 **	Physiology Charts, Johnson, set of 12, on charthead with tripod.
1	Washington School Collection, 40 rocks and minerals, labeled, in case, with teachers manual.
1	Microscope, 2 objectives, 1 eyepiece, without case.
1	Reading Glass, 2" diameter.
1	Tripod Magnifier, wide field, double lens.
72	Slides, microscopic, plain, 3×1 ".
$\frac{1}{2}$ oz.	Cover Glasses, 18 mm.
1	Forceps.
1	Dissecting Set, consists of scalpel, forceps scissors, 2 needles in metal handles, and metric ruler in leatherette case.
1	Balanced Aquarium, 6 gallon size.
1 set **	Prepared Microscopic Slides, for General Science, 25 in set.

Quantity Required	Name of Item	Quantity Required	Name of Item
6	Petri Dishes, Pyrex, 100x15 mm.		nutrient agar preparation sealed in.
6	Flower Pots, earthenware, 6" diameter.	1 vial	Litmus Paper, red, 100 strips per vial.
6	Flower Pot Saucers, earthenware, for pots, 6" diameter.	1 vial	Litmus Paper, blue, 100 strips per vial.
6	Culture Tubes, with sterile,		Approximate Cost—\$300.00

LIST B—CHEMICALS—Required

Minimum—One set for the entire class.

Quantity Required	Name of Item	Quantity Required	Name of Item
1x1 lb.	Acid, Acetic, C. P., 99.5% (glacial).	1x1 lb.	Cotton, absorbent.
1x6 lb.	Acid, Hydrochloric, C. P., concentrated.	1x1 lb.	Dextrose, pure, granular, (Glucose).
1x7 lb.	Acid, Nitric, C. P., concentrated.	1x1 lb.	Ether Sulphuric, U. S. P., (Ethyl Ether).
1x4 oz.	Acid, Pyrogalllic, C. P.	1x1 lb.	Fehling's Solution "A".
1x9 lb.	Acid, Sulphuric, C. P., concentrated.	1x1 lb.	Fehling's Solution "B"
1x4 oz.	Acid, Tartaric, pure.	1x4 oz.	Iodine, U. S. P., tincture.
1x1 lb.	Agar Agar, shreds.	1x1 lb.	Manganese Dioxide, native, powder.
1x1 pt.	Alcohol, Ethyl, denatured 95%.	1x1 lb.	Mercury Metal, virgin grade.
1x1 lb.	Ammonium Chloride, pure, white, granular.	1x4 oz.	Peptone, dry, from meat.
1x4 lb.	Ammonium Hydroxide, C. P., concentrated.	1x4 oz.	Phosphorus, yellow, sticks.
1x1 lb.	Ammonium Nitrate, pure.	1x1 lb.	Potassium Chlorate, U. S. P., crystals.
1x4 oz.	Aniline Dye, Eosin Red, basic.	1x1 lb.	Sodium Bicarbonate, U. S. P., powder.
1x2 oz.	Beef Extract.	1x1 lb.	Sodium Carbonate, technical, calcined, (Soda Ash).
1x5 lb.	Calcium Carbonate, marble chips.	1x1 lb.	Sodium Chloride, fine, white, (Common Salt).
1x1 lb.	Calcium Chloride, anhydrous, granular.	1x1 lb.	Sodium Hydroxide, C. P., sticks.
1x5 lb.	Calcium Oxide, technical, lump, (Quicklime).	1x1 lb.	Starch, corn.
1x1 lb.	Calcium Sulphate, calcined, (Plaster of Paris).	1x1 lb.	Sucrose, pure.
1x1 lb.	Carbon Bisulphide, pure.	1x1 lb.	Sulphur, Flowers sublimed.
1x1 lb.	Charcoal Wood, lumps.	1x1 qt.	Vinegar, cider.
1x1 lb.	Copper Sulphate, technical, crystals.	1x1 lb.	Zinc Metal, technical, mossy.
		1x1 lb.	Ferric Chloride, lump, pure.
		1x1 lb.	Formaldehyde, pure.

Quantity Required	Name of Item	Quantity Required	Name of Item
100	Limewater Tablets.	1x1 lb.	Sodium Phosphate, dibasic, dried, U. S. P.
1x4 oz.	Mercuric Oxide, red, pure.	1x1 oz.	Magnesium Metal, ribbon.
1x1 lb.	Paraffin, solid.	1x1 lb.	Lead Oxide, red, pure.
1x1 lb.	Potassium Hydroxide, pellets, U. S. P.	1x4 oz.	Olive Oil, pure.
1x1 oz.	Silver Nitrate, C. P.	1x1 lb.	Potassium Chloride, pure.
1x4 oz.	Sodium Dioxide, pure.	1x4 oz.	Potassium Iodide, pure.
Approximate Cost—\$30.00			

LIST C—ADDITIONAL RECOMMENDED APPARATUS

Quantity Required	Name of Item	Quantity Required	Name of Item
1	Metric Chart, Bureau of Standards form, 24x41", on wood rollers.		advance and retard of spark mechanism.
1	Tape, Metric, 66 ft., in case.	1	Steam Engine Model, locomotive type.
2	Pulleys, triple, bakelite.	1	X-Ray Tube, 7 cm diameter.
1	Inclined Plane, metal, with Pulleys.	1	Fluoroscope.
1	Hall's Carriage, swivel front wheels.	1	Photoelectric Cell and Relay.
1	Gyroscope, simple form.	6	Tumblers.
1	Pascals Vase, diaphragm guaranteed 20 years.	1	Electrolysis Apparatus, after Brownlee.
1	Compression Faucet, cut away model.	1	St. Louis Motor, with A. C. & D. C. armature.
1	Fuller Ball Faucet, cut away model.	1	Electromagnet Attachment for St. Louis Motor.
1	Water Wheel Model, showing overshot, undershot and breast type.	1	Induction Coil, gives 12 mm spark.
1	Barometer, mercurial, mercury column entirely exposed, with milk glass plate and electrical attachment.	1	Short Wave Demonstration Apparatus.
1	Thermometer, comparison, with Fahrenheit, Centigrade and Reaumur scales.	1	Telegraph Key.
1	Maximum and Minimum Thermometer, self-registering.	1	Telegraph Sounder.
1	Hygrometer, Taylor, wet and dry bulb.	1	Telephone Receiver, dissectable.
1	Rain Gauge, U. S. Weather Bureau type.	1	Telephone Transmitter.
1	Gas Engine Model, with	1	Sonometer, key tension type.
		1	Acoustical Chart, of Pitch Ranges.
		1	Sextant Model, cardboard.
		1	Snellens Eye Test Chart.
		1	Camera Obscura.
		1	Baloptican, B. & L. Model B.
		100	Lantern Slides, to be selected.
		1	Chart of the Atoms and Periodic Table, after Hubbard.

Quantity Required	Name of Item	Quantity Required	Name of Item
1	Germinating Box, metal, inclined glass front $7\frac{1}{4} \times 5\frac{1}{4} \times 5$ ".	1	Life History Mount, of Apple Borer.
1	Chemical Garden, including tank 18×48 ", with peat, moss, test paper, chemicals, seeds and bulbs, to grow plant life without soil.	1	Model of Human Eye, separable.
1	Life History Mount, of Codling Moth.	1	Model of Human Ear, separable.
		1	Model of Human Digestive System.
Approximate Cost—\$400.00			

Physics

The equipment is listed in 3 groups below:

LIST A—APPARATUS FOR EXPERIMENTS—Required. These items permit the doing of 50 of the 64 experiments recommended for the state adopted text. Since duplication of this list for each group of students doing laboratory work is expensive, it is suggested when necessary that the size of the groups be increased to not more than 4 students per group and that different experiments be carried on by different groups up to not more than 4 different experiments going on at the same time. Thus, one set of apparatus for experiments would care for a maximum class of 16 as above outlined. Even this platooning system will necessitate that some items be procured in multiples because they are used in several different experiments. Such items are Meter Sticks, Steam Boilers, Galvanometers, etc.

LIST B—DEMONSTRATION EQUIPMENT—Required. One set for the entire class. This list also contains some articles for experiments not provided for in List A which may be performed by the teacher, or by the class as a group. This abbreviated list of demonstration equipment will not provide for all of the demonstrations expected. More demonstration apparatus should be added as soon as possible by making selections from List C—Additional Recommended Apparatus. The student interest in the physics course is almost directly proportional to the richness and effectiveness of demonstrations—if all other things are equal.

LIST C

Quantity
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LIST C—ADDITIONAL RECOMMENDED APPARATUS—Not required. To be added to whatever extent funds will permit as soon as the minimum required equipment is provided.

LIST A—APPARATUS FOR EXPERIMENTS—Required

Minimum—One set for a class of not more than sixteen students.

Experiment 1—English and Metric Units of Length

1 Meter Stick, English and Metric.

Experiment 2—Area and Volume

1 Cylinder, wood, 4x8 cm.
2 Wood Blocks, water proof, 7.5x7.5x3.8 cm.
1 Ball, steel, 1½" diameter. (Meter Stick, Experiment 1.)

Experiment 3—Vernier

1 Vernier Caliper, 0-10 cm. by 0.1 mm, 0-4" by 1/128".
1 Brass Cylinder, 5 cm x 13 mm.
1 Aluminium Cylinder, 5 cm x 25 mm.

Experiment 5—Beam Balance

1 Trip Balance, Bakelite pans.
1 set Weights, brass, mounted in block, 1 gram to 500 grams. (Metal Cylinders, Experiment 3.)

Experiment 6—Angles

1 Protractor, brass, diameter 4½".
1 Ruler, 12" long, graduated Metric and English.

Experiment 7—Buoyancy

1 Battery Jar, 5"x7".
1 Overflow Can, 12.5x7.5 cm.
1 Catch Bucket, 6.5x8 cm.
1 Aluminum Cylinder with Hook, 7.5x2.5 cm.
1 Beaker, Pyrex, 250 cc.
1 Support, for balance for specific gravity work.

Experiment 8—Specific Gravity and Density of a Metal

1 set Specific Gravity Specimens.

1 Beaker, Pyrex, 400 cc. (Vernier Caliper, Experiment 3, Balance and Weights, Exp. 5.)

Experiment 9—Specific Gravity and Density of a Body Lighter than Water

1x1 lb. Paraffin.
1 Sinkers, lead, 175 grams.
1 Beaker, Pyrex, 1000 cc. (Balance and Weights, Exp. 5.)

Experiment 10—Density of a Liquid, Specific Gravity Method

1 Specific Gravity Bottle, 50 cc. (Balance and Weights, Exp. 5.)

Experiment 11—Density of a Liquid Hydrometer Method

1 Hydrometer, for heavy liquids.
1 Hydrometer, demonstration.
1 Hydrometer Jar. 12"x2".

Experiment 12—Pressure of Atmosphere

1 Barometer Tube, pipette and well.
1 Support, 5"x7" base.
1 Burette Clamp.
1x1 lb. Mercury, metal, C. P. (Meter Stick, Exp. 1.)

Experiment 14—The Siphon

2 Beakers, Pyrex, 1000 cc.
1 lb. Glass Tubing, 6 mm. (Support, Clamp, Exp. 12.)

Quantity
Required

Name of Item

Experiment 15—Elasticity, Hook's Law

- 1 Hook's Law Apparatus.
- 1 set Slotted Weights, 10 to 500 grams, with holder.
- 1 Clamp, 4" opening. (Meter Stick, Exp. 1.)

Experiment 18—Parallel Forces

- 1 set Weights, Metric, Universal, 10 to 1000 g.
- 2 Spring Balances, 2000 grams, 64 oz. (Meter Stick, Exp. 1; Weights, Exp. 15.)

Experiment 19—Forces Acting at an Angle

- 1 Force Board, all metal, with balances. (Protractor, Ruler, Exp. 6.)

Experiment 20—Study of Pendulum

- 1 Ball, iron, drilled, 1" diameter.
- 1 Pendulum Clamp, metal, 25 cm long.
- 1 card Cord, fish line. (Support, Exp. 12.)

Experiment 21—The Center of Oscillation of a Compound Pendulum

(Metal Clamp, Ball, Exp. 20.)

Experiment 22—The Point of Balance of Two or More Forces

- 1 Demonstration Balance. (Weights, Exp. 18; Meter Stick, Exp. 1.)

Experiment 23—The Problem of Moments

- 1 Try Square, 4½" blade.
- 1 Support Rod, 100 cm long, 13 mm diameter.
- 1 Hook Collar, for 13 mm rod.
- 1 Truss, simple form. (Weights and Balance, Exp. 18; Cord, Exp. 20.)

Quantity
Required

Name of Item

Experiment 24—The Lever (Mechanical Advantage)

(Balance, Experiment 22.)

Experiment 25—The Wheel and Axle

- 1 Wheel and Axle, Bakelite.
- 1x1 lb. Lead Shot.
- 1 Outside Caliper, 6" long. (Weights, Experiment 18; Meter Stick, Exp. 1; Support, Exp. 12; Cord, Exp. 20.)

Experiment 26—Pulleys

- 3 Pulleys, single, Bakelite.
- 2 Pulleys, double, Bakelite.
- 1 Pulley, double tandem, Bakelite.
- 1 Spring Balance, 8 oz. in ½ oz. and 250 grams in 10 grams. (Weights, Exp. 18.)

Experiment 27—Inclined Plane

- 1 Hall's Carriage, cone bearings.
- 1 Inclined Plane, board with pulley (or Inclined Plane, all metal form).
- 1 Support Rod, 10 mm dia., 30 cm long.
- 1 Scale Pan, 14 cm diameter.
- 1 Clamp, right angle. (Support, Exp. 12; Balance and Weights, Exp. 5; Meter Stick, Exp. 1.)

Experiment 28—Temperature

- 1 Ring Stand, 3 ring.
- 1 Funnel, 100 mm diameter.
- 3 ft. Rubber Tubing, ¼", for burner.
- 1 Steam Generator, solderless copper.
- 1 Bunsen Burner, needle valve control, (specify gas available).
- 1 Thermometer, -10 -110°C.

Quantity
Required

Experiment

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Quantity
Required Name of Item

**Experiment 29—Specific Heat
of a Metal**

- 1 Calorimeter, double w a l l.
(Bunsen Burner and Genera-
tor, Exp. 28; Thermometer,
Exp. 28; Balance and Weights,
Exp. 5.)

**Experiment 30—Heat Radiation and
Absorption by Different
Surfaces**

- 1 Thermometer, —10 to 110°C.
1 Calorimeter, black finish.
1 pkg. Coordinate Paper (40
sheets). (Generator and Burn-
er, Exp. 28; Calorimeter, Exp.
29, Thermometer, Exp. 28.)

**Experiment 31—Coefficient of
Expansion of Metals**

- 1 Beaker, Pyrex, 400 cc.
1 Brass Rod, 60 cm. long.
1 Linear Expansion Apparatus.
(Generator and Burner, Exp.
28; Thermometer Exp. 28;
Meter Stick, Exp. 1.)

Experiment 32—Expansion of Gases

- 1 Charles' Law Tube, Waterman
form. (Battery Jar, Exp. 7;
Generator and Burner, Exp.
28; Thermometer, Exp. 28.)

Experiment 33—Heat of Fusion

- (Balance and Weights, Exp.
5; Calorimeter, Exp. 29; Bat-
tery Jar, Exp. 7; Thermometer,
Exp. 28.)

**Experiment 34—Dew Point and
Relative Humidity**

- 1 Sling Psychrometer. (Ther-
mometer, Exp. 13; Calorim-
eter, Exp. 29.)

**Experiment 36—Latent Heat of
Solution and Evaporation**

- 1 Beaker, Pyrex, 400 cc.

Quantity
Required Name of Item

- 3 Beakers, Pyrex, 50 cc.
1x1 lb. Sodium Hyposulphite,
Hypo.
1x1 qt. Alcohol, Ethyl, denatured.
1x4 oz. Ether, pure.
1x4 oz. Cotton, absorbent. (Ther-
mometer, Exp. 28.)

Experiment 37—What Magnetism Is

- 1 Bar Magnets, 15x1x1 cm.
1 lb. Iron Filings, in sifter jar.
4 oz. Antimony Metal, lumps.
1 pkg. Knitting Needles, pack-
age of 20.

**Experiment 38—Magnets—
Magnetic Fields**

- 2 Square Magnets, 5x0.6x0.6 cm.
1 Bar Magnets, 15x1x1 cm.
1 Dipping Needle.
1 set Screens, magnetic.
1 Magnet Board, non-magnetic
metal.
1 pkg. Blue Print Paper, 5"x7".
1 Glass Plate, 6"x6". (Iron Fil-
ings, and Knitting Needles,
Exp. 37.)

**Experiment 39—Electrostatic
Charges and Their Effects**

- 1 Electroscope, metal case.
1 Proof Plane, 12x5 cm long.
1 Friction Rod, glass, 25x1.3 cm.
1 Friction Rod, wax, 25x1.5 cm.
1 Friction Rod, vulcanite, 25x1.3
cm.
1 Friction Rod, flannel, 20x20 cm.
1 Stirrup, for holding friction
rods.
1 Friction Pad, silk, 30x30 cm.
(Ring Stand, Experiment 28.)

**Experiment 41—A Simple Voltaic
Cell**

- 1 Voltaic Cell, demonstration
form.
1 Galvanoscope, simple form.

Quantity Required	Name of Item
1	Compass, 40 mm diameter.
3	Zinc Elements, 22x125 mm.
1	Contract Key, tandem form.
1x1 lb.	Sulphuric Acid, C. P., concentrated.
1x4 oz.	Chromic Acid, C. P., crystals.
1 lb.	Wire, Copper, D. C. C., No. 20. (Mercury Metal, Exp. 12.)

Experiment 42—The Voltmeter and Ammeter

1	Ammeter, triple range, 30/3/1.5 amperes.
1	Voltmeter, triple range, 15/1.5/0.15 volt.
1	Battery Rheostat, 10 ohms.
3	Dry Cells, 1.5 volt or Battery Substitute, A. C. and D. C. low voltage power unit, Copper Wire, Exp. 41, Contact Key, Exp. 41.

Experiment 43—The E. M. F. of a Voltaic Cell

3	Beakers, Pyrex, 600 cc.
1	Iron Element, 22x125 mm.
1	Carbon Element, 19x125 mm.
1	Zinc Element, 22x125 mm.
1x1 lb.	Hydrochloric Acid, C. P., concentrated.
1x1 lb.	Ammonium Chloride, pure, white. (Sulphuric and Chromic Acids, Cell and Wire, Exp. 41; Voltmeter, Exp. 42.)

Experiment 44—Electrolysis of Water

1	Electrolysis Apparatus, battery jar type. (Battery Jar, Exp. 7; Contact Key and Wire, Sulphuric Acid, Exp. 41; Dry Cells and Rheostat, Exp. 42.)
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Experiment 46—Lead Storage Cell

1	Electric Bell, 2½" gong.
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Quantity Required	Name of Item
1	Demonstration Storage Battery. (Contact Key, Exp. 41; Wire and Dry Cells, Exp. 42.)

Experiment 47—Ohm's Law

1	Resistance Coil, 1 ohm.
1	Resistance Coil, 2 ohms.
1	Resistance Coil, 5 ohms.
3	Dry Cells, Burgess Little-Six. (Amateur and Voltmeter, Dry Cells, Exp. 42; Contact Key, Exp. 41.)

Experiment 48—Resistance Measurement by Wheatstone Bridge

1	Wheatstone Bridge, skeleton type.
1	Resistance Box, new student 3 dial type, 99.9 ohms.
1	Galvanometer, Portable, Jewel bearing. (Resistance Coils, Exp. 47; Key and Wire, Exp. 41; Dry Cells, Exp. 42.)

Experiment 53—The D. C. Dynamo

1	St. Louis Motor, with A. C. and D. C. armatures.
1	Electromagnetic Attachment. (Contact Key and Wire, Exp. 41; Dry Cells, Exp. 42.)

Experiment 55—Resonance

1	Clamp, Universal.
1	Resonance Tube, 34 mm x 120 cm.
1	Tuning Fork, 256 V. P. S., Tone Alloy.
1	Clamp Holder, right angle. (Support, Exp. 12; Hydrometer Jar, Exp. 11; Meter Stick, Exp. 1.)

Experiment 56—Velocity of Sound

1	Resonance Apparatus, improved reservoir type. Tuning fork, Exp. 55; Thermometer, Exp. 28.)
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Experiment

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1 Incan
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Experiment

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Quantity
Required

Name of Item

Experiment 58—Vibration Rate of a Tuning Fork

- 1 Vibrograph, with fountain tracing pens.
- 1 Fork, for vibrograph.

Experiment 59—Intensity of Light

- 1 pr. Metal Supports, for photometers.
- 1 Photometer Box, Bunsen form.
- 1 Incandescent Lamp, 110 volts, 25 watt.
- 1 Incandescent Lamp, 110 volts, 60 watt.
- 2 Optical Light Sources, for meter sticks.
- 12 Candles, twelve.
- 1 Candle, standard s p e r m. (Meter Stick, Experiment 1.)

Experiment 60—Images Formed by Spherical Mirrors

- 1 Mirror, concave and convex, 75 mm dia.
- 1 Screen, with gauge over aperture.
- 1 Mirror Support. (Support and

Quantity
Required

Name of Item

Light Source, Exp. 59; Meter Stick, Exp. 1.)

Experiment 61—Index of Refraction

- 1 Index of Refraction P l a t e. (Protractor and Ruler, Exp. 6.)

Experiment 62—Images Formed by Convex Lenses

- 1 Lens, double convex, 30 cm focus.
- 1 Screen, white bristol board.
- 1 Screen Support.
- 1 Lens Support.
- 1 pr. Supports for Meter Stick. (Meter Stick, Exp. 1; Screen, Exp. 60; Light Sources, Exp. 59.)

Experiment 63—Compound Microscope

- 2 Lenses, double convex, 5 cm focus.
- 1 Lens, double convex, 23 cm focus. (Ring Stand, Exp. 28; Meter Stick, Exp. 1.)

Approximate Cost—\$225.00

LIST B—DEMONSTRATION EQUIPMENT—Required

Minimum—One set for the entire class.

The items marked with an asterick (*) are needed for the 14 experiments not included in the List A—Apparatus for Experiments.

Quantity Required	Name of Item
1	*Micrometer Caliper, Metric, range 0 to 25 mm. by 0.01 in plush-lined case.
1	*Quart Measure.
1	Metric Chart, mounted on plain rollers, 25"x41".
1	Capillary Tubes Apparatus, set of 7, mounted in frame.
1	Osmose Apparatus, simple form, including thistle tube and membrane.

Quantity Required	Name of Item
1	*Elasticity of Flexure Apparatus, contact method.
1	*Rod, steel, square, 4 ft. long, 3/16" dia.
1	*Rod, steel, square, 4 ft. long, 1/4" dia.
1	*Rod, steel, square, 4 ft. long, 5/16" dia.
1	Center of Gravity Apparatus, about 15 cm across.

Quantity Required	Name of Item
1	Rotator, hand form, driving ratio 8 to 1.
1	Centrifugal Hoop, two metal rings, 20 cm diameter mounted.
1	Combined Siren and Color Disc, gives all tones of diatonic scale.
1	Constant-Level Apparatus, 4 tubes, mounted.
1	Pressure Tubes Set, 4 tubes of different shapes.
1	Pascal's Vase Apparatus, improved form, oil silk diaphragm, no splashing.
1	Cartesian Diver.
1	Hydraulic Press, working model of glass.
1	*Boyle's Law Apparatus, adjustable form.
1	Lift Pump, working model of glass, 37 cm long.
1	Force Pump, working model of glass, 37 cm long.
1	Demonstration Hydrometer, wood, graduated to mm.
1	Hydrometer, Universal, both light and heavy liquid scales.
1	Specific Gravity Bottle, 25 cc, adjusted.
1	Hydrometer Jar, with flange, 37.5 cm high, 5 cm diameter.
1	Catch Bucket, polished aluminum, 6.5x8 cm, cap. 250 cc.
1	Overflow Can, aluminum, 12.5 cm high, 7.5 cm diameter.
1	*Barometer, mercurial, mercury column exposed, with electrical attachment.
1	Comparative Thermometer, F. C. and R. Scales.
1	Hand Air Pump, exhaust and compression.
1	Air Pump Plate, lathe-turned surface, 27 cm. diameter, with

Quantity Required	Name of Item
	stopcock or 1 Electric Air Pump, rotary oil direct driven, 110 volts, with pump plate.
1	Bell Jar, straight form, knob top, 2 gal.
1	sq. ft. Rubber Dam.
1	Magdeburg Hemispheres, mounted.
1	Bell-in-Vacuo, with bell jar and suspended bell.
12	Rubber Balloons, with valves.
1	Air Thermometer Bulb, 5 cm diameters, stem 30 cm long.
1	Conductivity Indicator, brass tube and wood cylinder, 15 cm long.
1	Ball and Ring, to show expansion due to heat.
1	Unequal Expansion Bar, length over all, 30 cm.
1	*Electric Calorimeter.
1	Steam Engine Model, locomotive type, large size, complete model.
1	Lodestone.
1	Soft Iron Rod, round, 15x1.2 cm.
1	Horseshoe Magnet, 7.5 cm long.
1	pkg. Magnet Rods, package of 12, 15 cm long.
1	Breaking Magnet, 10x0.6x0.6 cm.
1	*Wimshurst Static Machine, two 12" glass plates.
1	*Condenser, 2 metal plates mounted on wooden blocks.
1	*Electroscope, Braun form.
1	Leyden Jar, size 15x7.5 cm., cap. 1 pint.
1	*Image Plates.
1	*Support, Universal, insulated.
1	*Copper Coulombmeter.
1	Electrolysis Apparatus, after Brownlee and others.

Quantity Required	Name of Item
2	Coils,
4	*Batt.
1	*Rheo-
	amper
1	*Bell,
	bell 2
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Quantity Required	Name of Item
1	*Mode
	scale
	metal
1	Cohesi
	cm, sq
1	Cohesi
	frames
	bubble
1	Diffusi

Quantity Required	Name of Item
2	Coils, for induction effects.
4	*Battery Jars, 10x10x20 cm.
1	*Rheostat, 50 ohms, 2.5 amperes.
1	*Bell, electric, diameter of bell 2½"
8	*Binding Posts.
2	*Switches, S. P. S. T., 13 amperes.
1	*Ammeter, A. C., 3 amperes, bakelite case.
1	Tuning Fork, C' (128 Vibrations) 25 cm long.
1	Tuning Fork, C" (512 vibrations) 15 cm long.
1	Organ Pipe, all metal, with sliding piston, 90 cm long.
1	*Sonometer, weight tension type.
1	set Demonstration Lenses, 38 mm dia., set of 6.
1	Prism, equilateral, 25x75 mm.
1	*Metal Screen, with slit.
1	Prism, equilateral, 7.5 cm x 9 mm.
1	*Hollow Prism.
1	Mirror, plane, 10x15 cm.
1	Mirror, cylindrical, 5x10 cm.
1	Snellen's Test Chart.

Quantity Required	Name of Item
1	*Gas Burner, low form.
1	Optical Disc, etched metal dial, complete with lenses.
1	*Universal Source of Light, for use with optical disc, without rheostat, Mazda bulb.
1	Spring Balance, double scale, capacity 64 oz. in 1 oz. divisions and 2000 grams in 25 gram div.
6	Beaker, Pyrex, with lip, capacity 100 cc.
1	*Hot Plate, 110 volts.
1x4 oz.	*Nichrome Wire, No. 28.
1 sq. ft.	*Aluminum Sheet, No. 20.
2 sq. ft.	*Zinc Sheet, 1/32" thick.
1	*Platinum Wire, with glass handle.
1x1 lb.	*Copper Sulphate, C. P., crystals.
1x1 oz.	*Lithium Chloride, C. P.
2x1 lb.	*Sodium Tetraborate, pure, crystals.
1x4 oz.	*Strontium Nitrate, C. P.
1x1 lb.	*Sodium Chloride, pure, white.
1x4 oz.	*Carbon Bisulphide, C. P.
Approximate Cost—\$295.00	

LIST C—ADDITIONAL RECOMMENDED APPARATUS

The items marked with an asterisk (*) are needed for the 14 experiments not included in the List A—Apparatus for Experiments.

Quantity Required	Name of Item
1	*Model of a Vernier, 50 cm scale graduated in cm, all metal design.
1	Cohesion Plates Set, glass, 7.5 cm, square, with handles.
1	Cohesion Figures Set, 4 wire frames with clay pipe for soap bubbles.
1	Diffusion of Gases Apparatus.

Quantity Required	Name of Item
1	Diffusion Apparatus, including porous cup and glass tube.
1	Inertia Apparatus, ball and card form.
1	Inertia Ball, with hooks, 75 mm dia.
1	Pulley, tackle block, three pulleys, 7.5 cm in diameter.
1	Gear Wheels Apparatus, wheels 5 cm dia.

Quantity Required	Name of Item
1	Jack Screw, simple form.
1	set Truss Units, set of 7, for all non-parallel force problems including practical applications, parallelogram of forces, roof truss, crane, derrick, etc.
1	Leaning Tower.
1	Governor, Watt's form.
1	Valve-Regulating Apparatus, for Governor.
1	set Color Discs, 16 discs in two sizes, with graduated reference discs.
1	Compression Faucet, cut away to show working parts.
1	Fuller Ball Faucet, cut away to show working parts.
1	Saturated-Vapor-Pressure Apparatus, consisting of 4 barometer tubes with support and cistern.
1	Hydraulic Ram, glass model.
1	Model Water Wheel, showing under shot, over shot, and breast types.
1	Weight of Air Cylinder.
1	Lung Demonstration Model with bell jar.
1	Leslie's Thermometer, differential.
1	Leslie's Cube, 7.5 cm sides, made of different metals.
1	Thermometer, ungraduated, 12 inches.
1	Tyndall's Specific Heat Apparatus, consisting of 5 balls of different metals, a rod for holding balls, a cake of paraffin, a tin molding pan, and a rectangular support for the paraffin cake.
1	Conductivity of Water Apparatus, funnel 12 cm. diameter.
1	*Gas Meter, commercial form.
1	Fire Syringe, glass.

Quantity Required	Name of Item
1	Convection Apparatus, with glass sides and chimneys.
1	Convection of Liquids Apparatus.
1	Radiometer, one set of vanes.
1	Gas Engine Model, 4-cycle, with miniature bulb to indicate spark, with poppet valves and mechanism for advancing and retarding the spark.
1	Alnico Magnet.
1	Magnet Board, all metal, for plotting lines of magnetic force, 19x21 cm.
1	pkg. Blue Print Paper, 24 sheets, 8½"x11".
1	Electromagnet, dissectible, U-shaped.
1	Cat Skin, half skin, about 20x20 cm.
1	Electrophorous, large size, 20 cm dia., hard rubber plate on stand 30x30 cm.
1	Induction Cylinder, fitted with 2 rods carrying pith balls.
1	Ellipsoidal Conductor.
1	Electric Whirl, 10 cm dia., with rod mounting.
1	X-Ray Tube, 7 cm bulb.
1	Fluoroscope, with removable screen and viewing box.
1	Focus Tube.
1	Crooke's Tube, 20 cm long, with Maltese cross for shadow effects.
1	Deflection of Cathode Ray Tubes.
1	Crooke's Phosphorescent Tube.
1	Vacuum Tube, exhausted.
1	set Geissler Tubes, brilliant varying fluorescences, 6 in set.
1	Gravity Cell, closed circuit cell, gallon size.
1	Ampere's Rule Apparatus, block 15 cm long, 7.5 cm high.

Quantity
Required

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Quantity Required	Name of Item	Quantity Required	Name of Item
1	Induction Coil, 12 mm spark.	1	Refraction Tank, with protractor.
1	Primary and Secondary Coil, mounted for both vertical and horizontal positions.	1	Mirror, concave and convex, 12 cm. dia. 25 cm focus.
1	Demonstration Transformer, ratio of primary to secondary voltage 1 to 4.	1	Multiple Image Apparatus.
1	Power Unit, for low voltages A. C. and D. C., operates on 110 V. A. C., produces 2.5 to 10.5 V. A. C. and 6 to 22 V. D. C.	1	Newton's Rings Apparatus.
1	Telegraph Key.	1	Foot-Candle Meter.
1	Telegraph Sounder, 5 ohms resistance.	1	Model of the Human Eye.
1	Telephone Receiver, demonstration form, completely dissectible, resistance 75 ohm.	1	set Polaroid Discs and Demonstration Kit.
1	Telephone Transmitter, commercial type.	1	*Gas Burner, 12½"x12", one burner.
1	set Sympathetic Forks, Mounted on highly resonant cases.	1	Laboratory Balance, agate bearings, sensibility .05 grams, rider weighs 10 grams to 0.1 grams, complete with support for specific gravity jar.
1	Singing Flame Apparatus.	1	set Weights, brass, in wood block, 1 gram to 1,000 grams, including 1 gram, (2) 2 grams, 5 grams, 10 grams, (2) 20 grams, 50 grams, 100 grams, (2) 200 grams, 500 grams, and 1,000 grams.
1	Model of Human Ear.	1	Comptons Chart of Electromagnet Radiations.
1	Achromatic Lens, 2" dia., 8" focus.		
1	Index of Refraction Plate, 7x7 cm.		

Approximate Cost—\$450.00

Physiology and Hygiene

Health is usually listed as one of the major objectives of education. This being true, every school should offer systematic health instruction. To obtain the best results, the laboratory should be well equipped for experiments and demonstrations.

If physiology and hygiene are taught in a well equipped general science or biology laboratory, most of the needed equipment will be available. However, if this subject is taught in another room, additional apparatus should be provided even though it may entail some duplication. Good hygiene charts and models of various parts of the body should be available.

The United States Government publishes a number of valuable

health bulletins. Write the Superintendent of Documents, Washington, D. C., for a full list of bulletins on health education. The State Board of Health, Louisville, Kentucky, publishes a number of bulletins that are of special value in the teaching of physiology and hygiene.

If physiology and hygiene is given as a half-year subject, it should be given as a demonstration course with the following equipment. The items marked with an asterisk (*) may be purchased as funds permit. If the subject is given as a full year's course, much more material is needed.

Suggested
Quantity

Name of Item

- 1 Bunsen Burner, with gas and air adjustment and 3 ft. of Rubber Tubing, $\frac{1}{4}$ ". (Specify kind of gas.)
- 4 Beakers, Pyrex, with lip, capacity 250 cc.
- 1 Test Tube Clamp, Stoddard.
- 1 Dish, evaporating, porcelain, No. 00A, capacity 70 cc.
- 12 Dissecting Needles, straight, wood handle.
- 1 Flask, Pyrex, Erlenmeyer, 250 cc capacity.
- 1 Tripod Magnifier, double lens, wide field.
- 1 Support, ring stand, with 2 rings.
- 1 Scalpel, 38 mm cutting edge.
- 1 Support, test tube, 13 tube.
- 1 Gauze, iron wire, 20 mesh, 5x5".
- 1 *Microscope, compound, 1 eyepiece, 2 objectives, double circular nosepiece, magnifications of 40 to 320 dia., in case.
- 72 *Microscope Slides, blank, glass 25x75 mm.
- $\frac{1}{2}$ oz. *Cover Glasses, round, No. 2, dia. 18 mm.
- 12 Pipettes, with rubber bulbs (medicine droppers.)
- 1 Graduate, cylindrical, graduated up and down, 25 cc by 0.5 cc.

Suggested
Quantity

Name of Item

- 1 Dissecting Set, including scalpel, forceps, scissors, two dissecting needles, and 6" ruler, in case.
- 2 Funnels, glass, 100 mm dia.
- 1 pkg. Filter Paper, 100 sheets, 15 cm dia.
- 1 *Anatomical Model of Organs of Respiration.
- 1 Anatomical Model of Human Skull and Brain.
- 1 Anatomical Model of Human Ear.
- 1 Anatomical Model of Human Eye.
- 1 *Balance, Triple Beam, Harvard Trip construction, agate bearings, sensibility .05 cg, capacity 610 g., no extra weights needed.
- 1 Bladder, for osmosis, attached to glass tube.
- 1 lb. Glass Tubing, outside dia. 6 mm.
- 1 set *Microscope Slides for Physiology, set of 25.
- 10 *Microscope Slides for Bacteriology, ten to be selected.
- 1 Snellen's Eye Test Chart.
- 2 vials Litmus Paper, blue.
- 2 vials Litmus Paper, red.
- 1 lb. Acid, Hydrochloric, C. P., conc.
- 1 lb. Acid, Nitric, C. P., conc.

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1 lb.	Acid, Sulphuric, C. P., conc.	4 oz.	Potassium Iodide, U. S. P.
4 oz.	Agar Agar, Shreds.	1 vial	Rennet Tablets, 100.
1 lb.	Ammonium Hyd r o x i d e, conc., U. S. P.	1 lb.	Sodium Hydroxide, U. S. P.
1 lb.	Chloroform, U. S. P.	4 oz.	Sodium Oxalate, C. P.
1 lb.	Copper Sulphate, technical, cryst.	1 set	12 Physiology, Health and Hygiene Charts.
4 oz.	Fehling's Solution A.	1 *	Microscope Slide, prepared, three types of bacteria.
4 oz.	Fehling's Solution B.	16	Petri Dishes, Pyrex, with cover, 100 mm dia.
1	Lung Demonstration Apparatus.	1 lb.	Agar Agar, culture media shreds.
1 oz.	Pancreation, U. S. P.		
1 oz.	Pepsin, U. S. P., powder.		

Approximate Cost—\$185.00

Equipment for Vocational Courses

Write the Director of Vocational Education, Frankfort, Kentucky, for information and suggestions concerning equipment for respective vocational fields.

2. Equipment for Treatment in Case of Accidents

Every laboratory should be supplied with the materials necessary for the treatment of cuts and burns. Such wounds when immediately and intelligently treated give little or no trouble, but if left to take care of themselves, infection may occur and serious results may follow. In case of severe wounds after the preliminary treatment in the laboratory, the pupil should be sent to a physician.

The following materials required for the treatment of wounds should be kept in the laboratory in a tight cabinet or cupboard:

- a. Sterile gauze bandage, plain: 6 rolls, 1 in. x 10 yd.; 6 rolls, 2 in. x 10 yd.
- b. Adhesive plaster for holding gauze in place: 2 rolls, 1/2 in. x 10 yd.
- c. Benzine, 1 qt.
- d. Seiler's Solution: 1/2 gal. (This may be made from tablets purchased from drug store.)
- e. Boric acid solution, prepared by dissolving 20 grams of boric acid in 1000 cc. of water.
- f. Iodine solution—ordinary tincture of iodine. (This may be purchased from drug store.)

- g. Methyl Salicylate (Oil of Wintergreen) : 1 lb.
- h. Agnew's Solution, prepared after the following formula:
- | | |
|------------------------|------------------------------|
| Tannic acid | 2 grams |
| Borax | 2 grams |
| Glycerin | 11 milliliters |
| Camphorated water..... | q. s. to make 90 milliliters |
- i. Cotton seed oil : 1 qt.

The following directions for the treatment of wounds in the laboratory should be posted in a conspicuous place:

a. Cuts from Glass. Remove any dirt or grease from the wound and surrounding skin by washing with gauze saturated with benzine. A rather free bleeding at first will help to prevent infection. Finally, wash the wound with a piece of gauze saturated with an iodine solution and then bandage to prevent contamination.

b. Burns, Any Kind.

(1) If not blistered, or before blister is opened, wash thoroughly with soap and water and dry. Paint immediately with methyl salicylate (oil of wintergreen). When dry, or nearly dry, cover with a piece of gauze soaked in cotton seed oil, or any oil of similar character. Bandage.

(2) If skin is broken, immediately apply gauze saturated with Seiler's Solution and then bandage.

c. Burns from Acids. Treat the same as ordinary burns, as directed under Nos. b (1) and (2) above.

d. Burns from Alkalies. Immediately wash the eyes with a large volume of water, then with a solution of boric acid. Finally, drop into the eyes three or four drops of Agnew's Solution and then apply to the eyes a small gauze pad saturated with ice water.

Note.—For a complete statement covering the treatment of injuries suffered as a result of accidents in the laboratory, see Laboratory Emergency Chart, published by Fisher Scientific Company, Pittsburgh, Pennsylvania. This chart should be placed in every laboratory. It may be secured free of charge.

3. Maps, Charts, Visual Aids, etc.

All high schools are expected to be supplied with supplementary material necessary for effective class work. This material includes maps, charts, pictures, stereotypes, display exhibits, specimens, clippings, lantern slides and visual aids. The minimum equipment is indicated below:

a. Maps

Political maps—United States, North America, South America, Europe, Asia, Africa, Australia, World, Kentucky.

Physical maps—United States, North America, South America, Europe, World.

American History—The subjects that should be covered by maps are: discoveries and explorations, territorial claims of nations, colonial products, commerce and industries, Revolutionary war, westward movement, Louisiana purchase, Civil war, United States today.

World History—The subjects that should be covered by maps are: ancient world, ancient oriental empires, ancient Greece, Greek and Phoenician settlements and commerce, ancient Italy, Roman empire, barbarian migrations, crusades, Europe after the Peace of Westphalia, discoveries and colonization, Europe under Napoleon, Europe after the Congress of Vienna, Europe or world in 1914, Europe or world today.

b. Charts

No special charts are required. Schools should have a good chart on physiology and hygiene. Others on various phases of science work are desirable. The following are suggestive: metric system, periodic law, diagram of machines, Greek and Roman life charts, historic pictures, physiology and hygiene, biology and agriculture.

c. Newspapers

Each school should have a daily newspaper.

d. Visual Education Equipment

The field is enlarging so rapidly that it is hardly safe to make more than very general suggestions. The portable stereopticon with projector attachment is a most useful and effective aid to instruction.

These instruments are practical and within the means of many schools. The larger schools should provide motion picture machines.

e. Illustrative Material

Every school should have files for pictures, clippings and similar material that may be used in class work. Much of this material may be assembled by the pupils. It should be cataloged and filed for convenient reference. This is strictly a function of the school library.

Chapter VIII

THE HIGH SCHOOL PRINCIPAL AND HIS WORK

Much has been written regarding the various functions and responsibilities of the high school principal. It is now recognized that these functions are many and various, that the successful principal is not only a skillful classroom teacher, but he is at the same time administrator, supervisor, director of extra-curricular activities and leader of educational thought in his community.

Naturally, the functions and responsibilities of the high school principal vary widely according to the type and size of the school. In practically all of the smaller high schools the principal has charge of the elementary grades as well as the high school. Teaching is his principal duty in most of them. Even in the small city high school the principal often devotes most of his time to teaching. It is only in the larger city high schools that the principal is almost solely responsible for the high school work and devotes practically all of his time to administration and supervision.

1. The Position of the Principal in the General Organization

The suggestions that are made herein regarding the functions of the superintendent and principal will not apply equally well in all schools. This is due to the fact that the schools of the state vary widely in type and size. In the smaller systems there is usually not a fully functioning high school principal and the superintendent performs many of the duties that would be delegated to the principal in a larger system. In such cases there should be a definite understanding regarding the limits to which their respective authority and duties reach. In arriving at this understanding, the superintendent should recognize that the principal is entitled to considerable freedom of action and an opportunity to exercise his initiative. Likewise, the principal should recognize that he is subordinate in rank to the superintendent and that in arriving at this understanding he should work with the superintendent instead of the board of education.

a. *Functions Which Belong to the Superintendent.*

The superintendent is the chief executive and the administrative

head of the school system. As such he is responsible for the formulation of school policies and for the measuring of the results of such policies. His chief functions are:

- (1) To select the personnel to be recommended for appointment, promotion, transference and discharge.
- (2) In association with the staff, to select all textbooks to be adopted by the board.
- (3) In cooperation with the staff, to make the curriculum and course of study.
- (4) In association with principals and supervisors, to rate teachers in service.
- (5) To prepare a tentative budget for the consideration and approval of the board.
- (6) To administer the budget and associated business affairs.
- (7) To exercise general supervision over instruction.
- (8) To purchase staple supplies and recommend to the board the purchase of the larger items needed.
- (9) To prepare a tentative salary schedule for consideration and approval of the board.

b. *Functions Which Belong to the Principal.*

- (1) Make a daily schedule of recitations for the school.
- (2) Supervise instruction as ability and time will permit.
- (3) Keep all records of attendance and scholarship.
- (4) Inspect building and supervise janitor.
- (5) Handle cases of discipline.
- (6) Direct extra-curricular activities program with the help of teachers and sponsors.
- (7) Direct the counseling and guidance work of the school.
- (8) Conduct faculty meetings.
- (9) In cooperation with teachers and librarian, select library books.
- (10) Direct tests.
- (11) Control school funds and publications.
- (12) Direct the publicity program of the school.

2. Duties of the Principal

Excluding any part-time teaching which he may or may not

do, the principal's duties may be grouped under three captions, namely:

- a. Administrative.
- b. Supervisory.
- c. Extension or social.

(1) Administrative Duties.

The high school must be administered efficiently before conditions can be provided and maintained for good instruction. Although the improvement of instruction through effective supervision is the primary function of the principal, still, a successful principal must be first of all an organizer and administrator of ability. The greater his ability along these lines, the more time he will naturally find for instructional assistance.

These duties should be so systematized that they will not require more than 25 per cent of the principal's time. By proper delegation of duties to teachers and other responsible persons, the amount of time required for this work can be reduced materially.

Being the responsible leader of the school, the principal must assume the responsibility for the performance of such administrative duties as the following:

(a) Making the daily schedule for the school. This should be worked out and ready to put into effect on the opening day.

(b) Enforcement of the requirements of the law and the State Board of Education that relate to the operation of his school. The principal should remember that he is an agent of the state and the intermediate unit between the state and those whom he serves directly.

(c) Enforcement of the rules and regulations of the board of education and the superintendent.

(d) The oversight of the building, janitor, grounds, furniture, apparatus and supplies.

(e) The keeping of an adequate system of records and the making of reports.

(f) The careful checking of tardiness and absence of pupils and teachers.

(g) Handling cases of discipline.

(h) The organization of his school so that teachers are not bothered during school hours.

(i) The oversight of pupils' programs and changes in same.

(j) The issuing of all special excuses.

(k) The registration of pupils. This work should be done before the close of school so that the schedule of recitations may be in complete operation and the class rolls may be in the hands of the teachers when school opens in the fall.

(l) The requisition of supplies.

(m) Answering school correspondence.

(n) Controlling school funds and publications.

(o) Securing substitute teachers, if necessary.

(p) Directing all phases of attendance work in the school.

(q) The preparation and submission of reports regarding needed repairs.

(r) The control and management of all other phases of the school as an organization.

(2) Supervisory Duties.*

The supervision of instruction is the most important and at the same time the most neglected duty of the principal. True, the principal of the small high school must, of necessity, do much teaching, but even this principal can make or find time for more supervision. How can he do it?

(a) He can postpone many things which he does during school time until after school hours—answering correspondence, for example.

(b) He can stop doing many things that are unnecessary.

(c) He can stop doing so much teaching or shift some of it to others or dispose with some of it altogether.

(d) He can budget his time as he does his income and follow this schedule religiously. Allot a given amount of time to administration, teaching, supervision, etc. This systematizes his activities.

(e) He can work expeditiously, i. e., speed up the thing that he is doing and get through with it.

* See Roberts, A. C., and Draper, E. M. *The High School Principal as Administrator* for a suggestive list of the principal's supervisory duties.

(f) He can delegate many responsibilities to pupils, clerks and teachers. To responsible pupils he can delegate "keeping the office," answering the telephone, recording grades and attendance and even the "keeping of the study hall." Through his home-room teachers he can handle the matter of absence and tardiness, the recording of grades and attendance. To teachers he can delegate the management of the library, study hall, athletics, school publications and clubs. To the janitor he can delegate many duties in connection with the care of the building and grounds.

(g) He can shift his teaching periods to different hours during the week and be enabled to observe more teachers at work.

The chief aim of supervision is to improve the instruction in the school. The teaching profession is expected to assume the responsibility for improving instruction, while the principal, because of his broader professional knowledge and insight, is expected to furnish leadership for such improvement. Since this is true, the principal should plan a program of improvement of his teachers and their teaching.

(a) Improvement through professional supervision.

1) Classroom visitations.

a) Suggestions regarding classroom visitations.

(1) Frequency of visits depends entirely on circumstances. Poorly trained and inexperienced teachers will require more visitations than will the best teachers. Visit good teachers enough to keep them accustomed to it, however.

(2) Length of visit also depends on circumstances. See the teacher at various types of work. Stay long enough to see a teaching process completed.

(3) Frequently, if not usually, announce intention to visit.

(4) Refrain from taking anything, but mental notes.

(5) As principal visits he should be natural and maintain an attitude of friendly interest.

(6) Ordinarily refrain from participating in the classroom procedure.

(7 Look for really "vital things, not those that are trivial and have slight bearing upon true teaching."

2) Conferences with teachers.

a) Suggestions regarding conferences.

(1 A suitable time must be arranged. It should not be held until principal has had time to reflect on items observed in visit. Should be held at a time when neither the teacher nor the principal is tired or in a disagreeable mood.

(2 The place should be absolutely private. Possibly the best place is the teacher's classroom. The teacher is more at home there.

(3 The conference should not be held in the presence of pupils.

(4 The principal must carefully prepare for the conference. It should not be held until he has something of a serious nature to improve. In planning the conference he should take into consideration the teacher—her age, training, experience, health, timidity and her attitude towards a conference.

(5 It is well to remember that the success of the conference will depend very largely upon the personal relationship that is established between the teacher and principal. The teacher must believe in the principal's interest and ability to help. He must respect her opinions. "Be impersonal in evaluation and highly personal in helpfulness."—Dr. Briggs.

(6 Criticize the teaching process and not the teacher.

(7 Work by suggestions and guiding questions and not by dictation. Do not appeal to authority. Lead teacher through guiding questions to discover solutions to problems she faces. Criticisms should be encouraging, instructive and forward looking. Try to make criticisms lead to self-analysis and self-criticism.

3) Use of strong teachers—demonstration lessons.

a) The average principal in a small school is limited in

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experience. He is likely to have under his supervision teachers who are more skillful than he. These are the teachers he should visit most often at the start. He can learn characteristics of good teaching from them.

- b) It is well, too, to let the beginning teachers observe the work of the more experienced and better teachers. If substitutes cannot be provided, the principal can well take a teacher's room while she goes to visit a period now and then in another teacher's room. Such visitation should be done with definite aims in mind.

(b) Improvement through individual effort.

- 1) Improvement through summer school attendance.

- 2) Improvement through correspondence study and organized extension classes.

- 3) Improvement through professional reading. Every Kentucky high school teacher should read the Kentucky School Journal, the Journal of the National Education Association, at least one good professional book devoted to her field, current magazines, professional books and worth while fiction.

- 4) Improvement through keeping fit.

- a) Every teacher should observe laws of health with respect to food, rest, sleep and recreation.

- b) Every teacher should avoid worry and should guard against all diseases.

(c) Improvement through group effort.

- 1) Improvement through teachers' meetings.

- a) Some suggestions for improvement of meetings.

- (1) Hold meetings at stated intervals.

- (2) Begin on time and close on time.

- (3) Plan a definite program for each meeting and carry it out. The teachers should be responsible for this.

(4) Waste no time on routine announcements. Use bulletin board for this purpose.

(5) Keep a record of each meeting.

(6) Do not make meetings too long. An hour to an hour and a quarter is enough.

(7) Do not permit faultfinding or complaining. This is not the place to spill troubles.

(8) Set the meetings at the first of the week. Tuesday afternoon is a good time. Twice a month is often enough for the meetings.

2) Improvement through membership in district, state and national educational associations. Membership in the various teachers' associations should be taken as a matter of course by all high school teachers and principals. There is no reason to go into a discussion of the advantages to be gained by such membership; they are apparent to all thoughtful teachers. Every principal should be a member of the National Association of Secondary School Principals.

3) Improvement through school visitations.

a) Arrangements should be made for every teacher to visit some other system at least once a year.

b) Teachers may also receive new ideas and inspirations by visiting classes of other teachers in their own system.

4) Improvement of the course of study.

The local school should be working constantly on the problem of improving the course of study in the various fields of subject matter. All teachers should cooperate in this work.

(3) Extension or Social Duties.

One of the most important social duties of the principal is that of the direction of the program of extra-curricular activities of the school. The principal is probably judged by the community more by these activities than by any other part of the school's work. The importance of these activities in teaching boys and girls how to live in this complex social life cannot be overemphasized. While the principal should not carry all of the burden of these activities, he is

directly responsible for them and should be familiar with their proper organization and supervision. These activities are discussed in Chapter V.

There is much more to this division of the principal's duties than that of directing the extra-curricular activities of the school. These duties imply an obligation on his part to employ every legitimate means that he can use to gain a closer understanding and cooperation between the school and community. The school belongs to the people who support it. The whole community should feel interested in and responsible for the enterprise. This interest should not be confined to athletics and other extra-curricular activities alone. The principal must realize that it is his job to interpret all phases of the work of the school to the community. The successful principal knows this is true and he deliberately plans to sell his school to his community. He takes the community into his confidence by advising it regarding what the school is undertaking, what it is achieving, what it is needing. He makes systematic use of the newspaper for desirable publicity through interviews and written articles. He serves on committees to promote community interests, throws his building open to community undertakings and gladly assumes responsibility for furthering worth while social and civic activities. Through his membership in church, lodge, club and other organizations, he keeps in touch with the community life and through these contracts strives to develop a spirit of mutual friendliness and cooperation between the school and the community which he serves. These things he does because he knows that if there is to be adequate and willing financial support of his school, respect for his educational leadership and increasing community pride in the school, this type of relationship with the public must be established.

3. The Principal's Office.

Each school should have an office for the principal. In small schools a single room is sufficient. In larger schools a suite of three rooms is desirable—a private office, a large room for clerical work and a waiting room.

More attention should be given to the equipment and care of this feature of the school. It reflects the management of the school and for that reason especially, it should present a neat and orderly appearance.

The following equipment is recommended:

- a. Flat top desk with desk chair.
- b. Filing cabinet for records and letters.
- c. Letter files.
- d. Typewriter and table.
- e. Work table.
- f. Bookcases.
- g. Supply cabinet.
- h. Wardrobe.
- i. Key cabinet.
- j. Cork bulletin board.
- k. Teacher's mail box.
- l. Chairs.
- m. Telephone.
- n. Duplicator.
- o. Fireproof safe or vault.

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Chapter IX

MISCELLANEOUS

1. Records and Reports

Accurate and complete records must be kept in such form as to be conveniently referred to and safely preserved. Former high school pupils not infrequently find it necessary to look up their scholarship records many years after they leave high school. They have a right to expect that these records have been carefully preserved. The failure of a school to be able to furnish this record is a serious indictment of the administration of the school. Too many Kentucky high schools have not yet realized the importance of a good record system. Each high school should have its records from the date of its foundation.

The purpose of a record of any kind is to enable some one who needs and has a right to know, to find out what he needs to know as easily and quickly as possible.

a. Requisites of a good record system :

- (1) The data must be recorded in such a manner as to be easily interpreted.
- (2) The records should be as compact as possible. Avoid duplication of information.
- (3) The data should be recorded in an orderly fashion so as to be readily found.

It is generally agreed that these requisites are best found in a card system. The cards with the greater stiffness are more readily filed, are more compact and are more susceptible to rearrangement and transfer from file to file than are paper forms.

b. Records should be kept in such manner that :

- (1) They are accessible to those who desire to use them.
- (2) They are protected from misuse and destruction.
- (3) They are protected from such destructive agencies as fire and water. Fire resistive steel filing cabinets or fireproof vaults should be installed for the permanent records.

c. Number and kinds of record forms:

The number and kinds of record forms vary according to the size and type of the school. The following is a list of forms that will be used in most of the high schools:

- (1) Registration card (suggested size, 3x5). This card should be filled out for each pupil at the time the pupil enters the high school. It should be kept in the file as long as the pupil is in attendance. It should contain all the personal data concerning the pupil.
- (2) Advance enrollment card (suggested size 4x6). This card is made out near the close of each semester. It shows the curriculum which the pupil has chosen, the subjects which the pupil is taking at that time, and the subjects which he expects to take the following semester.
- (3) Program card (suggested size, 3x5). This card is made out at the opening of each semester. It shows the individual pupil schedule for each day of the week.
- (4) Permanent record card (suggested size, 8½x11). This card should contain besides certain personal data the complete attendance and scholarship record of the pupil.

Other forms that will be used in many schools are health record, guidance record, property record, transfer card, etc.

Certain reports must be made from time to time in all well administered schools. Teachers must make reports to parents and pupils, to each other, and to the school authorities. All reports should be accurately and promptly made.

a. The report forms that are most commonly used are:

- (1) Teachers' attendance report. This report is made to the principal once or twice daily. Both the tardiness and absence should be reported.
- (2) Teachers' class report. This report is made to the principal once each month or six weeks' period. The marks given each pupil in each class should be given.
- (3) Report to parents. This report is made to the parents at periodic intervals. It shows the teacher's estimate of the work of the pupil in each subject the pupil is taking.

- (4) Principal's reports. At least annually the principal should report in a detailed manner the facts concerning the work of the school. This material will be used by the superintendent in measuring results and reporting facts to the public, State Department of Education, etc.

b. Reports to the State Department of Education.

Shortly after the beginning of the school year, there will be mailed to each high school principal copies of the Annual High School Report. Failure to return these reports after two notices have been sent shall be cause for dropping a school from the accredited or approved list.

2. Teachers' Marks

Teachers' marks play an important part in the administration and management of high schools. Since this is true, it is the responsibility of the principal to work out a good marking system and administer it carefully.

a. *Defects in marking system.*

If marks as they are usually given were valid and reliable, that is, if they measured what they are supposed to measure and did so consistently and accurately, there would be no problem here. It is a matter of common knowledge, however, that most of the marks given by teachers do not do this. Because of the varying standards and significance of teachers' marks, both pupils and parents are frequently misled and confused. Most of the marks given by teachers are largely subjective and hence, are not reliable. The following are among the chief defects in present day marking practices:

(1) Lack of agreement as to what to measure.

There seems to be little agreement among educators and teachers as to the trait or traits which a mark should measure. Some argue that the teacher's mark should measure only achievement in the subject concerned. Others argue that the final mark given a pupil in a subject should show the relation of the pupil's achievement to his ability. Others insist that such items as behavior, effort, neatness, industry, honesty, etc., should be taken into account in arriving at the mark that should be given a pupil in the subject concerned.

(2) Teachers try to make too fine distinction in degrees of merit.

This defect is found in the grading of many teachers whether they use the percentage or the letter system. Who can say whether a composition in English deserves a grade of 84 or 85, or even C plus or C minus?

(3) Marks are uniformly too high or too low.

Some teachers are inclined to be exacting and critical, while others are inclined to be lenient and liberal. Some teachers are of the opinion that their teaching is "so good" that every one deserves a high grade. Other teachers think their courses are "so hard" that only a few should receive a high grade and that a large percentage should fail. Sometimes, for political reasons or because of sympathy, there is a tendency to give too many high grades.

b. *Recommended marking system.*

Some degree of standardization in the matter of giving marks is desirable. It is not thought advisable, however, to make any system obligatory or compulsory, overthrowing or confusing many existing records or usages. With the hope that some degree of uniformity in grading will result, the following system is recommended for adoption wherever feasible:

- A—Excellent.
- B—Good.
- C—Average.
- D—Poor.
- F—Failures.

c. *Definition of above marks.*

- (1) The mark of A should be used to indicate that the pupil is one of the few most excellent pupils. Where a relatively large number of pupils are studying any high school subject, from three to five per cent should receive the mark of A.
- (2) The mark of B should be used to indicate that the pupil ranks among those who are superior to the medium or average pupils. Twenty to twenty-five per cent of pupils should receive the mark of B.
- (3) The mark of C should be used to indicate that the pupil has done work of medium or average quality. Approxi-

mately fifty per cent of pupils should receive the mark of C.

- (4) The mark of D should be used to indicate that the pupil ranks among those who are inferior to the medium or average pupils, but not so inferior as to deserve to fail. Twenty to twenty-five per cent of pupils should receive the mark of D.
- (5) The mark of F should be used to indicate that the pupil has failed to meet the minimum requirements of the course. Under normal conditions not more than three to five per cent of pupils should receive the mark of F.

The basis for the above distribution of marks has been arrived at by experimentation with large groups of pupils and will not apply accurately with all smaller groups. Therefore, the distribution cannot be used arbitrarily. At the end of the semester it should be helpful in making a teacher critical of the accuracy with which she has distributed her marks.

After all, any statistical analyses made of teachers' marks will be a useless venture unless remedial measures are taken early in the year. No teacher should assign a pupil a mark of failure unless she knows all the facts of the case—the pupil's health, home conditions, home preparation, etc. She should be required to report the definite steps which she has taken to help the pupil avert failure.

3. Public School Music

Music is now recognized as a subject worthy of an important place in the educational scheme. Due to its values as an educational, cultural, æsthetic, vocational, emotional and socializing influence, it should receive more recognition in high school than it is accorded.

Music courses should receive credit as other high school subjects, provided the teacher holds a certificate to teach the subject in high school.

Two units of credit in music may be counted toward high school graduation. Principals should bear in mind, however, that only one unit may be counted for college entrance.

Credit for participation in orchestra, band, glee club and organized choruses shall be on the basis of extra-curricular activities and if credits are given, they must be in addition to the sixteen necessary for graduation.

The work in public school music should include theory, harmony, history of music and music appreciation. A brief outline of a two-unit program in these courses follows:

a. *Theory.*

COURSE I. (Two periods a week, .4 unit.) Principles of notation, symbols, abbreviations, embellishments, scale building (major and minor), intervals, chords, cadences, measure, tempo, dynamics, forms and signs.

b. *Harmony.*

COURSE II. Harmony I. (Two periods a week, .4 unit. Prerequisite—student must be able to play chords that come up for study.) Primary and secondary triads and dominant sevenths in fundamental and inverted positions; elementary harmonization of simple melodies.

COURSE III. Harmony II. (Three periods a week, .6 unit; same prerequisites as for Course II.) Knowledge of secondary sevenths and inversions, altered chords and chromatic harmony; simple modulations.

c. *Appreciation and History.*

COURSE IV. Music appreciation and history. (Three periods a week, .6 unit.) Correlation of music with general historic movements, folk music in different ages, church music, classic (Bach, Haydn, Beethoven), romantic (Schumann, Mendelssohn, Chopin), American (MacDowell, Parker and others), composers and their music.

4. **Health and Physical Education**

Administratively, the modern school programs of health and physical education include three types of activities: health service, health education and physical education.

a. *Health Service.*

Health service may be thought of as the service which the school renders to conserve or improve the personal and environmental health conditions of children. The program includes the following activities of health protection and promotion:

- (1) Health examination of children by physicians and dentists.
- (2) Follow up program for the correction of remediable defects.

- (3) Clinics.
- (4) Special classes.
- (5) Immunization against certain communicable diseases.
- (6) First aid and safety provision.
- (7) Hygiene and sanitation of the school plant and equipment.
- (8) Hygiene of instruction.
- (9) Health of teachers, janitors and those who come into contact with school children.

b. *Health Education.*

Health education is the sum of experience in school and elsewhere which favorably influences habits, attitudes, and knowledge relating to individual, community, and racial health.

It is a common practice in health education to utilize situations in the health service and physical education programs which may be articulated effectively.

c. *Physical Education.*

Physical education is the contribution made to the complete education of the individual through psycho-motor activities.

Primarily, physical education has two major objectives:

- (1) To aid in the development of normal robust health.
- (2) To promote desirable social and moral characteristics, since the gymnasium or playground acts as a citizenship laboratory where children react naturally to play activities.

There is no distinct line of demarcation between the activities of this triangular program of health and physical education.

In formulating a program of physical education for elementary and secondary schools, administrators should consult *A Physical Training Manual for Kentucky Schools*, published July, 1937, by the State Department of Education, Frankfort, Kentucky.

5. **The Guidance Program**

As schools have become more aware of the importance of emphasizing the well-rounded development of each individual pupil rather than the drilling of pupils to pass examinations, carefully planned counseling and guidance have become a vital part of the high school program.

Professor Harl R. Douglass, in his book *Organization and Administration of Secondary Schools*,* page 158, classified the various types of guidance as follows:

a. *Vocational*

- (1) Furnishing the pupil with knowledge of occupations, particularly relating to rewards, condition of employment, opportunities for advancement, and requirements for entrance to, and success in, occupations in the way of education, of traits of personality, of capital, etc.
- (2) Furnishing the pupil with opportunities to discover and reveal to himself his general and special capacities and aptitudes, his interests, and his traits of personality and character as related to vocational life.
- (3) Furnishing the pupil with a point of view and a method of study of occupations which will assist him in making his vocational decisions.

b. *Educational*

- (1) Furnishing the pupil counsel and the opportunity to discover his interests, abilities, and capacities in various studies.
- (2) Furnishing the pupil counsel and the opportunity to discover what studies will contribute best to the realization of his probable vocational and educational plans, and where such studies may be best pursued.
- (3) Providing courses of study adapted to the abilities of atypical children, and guidance in electing such courses.
- (4) Furnishing pertinent information concerning the possibility and desirability of further schooling and stimulating the pupil to consider these carefully.
- (5) Acquainting the pupil with the curricular and extra-curricular activity opportunities of the school and with conventions relative to the life and management of the school.
- (6) Acquainting the pupil with the opportunities and methods of using the school library most effectively.

c. *Leisure or Avocational Guidance*

- (1) Providing opportunities, curricular and extra-curricular, for the pupil to discover or develop tastes and interests which will

* Douglass, Harl R., "Organization and Administration of Secondary Schools", Ginn and Company, 1932.

provide avenues or fields of reflection, enjoyment, and recreation, and thus make life more worth while to the individual and make the individual more worth while to society.

d. *Moral or Social Guidance*

(1) Furnishing counsel, example, and learning situations in private conference, in the classroom, or by means of extra-curricular activity which shall contribute to the development of right ideals and habits of conduct and living.

(2) Furnishing opportunities for training in extra-curricular group situations, which will result in information, attitudes, habits, and abilities which shall contribute to the tendency and ability to work and play effectively with other people with satisfaction—as leader, follower, or colleague—in the home, in school, at work, or at play.

(3) Furnishing training in correct social conventions.

e. *Health Guidance*

(1) Providing situations which shall call attention to infirmities, defects, or tendencies that should be corrected or removed.

(2) Developing an interest in health and in strong, healthy bodies.

(3) Developing interest, habits, and skills in games and other activities which will operate to promote health.

f. *“Personal” Guidance*

(1) Providing, under favorable conditions, hints or suggestions that are likely to make for improvement of personal appearance and traits of personality.

(2) Providing advice and counsel on personal problems of all sorts which the boy or girl may desire to receive.

(3) Providing the inspiration and encouragement which come from personal interest of an older individual who “understands” and is “interested.”

It is apparent that guidance of this kind cannot be furnished effectively without teachers who have a sympathetic understanding of the principles and purposes of guidance, and without a carefully organized plan for allocating the responsibilities asso-

ciated with the various phases. This type of service calls for cooperative planning and study on the part of all members of the teaching staff.

6. Work Books

During the past few years the work book idea has come into the learning situation in practically all phases of school work.

Dr. William E. Cole, University of Tennessee, has made a study of the value of work books as teaching devices. He lists points in favor of their use, as well as points against. The points in favor of their use are:

- a. They insure definite assignments.
- b. They provide for organization of work.
- c. They give an opportunity for directed study.
- d. They save time by reducing the amount of dictation.
- e. They furnish a means for remedial and individual instruction.

The following are points of weakness in the work book:

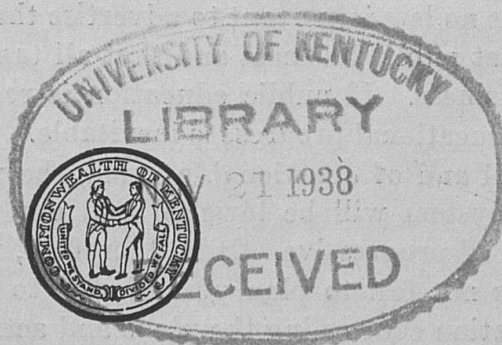
- a. Much of the content of work books is trivial in character.
- b. Many conform poorly to the courses of study.
- c. They are inflexible, if followed slavishly.
- d. They lack organization of information.
- e. The price of many work books is prohibitive to many children.

In selecting work books the teacher should be careful to select such material as will bear directly on the aims and purposes of the courses. Work book activities should grow out of group discussion in classes. The work book should not be used merely as a means of keeping pupils busy, but should be used as a means of attaining some desired end.

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FOREWORD

Private business realizes that its welfare depends upon the attitude of its stockholders and customers. A prosperous business firm never fails to provide its stockholders with periodic information as to the status of its investments or allow the buying public to be informed of its products. The business world spends millions of dollars advertising its activities and products

It is no less important to advertise the fact that public education is a great public business and that all taxpayers are stockholders in that business. If public education is regarded as a worthy enterprise, educational progress is inevitable. If it is regarded as a necessary evil and of questionable value, the whole morale of the public school system will be lowered and our schools will become static instead of progressive. It is, therefore, very important that school officials not fail to plan periodically to systematically disseminate information concerning the plans and activities of the school.

This bulletin contains information as to the origin, purpose and growth of American Education Week. It contains suggestions for this year's observances of that week. This information was collected and arranged by Freddie Riddle of the Department of Education. It is hoped that it may be useful to the school people in the preparation of programs intended to inform the public as to the status, work and needs of our school system.

H. W. PETERS
Superintendent Public Instruction

TABLE OF CONTENTS

	Page
Chapter I. Origin, Growth and Purpose of American Education Week	1
Resolution of the National Education Association.....	5
Proclamations of Presidents W. G. Harding and F. D. Roosevelt	5-6
The General Theme for American Education Week 1938	7
"Education for Tomorrow's America"—J. W. Studebaker, Commisisoner of Education, Washington, D. C.	7
"Elementary Education for Tomorrow's America"—Bess Goodykoontz and Helen K. Mackintosh, U. S. Office of Education, Washington, D. C.	8
Chapter II. Suggestions	11
Chapter III. Daily Programs	12
1. Sunday, November 6, 1938; Topic—Achieving the Golden Rule. "Achieving the Golden Rule"—Joseph R. Sizoo, Minister	12
2. Monday, November 7, 1938; Topic—Developing Strong Bodies and Able Minds	14
"Developing Strong Bodies and Able Minds"—Harl R. Douglass, Head of Department of Education, University of N. C.	14
"Building Strong Bodies"—Katherine F. Lenroot, Chief, Children's Bureau, U. S. Department of Labor	16
"Know Thyself"—A Message to High School Students	17
3. Tuesday, November 8, 1938; Topic—Mastering Skills and Knowledges	19
"The Three R's in the Modern Curriculum".....	19
"The Mastery of Skills and Knowledge in the New Secondary School"—William H. Bristow.....	21
"What High School Students May Do With Their Skills and Knowledge"	22
4. Wednesday, November 9, 1938; Topic—Attaining Values and Standards	23
"Standards and Values"—Angelo Patri, Principal, Public School No. 45, New York, N. Y.	23
"Forming Good Habits and Attitudes"—Sarah L. Young, Principal, Parker School, Oakland, California	25
"Quotations on Habits and Attitudes".....	27
5. Thursday, November 10, 1938; Topic—Accepting New Civic Responsibilities	27
"Accepting New Civic Responsibilities"—Paul R. Hanna, Stanford University, California	28
"Responsibility and the School Group"—Sidonie Matsner Gruenberg, Director, Child Study Assn. of America, N. Y.	29
6. Friday, November 11, 1938; Topic—Holding Fast to Our Ideals of Freedom	31
"Developing Independence of Thought and Action"—Booth Tarkington	31
"How the Elementary School Helps to Prepare for Independent Thinking and for Independent Responsible Action"—Aaron Kline, Principal, Pullman School, Chicago, Ill.	31
7. Saturday, November 12, 1938; Topic—Gaining Security for All.....	33
"Gaining Security for All"—David Cushman Coyle, Engineer and Author, New York and Washington	33
Chapter IV. Facts About Kentucky's School System.....	36

Chapter I

ORIGIN, GROWTH AND PURPOSE OF AMERICAN EDUCATION WEEK

There are many occasions on which human beings celebrate and rededicate themselves to great ideals. Thus we observe Christmas, July 4th, Armistice Day, and many other days. One of the later occasions for celebration on a nation-wide basis is **American Education Week**.

There were many factors that contributed to the beginning of **American Education Week**. Some of those factors are discussed briefly below.

For the beginning of **American Education Week** some credit can be given to the World War. That war brought to the front obvious advantages of an education. It was shown that a majority of officer's commissions were given to college graduates. A survey showed that one-fourth of those who responded to the draft were not able to read or write, and twenty-nine per cent could not be accepted for general military service because of physical defects.

The 1920 census showed that thirty-four per cent of our people were foreign-born, or the offspring of parents one or both of whom were foreign-born. Sixty-two per cent of those illiterate were native-born.

All these facts pointed to a need for an improved public school system. Many studies of the public school system were made, revealing poor buildings, short school terms, poorly trained teachers, poor school attendance, etc.

Along with these factors was another that contributed to the establishment of **American Education Week as a permanent institution**. This factor was the severe depression which threatened to "short change" the educational program of the nation. **American Education Week** provided an opportunity for friends of education to again tell the public of the advantages of education to individuals, society and the government.

With these as contributing factors, **American Education Week** was first observed in 1921. The American Legion and The National Education Association were the first sponsors of the movement. At Des Moines, Iowa, in 1921, the Director of the Americanism Commission of The American Legion, requested and received the cooperation