TENTATIVE COURSE OF STUDY FOR SEVENTH AND EIGHTH YEARS'. WORK IN JUNIOR HIGH SCHOOL MATHEMATICS MEETING THE NEEDS OF PUPILS OF SUPERIOR, AVERAGE, AND LOW ABILITIES

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A. L. V.

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CHAPTER I

## I. THE INTRODUOTION

## CHAPTER I

## I. THE INTRODUCTION

## A. The Problem

It is the duty of society to provide a basic education for every child. State compulsory education laws and a changing environment force the child into school. School curricula have often been based upon the theory that all have the same native ability. The schools of the past have been for the selected few rather than for the masses.

The industrial world does not demand that all workers have the same ability. Each one finds the particular task for which he is best fitted. The time has come for the schools to follow the lead of industry and adapt the currioula to the needs of the individual child.

There afe a few basic facts in mathematics which should be known by all. The amount or extent of these facts acquired by each individual varies with his ability and need in life.

It was the purpose of this study to suggest a tentative curricula in seventh and eighth year mathematics, meeting the needs of pupils of superior, average, and low abilities.

The problem required the finding of answers to the following questions:

1. That general objectives are included in the field of seventh and eighth ysap nathematios?
2. What subject-matter units are used in these years?
3. How should the units be organized?
4. What problems are involved in each unit?
5. How do these vary with different ability groups?
6. What activities should be suggested to carry out the problems?
7. What outcomes are desired from a study of each unit for the different ability groups?

## B. Organization

The examination of current text-books, courses of study, and opinions of authorities in this field, together With three years of experimentation were used as a basis for this study.

Materials selected from sixteen sets of current textbooks in junior high school mathematics were used as an initial basis. While new trends of thought and better ideas of the older trends were suggested by these ourrent textbooks, yet, an ideal course of study could not be built around this single basis alone. Many of the books contained considerable obsolete and undesirable material. Some writers' tried to fit their text-books to meet the demands of certain localities and negleoted opportunities for real pioneering In mathematics,

The examination of thifty courses of study, selected from the various sections of the United Stetes, represented
a second phase of the investigation. In many cases, oertain obsolete processes and old-fashioned business practioes offered serious objeotions to this source being used as a single background for an ideal course of study. The type' of locality for which a course was made, often determined the subject matter in it. In the farming communities, the farm problems were emphasized, while in the industrial sections, business, industrial, and banking problems made up the major portion of the curricula. This phase of the study revealed a new tendenoy, that of adapting the currioulum to meet the probable future needs of the partioular child.

Current magazine articles and other writings of authorities in the field of mathematics gave valuable help and suggestions in the form of departures from the old methods of teaching.

All objectives, subject matter, and activities, finally evolved after the above mentioned preliminary analyses, were organized and placed in the hands of a committee of teachers who gave their opinions and agreed to use the tentative course of study as an experiment, noting the strong and the weak points. This method proved most valuable, as it made the final revision of the course practical and usuable.

## C. Similar Curricula

The Cleveland city schools are organized into $X, Y, Z$ group, The classification is based upon the intelligence end achievement quotients of the pupils. The Curricula in

Mathematics provides the same large units with a varying amount of quality and quantity under each. Different procedures are suggested for each group, and the desired outcomes vary accordingly.

In the junior high schools of St. Louis, the pupils are classified into various ability groups. The same cur2 riculum in mathematics is used for the first and second groups. The first group covers the work rapidly and is promoted as soon as the required amount of work is covered. The second group proceeds at an average fate of speed and receives the regular bi-annual promotions. The third group is kept as a separate group without a regular course of study to follow. Each class is grouped and works as far as the ability of each group allows. In a third group of the seventh grade olass, there might be smaller inner sections as, one working fourth year problems; another, working fifth year problems; and a last group working sixth year mathematics.

Both systems eliminate fallures. If a pupil cannot do the work of a higher group, he is transferred to the next lower one. If, however, he is capable of doing a superior type of work, he is transferred to the next higher group.

1
Tentative Course of Study in Mathematios for Junior High Sohools, Grades VII-IX, Cleveland Public Schools (1928), Bulletin No. 23.

2
The St. Louis Course of Study in Mathematics for the Junior High Schools (Board of Education, 1925).

CHAPTER II
I. GENERAL PROCEDURE

## CHAPTER II

## I. GENERAL PROCEDURE

The Woodrow Wilson Junior High School of Terre Haute, Indiana, was organized in September, 1927, and during that year tentative curricula were organized by the different departments. The chairman of mathematics was relieved from three classes to work on the mathematics curriculum, under the supervision of Dr. D. H. Vass, the school principal.

Several junior high schools were visited during the year. Text-books of leading educators in the field of mathematics were surveyed. Other courses of study in junior high school mathematics, as well as, magazine articles and books on junior high school curricula were studied. From these sources a tentative currioulum was created and tried out with unclassified classes.

During the following year the classification program was begun in the school. This program was in charge of Miss Edith Price who was relieved from several classes to put it into effect. Group intelligence tests, ${ }^{l}$ achievement tests, chronological ages, and grade marks formed the basis for this

1
The Terman Individual Intelligence Tests were given in unusual cases.
classification. The classes were divided into three groups, the superior, average, and slow. At the beginning of each school year enough pupils entered to form six sections while in the middle of each year only about half of that number entered. The first group always contained a superior section, a slow section, and four average sections. The latter were subdivided into a superior average, a slow average, and two average classes.

The Schorling-Clark-Potter Arithmetic Test, Form A, was given to every pupil and this helped to further classify pupils in mathematios. The school program, as far as possible, was arranged so that pupils of the same grade level would take mathematics the same period. Thus, pupils who were found superior or inferior to the group in which they were placed could be shifted in the mathematics classes without being reclassified in all of their subjects.

The classified groups used the same tentative course of study and text-book, the Hamilton-Bliss-Kupfer, Essentials of Junior High School Mathematics. Other text-books were placed in the library to accomodate both teachers and pupils.

The school continued this organization for two years, then, on account of economic conditions the classification was dropped. The tentative curriculum continued to function during the next year with the new unclassified groups. At the end of that year the whole program was dropped when the

2
For complete details on the classification read the ohapter on ability grouping in The History of Foodrow Wilson Junior High School, an unpublished thesis by Grace DeVaney.
chairman of the mathematics department was transferred to a senior high school.

Tests had been devised for each unit of work and were given to all thirty-two experimental groups. The results of these tests were tabulated so that comparisons between the classified and unclassified groups could be noted:

1. Scores of individual pupils were kept and group medians were determined. These medians were tabulated for later use.
2. The amount of time needed by the different groups to cover each unit of work formed another table.
3. The number of units covered by each classified group was averaged and compared to the average number of units completed by the unclassified groups.
4. All problems that were missed by the slow and average groups were carefully recorded. This record, together with a check on the difficult problems of each unit, was used as a basis for the selection of the problems found in these curricula.

## CHAPTER III

I. CHOOSING OBJECTIVES IN JUNIOR HIGH SCHOOL MATHEMATICS
II. CHOOSING THE SUBJECT MATTER UNITS IN JUNIOR HIGH SCHOOL MATHEMATICS
III. GENERAL CONCLUSIONS DRAWN FROM THE EXPERIMENTAI CURRICULA WITH PUPILS OF WOODROW WILSON JUNIOR HIGH SCHOOL

CHAPTER III
I. CHOOSING OBJECTIVES IN JUNIOR HIGH SCHOOL MATHEMATICS
A. Opinions of Educators in the Field of Junior High School

Mathematics

1. Smith, David E.-Reeves, Wm. D., The Teaching of Junior High School Mathematics
a. Basis for choosing objectives
(I). The intrinsic worth of mathematics itself
(II). The social needs of the people, especially
those in the local community itself
(III). The interests of the pupil
b. Great central mathematical objectives
(I). Introduction to the general range of elementary mathematics
(II). Some appreciation of the power of mathematics
(III). The increase of certain powers
(IV). The fostering of the study of mathematics
c. General objectives
(I). Establishing habits of:
(A). Neatness and method
(B). Thinking
(C). Moral conduct
(D). Character
(II). Exercise in fundamental modes of thought
(A). Simplicity of language
(B). Accuracy in reasoning
(C). Originality in thought
(III). Appreciation of mathematics as a useful art
(IV). Appreciation of mathematics as a science
(V). Appreciation of the historical growth of mathematics
(VI). Attitudes of mind to be developed
(VII). Ideals to be cultivated

These last five points may be classified as the fivefold general purpose of mathematics. Mathematics should contribute in its purposes to the seven cardinal objectives in education.
2. Schaff, Wm. L., A Course for Teachers of Junior H1gh School Mathematics
a. The objectives in junior high school mathematics
depend upon the subject-matter units. These
may be obtained from the following sources:
(I). Junior high school text-books;
(II). Current literature;
(III). Standard text-books upon study of education in general;
(IV). Courses of study.
b. Mathematics should be made to apply to the practical needs of the life of the individual as well as to his cultural and social needs.
3. Comnittee, The Reorganization of Mathematics in Secondary Education. Report of the National Committee on Mathematical Requirements under the auspices of the Mathematical Association of America, Incorporated.
a. The old disciplinary aims of mathematics have given way to the newer ideas in education. Mathematics in itself was considered one of the best subjects of the old school for this purpose. To-day, mathematics should be treated as a good subject to train in citizenship as any other in the curricula. The subject should tend to bring out appreciation in better homes, nature, and industry in its broadest sense.
4. Hassler, Jasper 0.-Smith, Rolland R., The Teaching of Secondary Mathematics
a. Objectives of secondary mathematics
(I). Main objectives
(A). Growth of the pupil's mind
(B). Power in mathematical thinking
(II). Indireotly, mathematics should aim at such attitudes as:
(A). Discrimination between the true and false;
(B). Desires to analyse;
(C). Better mathematical habits in every-day life.
b. The aims should include philosophy as well as
psychology in the practical objectives of mathematics.
5. Breslich, Ernest R., Problems in Teaching Secondary Mathematics
a. Major purposes in teaching junior high school mathematics
(I). To enable pupils to deal successfully with such quantitative situations as they are likely to meet in their every-day experiences
(II). To prepare them in so far as possible to meet quantitative situations in adult life
(III). To give them an understanding of the meaning of the social uses and applications of arithmetical mathematics
(IV). To develop a high degree of familiarity with accuracy in the fundamental processes of arithmetic
b. Indirect purposes in teaching junior high school mathematics
(I). To develop such qualities as:
(A). Reflective thinking
(B). Functional thinking
(C). Ability to solve problems that may arise outside the school
(II). To train for better future citizens
6. Blackhurst, J. Herbert, Prinoiples and Methods of Junior High School Mathematics
a. Goals in secondary education in the relation to the teaching of mathematics
(I). Command of the fundamentals (II). Relation of secondary school mathematics to vocational efficiency
(III). Worthy home membership (IV). Citizenship
(V). Worthy use of leisure time
b. The basic list of objectives should take into consideration:
(I). Attitudes;
(II). Concepts;
(III). Abilities.
7. Schorling, Raliegh, A Tentative List of Objectives in the Teaching of Junior High School Mathematics a. Basic list of objectives
(I). Attitudes
(A). Assuming responsibility for correct results
(B). Recognizing the importance of an estimated answer as a control in the solution of the problem
(C). Appreciating the use of geometry in art
(D). Appreciating the use of geometry in architecture
(E). Being interested in and constantly sorutinizing personal growth in the skill of mathematics
(F). Appreciating the necessity for habits of thrift
(G). Being critical of investments
(H). Appreciating the power of compound interest
(I). Being critical to the extent to which a computed result based on measurement is accurate
(II). Concepts
(A). To gain concepts of all different phases of mathematics as:
(1). Ratio
(2). Proportion
(3). Parallel lines
(4). Taxation
(5). Vertex
(6). Variation
(III). Abilities
(A). Ability to apply fundemental processes
(B). Ability to understand and use per cents
(C). Ability to interpret, use, and make graphs
(D): Ability to understand, use, and make statistical tables
(E). Ability to use geometry and see its relation to. Iife about us
(F). Ability to understand and use

- business forms and devices
(G). Ability to apply fundamental processes to algebra
(IV). Informations. Such informations should be given as relating to:
(A). The fundamental processes
(B). Per cents
(C). Graphs
(D). Statistical tables
(E). Geometry
(F). Business forms and devices
(G). Algebra
B. Objectives in Junior High School Mathematics From Current Text-Books

1. Hamilton-Bliss-Kupfer, Essentials of Junior High School Mathematios
a. To give a mastery of number combinations that will give skill in speed and accuracy
b. To develop ability to think clearly and judge soundly, and to cultivate powers of generalization
c. To give an insight into the quantitative and spatial relations of surrounding objects
d. To produce skill in the application of mathematical problems to every-day life
e. To give a foundation for later work in math-ematics-and science
2. Gugle, M., Modern Junior Mathematios
a. To show the application of arithmetic principles to every-day life
b. To develop speed and accuracy
c. To develop habits of checking
d. To train for better citizenship
e. To give the pupil a knowledge of business life, banking, and better home life by means of mathematical knowledge
3. Schorling-Clark, Modern Mathematics
a. To develop speed and accuracy
b. To show the relation of mathematics to the child's life
c. To challenge the child's interest. thus developing habits of training in worthy use of leisure time
d. To show the relation of mathematics to other school subjects and activities of the school life
e. To prepare for adult life
4. Bresiioh, Ernest R., Seventh Year Mathematics; Eighth Year Mathematics
a. To fill a need in the life of the child by being useful in present studies as well as preparation for future use
b. To adapt the field of mathematics to the understanding of the adolescent youth
c. To give mathematical training in methods of:
(I). Thought
(II). Effective habits of study
(III). A conviction of the universal
applicability of powers of concentration
(IV). An insight into the method of sound generalization in any field
5. Bonser-Pickell-Smith, Practical Mathematics for Junior High Schools
a. To solve vital problems of the common life encountered by all people
b. To increase accuracy and speed
c. To give information relative to mathematical meanings, relationships, and values of situations and conditions not calling for pure computation but rather interpretation
d. To give growth in power to think mathematically
6. Knight-Studebaker-Ruch, Standard Service Arithmetics
a. To arouse a personal sense of responsibility for learning
b. To aid in mastering problem solving
c. To stimulate and facilitate self-remedial efforts
d. To train the pupil to see his own needs and to meet them
e. To give power to apply fundamental processes to social and simple industrial and commercial situations
f. To give a basis for later mathematical work
7. Hart, Walter W., Junior High School Mathematics a. To show the application of mathematical principles to life encountered by the average person
b. To show the relation of mathematics to the world about the pupil
c. To teach good citizenship
d. To prepare for later courses
8. Brueckner-Anderson-Banting, Mathematics for Junior High Schools
a. To develop an appreciation of the function of number as a tool for thinking, or as a method of thinking
b. To show the application of mathematics to the social, civic, and economic life of the community
C. Objectives in Mathematics for the Junior High School From Courses of Study
9. Athens, Ohio
a. Objectives
(I). To give the pupil the most intrinsically valuable information and training that he is capable of receiving
(II). To show the social and economic value of arithmetic
(III). To fix permanently general mathematical ideals, tools, and habits of maximum
importance
(IV). To emphasize the idea of relationship
$(V)$. To increase accuracy and speed
(VI). To show the value of neatness and order
10. Atlantic City, New Jersey
a. Objectives
(I). To develop a spirit of cooperation and responsibility
(II). To develop speed and accuracy
(III). To show the application of numbers and space relations to practical and social life
(IV). To train for citizenship
11. Berkeley, California
a. Aims of junior high school mathematics
(I). To lead all pupils to think accurately With a reasonable amount of speed
(II). To show the value of thrift
(III). To give mathematical information
about the business world
(IV). To train for honesty and sincerity
in business relations
(V). To train for future vocations
(VI). To give a basis for senior high sohool work
12. Cleveland, Ohio
a. Objectives in mathematics
(I). To develop powers of understanding and analyzing relations of quantity
and space which are necessary for
a better understanding of life and the universe about us
(II). To develop habits of thinking
(III). To aisclose mathematical ability or the lack of it
(IV). To develop intellectual, aesthetic, and spiritual appreciation
b. Practical aims
(I). To acquire command of:
(A). Mathematical principles and processes necessary to most people in general
(B). Mathematical principles and processes needed for special professions or vocations
(C). Mathematical principles and processes required in other sciences
(II). General aims to develop
(A). The use of concepts of number and space relations and certain thought modes
(B). Improved efficiency that can be transferred to related fields
(III). Cultural aims
(A). Ideals of precision in statement and thought
(B). Ideals of perfection as to logical
structure and reasoning
(C). Discrimination between the true and false
(D). Appreciation of mathematics in the development of civilization
(E). Enjoyment of precision, logical reasoning, and satisfaction in the recognition of truth
13. Fort Wayne, Indiana
a. Aims
(I). To build up the work of the elementary grades
(II). To develop the power to see relationships (III). To give training in logical thinking (IV). To lead to training in arithmetic as a tool to be applied in solving problems of every-day life
( $V$ ). To create an appreciation of the quantitative side of one's environment
(VI). To give a practical knowledge of home and community
(VII). To train for citizenship

## 6. Indiana

a. General objectives
(I). To develop that understanding of numbers in their larger sense that will:
(A). Result in ability to meet new situations
(B).- Lead to an appreciation of number
and number ideas in our present civilization
(II). To give knowledge and skill that will enable the pupil to function in real life situations
(III). To develop power to use mental calculations that every-day life demands
(IV). To bring number facts and skill within the experience, interests, and needs of their age
(V). To develop the power of interpretation
(VI). To develop habits of accuracy, speed, and checking
(VII). To develop ability to recognize problems in life situations and evaluate them (VIII). To give the social and economic informational background of mathematics
(IX). To develop ability to spend and save money wisely
(X). To lay foundation for higher mathematics

## 7. Kentucky

a. Objectives
(I). To satisfy the neads of the various types of pupils who take the subject
(II). To discover mathematical abilities
(III). To exhibit mathematical types of thought
(IV). To show the application of mathematics to other fields of work
(V). To show how mathematics aids in solving
problems of social life, organization, and activities in modern life
.8. Louisiana
a. Aims
(I). To give better proficiency in the use of number combinations
(II). To improve mathematical ability
(III). To show the practical application of mathematics
(IV). To check for weakness and be able to correct such
9. Madison, Wisconsin
a. Objectives
(I). To provide an understanding of business practices
(II). To develop speed and accuracy
(III). To develop an appreciation of mathematics as a practical subject for later life
10. Massachusetts
a. Aims of junior high school mathematics
(I). Attitudes and habits to be fostered
(A). The attitudes toward mathematics: The pupil should be lead to think of mathematics as:
(1). A tool;
(2). As an interesting field of knowledge;
(3). As a mode of human thought;
(4). As an indispensable aid
in civilization.
(B). Personal attitudes and habits: Pupils should be lead to desire:
(1). Self-discovery;
(2). Self-development;
(3). Knowledge.
(C). Social attitudes: The instruction should foster:
(1). Self-confidence;
(2). Public-mindedness.
b. Other aims of instruction
(I). Concepts should be formed
(II). Information should be supplied
(III). Abilities should be developed
11. Miohigan
a. Junior high school mathematics should:
(I). Develop mechanical skills
(II). Develop proper attitudes and logical relations
(III). Give a background for higher mathematics and sciences
12. Minnesota
a. Objectives
(I). To awaken the pupils to the quantitative aspects of environment and life
(II). To develop abilities to enable pupils to meet quantitative needs in life situations
(III). To develop speed and accuracy
(IV). To train for good citizenship
(V). To appreciate the power of mathematics as illustrated in its influence on civilization
13. Missouri
a. General objectives of all secondary mathematics
(I). To give command of mathematical facts and prooesses neoessary for a complete adjustment to surrounding environment
(II). To give a closer contact with life and society by the use of material in itself useful
(III). To increase and furnish the incentive for studying mathematics for the love of the subject and the appreoiation of its beauty and power, thus providing for worthy use of leisure time
(IV). To give an introductory knowledge to the broad fields of mathematics with materials to form contacts in life, thus developing adaptations and interests or, at least, discover the lack of them (V). To train in functional thinking b. Objectives of junior high school mathematics (I). To give training and instruction in mathematics useful to the average
citizen
(II). To disclose mathematical ability, or the lack of it, so that pupils may be guided in their later work
14. Nebraska
a. To develop speed and accuracy
b. To show the practical application
of mathematics
c. To develop habits of:
(I). Neatness
(II). Accuracy
(III). Speed
(IV). Logical procedure
(V). Perseverance
(VI). Self-reliance
d. To develop independent habits of thought
15. New Hampshire
a. The general aims in mathematics are:
(I). Worthy home membership
(II). Citizenship
(III). Control of the fundamentals
16. New York
a. Mathematics should:
(I). Give proficiency in handing number combinations
(II). Give ability to grasp a situation as a whole
(III). Develop an interest in the morld about the school and community
(IV). Provide for social needs
$(V)$. Develop speed and accuracy
(VI). Develop the power to reason
(VII). Stimulate mentel growth
(VIII). Lead the pupil to:
(A). Reflect
(B). Investigate
(C). Make him feel partly responsible
for his environment
(IX). Make for better citizenship
(X). Prepare the way for later vocations
17. North Dakota
a. Objectives
(I). To master common business forms
for later needs of life
(II). To show how mathematics may provide
better homes and communities
(III). To train for future as well as present citizenship
18. Oklahoma
a. Aims of secondary mathematics
(I). Practical
(A). Mathematics should prove its
direct usefulness in life of faots, methods, or processes in $1 t$
(II). Disciplinary aims
(A). The acquisition of training in:
(1).-Analysis of complex
situations into simpler parts
(2). Recognizing logical relations between interdependent factors and understanding, if possible, the expression of such relations in exact form
(3). Generalization
(B). Effective training in the iffe of the individual through the acquisition of such mental habits as:
(1). A seeking for relations and their precise expression
(2). An attitude of inquiry
(3). A desire to understand and get to the bottom of a situation
(4). Concentration and persistence
(5). A love for precision, accuracy, thoroughness, clearness, and a distaste for vagueness and incompleteness
(6). A desire for orderly and
logical organization as an aid to understanding and remembering
(C). The idea of relationship or
dependence
(III). Cultural aims
(A). Appreciation of beauty of geometrical forms
(B). Ideals of perfection as to logical structure, precision of statement and thought
(C). Appreciation of the power of mathematios
19. Pennsylvania
a. Junior high school mathematics should prepare the pupil for life by:
(I). Giving him a broad outlook on the whole field of mathematics
(II). Trying out his capaoities and aptitudes to find if he should go more deeply into the subject itself and to take up the study of scientific and technical subjects depending on higher mathematios
(III). Giving him knowledge that will tend to make for more intelligent citizenship in the world to-day and give a basis for the citizenship of to-morrow
20. Salt Lake City, Utah
a. General objectives for ultimate realization of the purpose of the junior high school in mathematics
(I). To olarify and fix a thorough review
of the principles of arithmetic so that iffe may be better understood
(II). To develop command of combinations and processes that will be needed for practical purposes
(III). To develop right mental attitudes, enlarge understanding, and lay
a broad foundation of mathematical concepts upon which to build for a liberal education
21. South Carolina
a. Objectives
(I). Ability to adapt mathematics to practical situations
(II). To train for better citizenship
(III). To develop habits of speed and accuracy
22. Texas
a. Objectives
(I). To form scientific basis for later work
(II). To provide for social needs
(III). To help train for better citizenship
(IV). To develop speed and accuracy
$(V)$. To develop habits of order and neatness
23. Trinidad, Colorado
a. Objectives
(I). To give an insight. Into arithmetical processes and their application to life situations
(II): To show the relation of mathematios to social, industrial, and commercial situations
(III). To familiarize the pupils with geometric forms in nature and to train the pupils to appreciate them
(IV). To train for better citizenship
24. Vermont
a. Mathematios in the upper grade levels should provide for:
(I). Skills in:
(A). Utilization of acquired knowledge
(B). Powers of clear thinking
(C). Accuracy and speed
(II). Vital life situations that will train for better citizens
25. West Virginia
a. Objectives
(I). To develop accuracy and speed
(II). To give a practical knowledge of the application of mathematios to life
(III). To help train for better citizenship
26. Wisconsin
a. Mathematios should be made to conform to the seven cardinal principles of education in general.
b. It should develop powers of understanding and the ability to analyse the relations of quantities which are necessary to an insight into and control over our environment.
c. It should develop an appreciation of our past and present civilization.
d. Habits of thought and action should be developed that will make these powers effective in the life of the individual.
D. Results of the Survey of Objectives in Junior High School Mathematics

1. The result of this survey showed that all authorities agree that mathematics in the Junior high schools has for its general objectives:
a. A provision for the social, economic, and civic needs of the child;
b. A provision for individual differences;
c. A foundation for quantitative thinking;
d. A basis for the scientific habit of mind.
2. Under each of these comes certain specific objeotives which in every case are not fully listed. There are disagreements on certain minor points, but on the whole, the authorities from the three sources, namely, Courses of Study, Educational Text-Books in Junior High School Mathematics, and Text-Books in Junior

High School Mathematics, have agreed upon the more important specific objectives.

TABLE I
A SUMMARY OF RESULTS OF THE SURVEY OF OBJECTIVES
IN JUNIOR HIGH SCHOOL MATHEMATICS


# II. CHOOSING THE SUBJECT MATTER UNITS IN JUNIOR <br> HIGH SCHOOL MATHEMATICS <br> A. Opinions of Leading Educators in the Field of Junior High School <br> Mathematics 

1. Schaff, William L., A Course for Teachers of Junior High School Mathematics
a. For the seventh grade the following subject matter units should be considered:
(I). Review of Fundamentals
(II). Rapid and Accurate Computation
(III). Arithmetic of Home
(IV). Arithmetic of Business
(V). Banking Forms and Processes
(VI). Intuitive Geometry
(VII). Direct Measurements
(VIII). Easy Demonstrative Geometry
(IX). Formulae as Easy Algebra
b. In the eighth year the following subject matter units should be considered:
(I). Use and Care of Money
(II). Investing Money
(III). Insurance
(IV). Supporting the Government
(V). Commeroial Arithmetic

$$
\begin{aligned}
& \text { (VI). Graphs } \\
&(V I I) . \text { Statistics } \\
& \text { (VIII). Ratio and Proportion } \\
& \text { (IX). Roots and Powers } \\
&(X) . \text { Algebra as Directed Number }
\end{aligned}
$$

2. Committee, Reorganization of Mathematics in Secondary Education. Report by the National Committee of Mathematical Requirements under the auspices of the Mathematical Association of America, Incorporated.
a. Subject matter units for the seventh and eighth years:
(I). Arithmetic
(A). Fundamental Operations
(B). Tables of Weights and Measures
(C). Simple Fractions
(D). Short Cuts in Multiplication and Division
(E). Percentage
(F). Graphs
(G). Applied Arithmetic to the Following:
(1): Home
(2). Household Accounts
(3). Thrift
(4). Simple Bookkeeping Accounts
(5). Sending Money
(6). Parcel Post
(7). Community
(8). Insurance
(9). Taxes
(10). Banking
(11). Investments
(II). Geometry
(A). Intuitive Geometry
(B). Graphs
(C). Arithmetical Geometry
(D). Some Demonstrative Geometry
(E). Applied Geometrical Trigonometry
(III). Algebra
(A). Roots and Powers
(B). Language of Algebra
(C). Fundamental Processes
(D). Positive and Negatives
(E). Applied Algebra
3. Hassler, J. O.-Smith, R. R., The Teaching of

## Secondary Mathematios

a. Five plans are presented as a guide-post in the selection of materials to teach in junior high school mathematics.
(I). Plan I
(A). First Year
(1). Review of Fundamentals
(2). Application of Arithmetio to:
(a). Home
(b). Thrift
(c). Other School Subjects
(3).- Intuitive Geometry
(B). Second Year
(1). Algebra
(2). Mensuration
(3). Arithmetic Applied to:
(a). Commerce
(b). Industry
(c). Social Needs
(II). Plan II
(A). First Year
(1). Same as Plan I
(B). Second Year
(1). Algebra
(2). Intuitive Geometry
(3). Mensuration
(4). Trigonometry
(III). Plan III
(A). First Year
(1). Review of Arithmetic
(2). Arithmetic Applied to:
(a). Home
(b). Thrift
(c). School Subjects
(d). Commerce
(e). Industry
(f.). Social Needs
(B). Second Year
(1). Intuitive Geometry
(2). Applied Geometry
(3). Algebra
(4). Applied Algebra
(5). Trigonometry
(IV). Plan IV
(A). First Year
(1). Applied Arithmetic as
in Plan III
(2). Intuitive Arithmetic
(B). Second Year
(1). Intuitive Geometry
(2). Algebra
(3). Applied Algebra and Geometry
(V). Plan $V$
(A). First Year
(1). Intuitive Geometry
(2). Simple Formulae as an Introduction to Algebra
(3). Statistics
(4). Applied Arithmetic
(B). Second Year
(1). Intuitive Geometry
(2). Algebra
(3). Practical Applications of Algebra and Geometry
4. Blackhurst, J. Herbert, Principles and Methods of Junior High School Mathematics
a. Suggested materials for the teaching of junior high school mathematics:
(I). Plan I
(A). First Year
(1). Application of Arlthmetic to:
(a). Home
(b). Industry
(c). Thrift
(d). Other School Subjects
(2). Intuitive Geometry
(B). Second Year
(1). Algebra
(2). Applied Arithmetic to:
(a). Cormerce
(b). Industry
(c). Social Needs
(3). Applied Geometry
(II). Plan II
(A). Pirst Year
(1). Same as Plan I
(B). Second Year
(1). Algebra
(2). Intuitive Geometry
(3). Trigonometry
(III). Plan III
(A). First Year
(1). Arithmetic Applied to:
(a). Home
(b). Industry

- (0). Thrift
(d). Health
(e). School Subjects
(2). Arithmetical Algebra
(B). Second Year
(1). Intuitive Geometry
(2). Algebra
(3). Applied Algebra and Geometry
(IV). Plan IV
(A). First Year
(1). Same as Plan I
(B). Second Year
(1). Intuitive Geometry
(2). Mensuration
(3). Geometry
( V ). Plan $V$
(A). First Year
(1). Intuitive Geometry
(2). Simple Formulae in Percentage and Geometry
(3). Elementary Principles of Statistics
(4). Arithmetic as in Plan I
(B). Second Year
(1). Applied Arithmetic
(2). Intuitive and Numerical Geometry
(3). Algebra
(4). Applied Algebra
B. Subject Matter Units From


## Current Text-Books

1. Hamilton-Bliss-Kupfer, Essentials of JuniorHigh School Mathematios
a. The Seventh Year(I). Review of Fundementals
(II). Review of Percentage
(III). Banking, Industry, and Business
(IV). The Home
( V ) . The Farm
(VI). Graphs
(VII). Intuitive Geometry
(VIII). Mensuration
b. The Eighth Year
(I). Investments
(II). Business
(III). Community
(IV). Banking
(V). The Home
(VI). Insurance and Taxation
(VII). Communication, Transportation,and Travel
(VIII). Farm and Forest
(IX). Longitude and Time
(X). Graphs
(XI). Mensuration
(XII). Numerical Trigonometry
(XIII). Ratio and Proportion

> (XIV). Powers and Roots
> (XV). The Metric System
> (XVI). Algebra
2. Barber, Junior High School Mathematics
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage (III). Banking, Industry, and Business
(IV). The Home
( $V$ ). Graphs
(VI). Mensuration
(VII). Intuitive Geometry
(VIII). Ratio and Proportion
(IX). Algebraic Equations
b. The Eighth Year
(I). General Business
(II). Community
(III). Investments
(IV). Banking
(V). The Home
(VI). Health
(VII). Insurance
(VIII). Taxation
(IX). Statistics
(X). Graphs
(XI). Numerioal and Intuitive Geometry
(XII). Numerical Trigonometry
(XIII). Ratio and Proportion
(XIV). Powers and Roots
(XV). The Metric System
3. Gugle, Modern Mathematics

## a. The Seventh Year

(I). Review of Fundamentals
(II). Review of Percentage
(III). Banking, Industry, and Business
(IV). Community
(V). Taxation
(VI). Graphs
(VII). Mensuration
(VIII). Intuitive Geometry
(IX). The Metric System
b. The Eighth Year
(I). Mensuration
(II). Intuitive Geometry
(III). Numerical Trigonometry
(IV). Ratio and Proportion
(V). Powers and Roots
(VI). Algebra
4. Schorling-Clark, Modern Mathematics
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Banking, Industry, and Business
(IV). The Home
(V). The Farm
(VI). Graphs
(VII). Mensuration
(VIII). Intuitive Geometry
(IX). Algebraic Equations(X). The Metrio System
b. The Eighth Year
(I). General Business
(II). Community
(III). Investments
(IV). Banking
$(\nabla)$. The Home
(VI). Health
(VII). Insurance
(VIII). Taxation(IX). Numerical Trigonometry(X). Ratio and Proportion(XI). Powers and Roots(XII). Algebra
5. Edgerton-Carpenter, The New Mathematics
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Banking, Industry, and Business
(IV). Graphs
(V). Intuitive Geometry
(VI). Ratio and Proportion
(VII). Algebraic Equations
(VIII). The Metric System
b. The E1ghth Year
(I). Community
(II). Banking and Investments
(III). Insurance and Taxation
(IV). Communication, Transportation, and Travel
(V). Intuitive and Numerical Geometry
(VI). Graphs
(VII). Ratio and Proportion
(VIII). Powers and Roots
(IX). The Metric System
(X). Numerical Trigonometry
(XI). Algebra
6. Wentworth-Smith-Brown, Junior High School

Mathematics
a. The Seventh Year
(I). Banking, Industry, and Business
(II). The Home
(III). The Farm
(IV). Mensuration
(V). Intuitive Geometry
(VI). Ratio and Proportion
(VII). Algebraic Equations
(VIII). The Metric System
b. The Eighth Year
(I). General Business
(II). Community
(III). Investments and Banking
(IV). The Home and Health
(V). Insurance and Taxation
(VI). Longitude and Time (VII). Graphs (VIII). The Metrio System (IX). Algebra
7. Brueckner-Anderson-Banting, Mathematics for the Junior High School
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Banking, Industry, and Business
(IV). The Home
(V). The Community
(VI). Graphs
(VII). Intuitive Geometry
(VIII). Mensuration
(IX). Ratio and Proportion
(X). The Metric System
b. The Eighth Year
(I). Community and The Home
(II). Investments and Banking
(III). Insurance and Taxation
(IV). Longitude and Time
(V). Graphs
(VI). Intuitive and Numerical Geometry
(VII). Ratio and Proportion
(VIII). Powers and Roots
(IX). The Metric System
(X). Algebra
8. Hart; Junior High School Mathematics
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Banking, Industry, and Business
(IV). Mensuration
(V). Intuitive Geometry
b. The Eighth Year
(I). General Business
(II). Community
(III). Investments
(IV). Banking
$(\mathrm{V})$. Insurance and Taxation
(VI). Communication, Transportation, and Travel
(VII). Statistios
(VIII). Numerical Geometry and Trigonometry (IX). Ratio and Proportion
(X). Powers and Roots (XI). Algebra

## 9. Knight-Studebaker-Ruch, Standard Service

 Arithmetica. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Banking, Industry, and Business
(IV). The Home
( $\nabla$ ). Graphs
(VI). Mensuration
(VII). Intuitive Geometry
b. The Eighth Year
(I). General Business
(II.). The Home and Community
(III). Investments and Banking
(IV). Insurance and Taxation
(V). Graphs
(VI). Numerical and Intuitive Geometry
(VII). Numerical Trigonometry
(VIII). Ratio and Proportion
(IX). Powers and Roots
(X). Algebra
10. Bonser-Pickell-Smith, Practical Mathematics for the Junior High School
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Banking, Industry, and Business
(IV). Mensuration
(V). Intuitive Geometry
(VI). Algebraic Equations
b. The Eighth Year
(I). General Business
(II). The Home and Community
(III). Investments and Banking
(IV). Insurance and Taxation
(V). Graphs
(VI). Numerical and Intuitive Geometry
(VII). Numerical Trigonometry
(VIII). Ratio and-Proportion
(IX). Powers and Roots
(X). Algebra
11. Breslich, Mathematics
a. The Seventh Year
(I). Banking, Business, and Industry (II). The Home (III). The Farm (IV). Graphs
(V). Mensuration
(VI). Intuitive Geometry
(VII). The Metric System
b. The Eighth Year
(I). General Business
(II). Community
(III). Investments and Banking
(IV). Insurance and Taxation
(V). Communication, Transportation, and Travel
(VI). Numerical and Intuitive Geometry
(VII). Numerical Trigonometry
(VIII). Ratio and Proportion
(IX). Algebra
12. Werremeyer, Cumulative Mathematios
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Banking, Industry, and Business
(IV). The Home
(V): Transportation, Travel,
and Communication
(VI). Graphs
(VII). Mensưration
(VIII). Intuitive Geometry
b. The Eighth Year
(I). General Business
(II). Community, Home, and Health
(III). Investments and Banking
(IV). Insurance and Taxation
( $V$ ). Graphs, Numerical and
Intuitive Geometry
(VI). Numerical Trigonometry
(VII). Ratio and Proportion
(VIII). Powers and Roots
(IX). The Metric System
(X). Algebra

## 13. Thorndike, The Thorndike Junior High School

Mathematics
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Banking, Industry, and Business
(IV). The Home
( $V$ ). The Community
(VI). Mensuration
(VII). Ratio and Proportion
(VIII). Algebraic Equations
b. The Eighth Year
(I). General Business
(II). Community, Home and Health
(III). Investments and Banking
(IV). Insurance and Taxation
(V). Mensuration
(VI). Ratio and Proportion
(VII). Powers and Roots
(VIII). The Metrio System
(IX). Algebra.
14. Strayer-Upton, Junior Mathematios
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Banking, Industry, and Business
(IV). The Home
(V). The Community
(VI). Mensuration
(VII). Intuitive Geometry
(VIII). The Metric System
b. The Eighth Year
(I). General Business
(II). Investments and Banking
(III). The Home
(IV). Insurance and Taxation
(V). Graphs
(VI). Mensuration
(VII). Numerical Trigonometry
(VIII). Ratio and Proportion (IX). Powers and Roots (X). The Metric System
(XI). Algebra
15. Drushel-Withers, Junior High School Mathematics Essentials
a. The Seventh Year
(I). Review of Fundementals
(II). Review of Percentage
(III). Community Problems
(IV). Health and Safety
(V). Taxation
(VI). Graphs
(VII). Mensuration
(VIII). Intuitive Geometry
(IX). Ratio and Proportion
b. The Eighth Year
(I). General Business
(II). Investments
(III). Banking
(IV). Insurance
(V). Texation
(VI). Graphs
(VII). Mensuration
(VIII). Numerical Trigonometry
(IX). Ratio and Proportion
(X). Powers and Roots
16. Stone, The New Mathematics
a. The Seventh Year
(I): Review of Fundamentals
(II). Review of Percentage
(III). Banking, Industry, and Business
(IV). Mensuration
b. The Eighth Year
(I). Generà Business
(II). Investments
(III). Banking
(IV). The Home
(V). Iṇsurance
(VI). Government
(VII). Graphs
(VIII). Mensuration
(IX). Intuitive Geometry
(X). Numerical Trigonometry
(XI). Ratio and Proportion
(XII). Powers and Roots
(XIII). The Metric System
(XIV) . Algebra
C. Subject Matter From State Courses of Study

1. Indiana
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Industry, Business, and Banking
(IV). The Home and Community
(V). Communication, Travel, and Transportation
(VI). Graphs
(VII). Intuitive Geometry (VIII). Mensuration
b. The Eighth Year
(I). Banking, Investments, and Business
(II). The Home and Community
(III). Travel, Transportation, and Communication
(IV). Taxation and Insurance
( $V$ ). Intuitive Geometry
(VI). Mensuration
(VII). Ratio and Proportion
(VIII). Powers and Roots
(IX). The Metric System
(X). Algebra
2. Kentucky
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Banking, Business, and Industry
(IV). The Home
(V). The Farm
(VI). Intuitive Geometry
(VII). Graphs
b. The Eighth Year
(I). Banks, Investments, and Business
(II). Community
(III). Communication, Travel,
and Transportation
(IV). Insurance-and Taxation
(V). Mensuration
(VI). Ratio and Proportion
(VII). Powers and Roots
3. Louisiana
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Banking, Business, and Industry
(IV). The Home and Community
(V). Transportation, Travel, and Communication
(VI). Taxation and Insurance
(VII). Investments
(VIII). Graphs
(IX). Intuitive Geometry
(X). Mensuration
b. The Eighth Year
(I). Graphs
(II). Intuitive Geometry
(III). Mensuration
(IV). Ratio and Proportion
$(\nabla)$. Powers and Roots
(VI). The Metric System
4. Massachusetts
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III) . Business, Banking, and Industry
(IV). The Home and Community
(V): Health and Safety
(VI). Graphs
(VII). Intuitive Geometry
(VIII). Mensuration
(IX). Squares and Roots
b. The Eighth Year
(I). Banking, Investments, and Business
(II). The Home and Community
(III). Travel, Transportation,
and Communication
(IV). Intuitive Geometry
(V). Mensuration
(VI). Ratio and Proportion
(VII). Squares and Roots
(VIII). The Metric System
5. Minnesota
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Business, Banking, and Industry
(IV). The Home
(V). The Farm
(VI). Graphs
(VII). Mensuration
(VIII). Intuitive Geometry
b. The Eighth Year
(I). Business, Banking, and Investments
(II). The Home and Community
(III). Transportation
(IV). Taxation and Insurance
(V). Graphs
(VI). Mensuration
(VII). Ratio and Proportion
(VIII). Powers and Roots
(IX). The Metric System
(X). Algebra
6. Missouri
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Business, Industry, and Banking
(IV). The Farm
(V). The Home and Community
(VI). Transportation, Travel, and Communication
(VII). Taxation and Insurance
(VIII). Investments
b. The Eighth Year
(I). Banking, Investments, and Business
(II). Intuitive Geometry
(III). Mensuration
(IV). Graphs
(V). Ratio and Proportion
(VI). Powers and Roots
(VII). The Metric System
(VIII). Algebra
7. Nebraska
a. The Seventh Year
(I): Review of Fundamentals
(II). Review of Percentage
(III). Business, Industry, and Banking
(IV). The Farm
(V). The Home and Community
(VI). Transportation, Travel,
and Communication
(VII). Taxation and Insurance
(VIII). Investments
b. The Eighth Year
(I). Investments, Banking, Industry, and Business
(II). Graphs
(III). Intuitive Geometry
(IV). Mensuration
(V). Ratio and Proportion
(VI). Powers and Roots
(VII). The Metric System
8. New Hampshire
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Business, Banking, and Industry
(IV). The Home and Community
(V). Taxation
(VI). Graphs
(VII). Intuitive Geometry
(VIII). Monsuration
(IX). Squares and Roots
b. The Eighth Year
(I). Investments, Business, and Banking
(II). The Home and Community
(III). Transportation, Travel,
and Communication
(IV). Taxation and Insurance
(V). The Farm
(VI). Intuitive Geometry
(VII). Mensuration
9. New Mexico
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Business, Banking, and Industry
(IV). The Home and Community
(V). The Farm
(VI). Communication, Travel,
and Transportation
(VII). Taxation and Insurance
(VIII). Investments
b. The Eighth Year
(I). Banking, Inrestments, and Business
(II). The Home and Community
(III). Health and Sefety
(IV). The Farm and Forest
(V). Travel, Communication,
and Transportation
(VI). Intuitive Geometry
(VII). Mensuration
(VIII). Ratio and Proportion
(IX). The Metric System
10. New York
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Banking, Business, and Industry
(IV). The Home and Community
(V). Transportation, Travel,
and Communication
(VI). Graphs
(VII). Intuitive Geometry.
(VIII). Mensuration
b. The Eighth Year
(I). Business, Investments, and Banking (II). The Home
(III). Taxation and Insurance
(IV). Mensuration
(V). Ratio and Proportion
(VI). Squares and Roots
(VII). The Metric System
(VIII). Algebra
11. North Dakota
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Busiriess, Industry, and Banking
(IV). The Home and Community
(V). Transportation, Travel,

## and Communiation

(VI). Graphs
(VII). Propórtion and Ratio
b. The Eighth Year
(I). Business, Investments, and Banking
(II). Health and Safety
(III). Community
(IV). Communication, Transportation, and Travel
(V). Taxation and Insurance
(VI). Graphs
(VII). Intuitive Geometry
(VIII). Mensuration
(IX). Ratio and Proportion
(X). Powers and Roots
(XI). The Metric System
(XII). Algebra

## 12. Pennsylvania

a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Banking, Business, and Industry
(IV). The Home and Community
(V). Communication, Travel, and Transportation
(VI). Graphs
(VII). Mensuration
(VIII). Intuitive Geometry
b. The Fighth Year
(I).-. Business, Investments, and. Banking
(II). The Home and Community
(III). Travel; Communication, and Transportation
(IV). Graphs
(V). Intuitive Geometry
(VI). Mensuration
(VII). Ratio and Proportion
(VIII). Powers and Roots
(IX). Algebra
13. South Carolina
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Business, Banking, and Industry
(IV). The Home and Community
(V). The Farm
(VI). Transportation, Travel,
and Communication
(VII). Taxation
(VIII). Investments
b. The Eighth Year
(I). Statistics
(II) . Graphs
(III). Intuitive Geometry
(IV). Mensuration
(V). Ratio and Proportion
(VI). Powers and Roots
(VII). The Metric System
(VIII): Algebra
14. Texas
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Business, Industry, and Banking
(IV). The Home
(V). The Farm
(VI). Graphs
(VII). Intuitive Geometry
(VIII). Mensuration (IX). Squares and Roots
(X). Algebraic Equations
b. The Eighth Year
(I). Business, Investments, and Banking (II). Community
(III). Insurance and Taxation
(IV). Graphs
(V). Mensuration
(VI). Ratio and Proportion
(VII). Powers and Roots
(VIII). Algebra
15. Vermont
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Banking, Investments, and Business
(IV). The Home and Community

- (V). Travel, Transportation, and Communication
(VI). Graphs
(VII). Intuitive Geometry
(VIII). Mensuration
b. The Eighth Year
(I). Banking, Investments, and Business
(II). The Home and Community
(III). Transportation, Travel, and Communication
(IV). Taxation and Insurance
$(V)$. The Farm and Forest
(VI). Intuitive Geometry
(VII). Mensuration
(VIII). Ratio and Proportion
(IX). Powers and Roots
(X). Algebra

16. Virginia
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Business, Industry, and Banking
(IV). The Home and Community
(V). The Farm and Forest
(VI). Travel, Communication,
and Transportation
(VII). Taxation
(VIII). Investments
(IX). Grephs
(X). Intuitive Geometry
(XI). Mensuration
b. The Eighth Year
(I). Banking, Investments, and Business
(II). Intuitive Geometry
(III). Mensuration
(IV). Powers and Roots
(V). Ratio and Proportion
(VI). The Metrio System
(VII). Graphs
(VIII). Algebra
17. West Virginia
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Business, Banking, and Industry
(IV). The Home and Community
(V). Taxation
(VI). Intuitive Geometry
(VII). Mensuration
b. The Eighth Year
(I). Business, Investments, and Banking
(II). The Home and Community
(III). Taxation and Insurance
(IV). Graphs
(V). Intuitive Geometry
(VI). Mensuration
(VII). Ratio and Proportion
(VIII). Powers and Roots (IX). The Metric System
(X). Algebra
18. Wisconsin
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Business, Industry, and Banking
(IV). The Home and Community
(V). The Farm
(VI). Communication, Transportation, and Travel
(VII). Graphs
(VIII). Intuitive Geometry (IX). Mensuration
b. The Eighth Year
(I). Business
(II). Investments
(III). Banking
(IV). The Home and Community
(V). Transportation, Travel,
and Communication
(VI). The Farm and Forest
(VII). Graphs
(VIII). Mensuration
(IX). Ratio and Proportion
(X): Powers and Roots
(XI). Algebra
(XII). The Metric System

## D. Subjeot Matter From C1ty <br> Courses of Study

1. Athens, Ohio
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Banking and Business
(IV). Community
(V). Safety and Health
(VI). Taxation
(VII). Graphs
(VIII). Intuitive Geometry
(IX). Mensuration
b. The Eighth Year
(I). Banking, Investments, and Business
(II). Home Problems
(III). Community Property
(IV). Transportation, Communication,
and Travel
(V). Taxation and Insurance
(VI). Graphs
(VII). Ratio and Proportion
(VIII). Powers and Roots (IX). Algebra
2. Atlantic City, New Jersey
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Business, Banking, and Industry
(IV). The Home and Community
(V). Taxation
(VI). Graphs
(VII). Intuitive Geometry
(VIII). Mensuration
(IX). Algebraic Equations
b. The Eighth Year
(I). Business, Banking, and Investments
(II). The Home and Community
(III). Health and Safety
(IV). Travel, Communication, and Transportation
(V). Insurance and Taxation
(VI). Statistics
(VII). Graphs
(VIII). Ratio and Proportion
(IX). Powers and Roots
(X). Algebra
(XI). The Metric System
3. Berkeley, California
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Business and Banking
(IV). The Home
( $V$ ). The Community
(VI). Transportation, Travel, and Communication
(VII). Graphs :
(VIII). Mensuration
(IX). Intuitive Geometry
b. The Eighth Year
(I). Business Problems
(II). Investments
(III). Banking
(IV). The Home
(V). Community
(VI). Taxation
(VII). Graphs
(VIII). Mensuration
(IX). Ratio and Proportion
$(X)$. Powers and Roots
(XI). The Metric System
4. Cleveland, Ohio
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Business and Banking
(IV). The Home and Community
(V). Graphs
(VI). Intuitive Geometry
(VII). Mensuration
(VIII). Algebraic Equations
b. The Eighth Year
(I). Business, Investments, and Banking
(II). The Home and Community
(III). Transpórtation, Travel, and Communication
(IV). Taxation and Insurance
(V). Statistics
(VI). Graphs
(VII). Mensuration
(VIII). Ratio and Proportion
(IX). Powers and Roots
(X). The Metric System
(XI). Algebra
5. Port Wayne, Indiana
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Business and Banking
(IV). The Home
(V). Mensuration
(VI). Intuitive Geometry
(VII). Ratio and Proportion
(VIII). Squares and Roots
b. The Eighth Year
(I). Business, Investments, and Banking
(II). The Home and Community
(III). Communication, Travel, and Transportation
(IV). Insurance and Tazation
( $\nabla$ ). The Farm
(VÍ). Graphs
(VII). Mensuration
(VIII). Ratio and Proportion
(IX). Squares and Roots
(X). The Metric System
(XI). Algebra
6. Lansing, Michigan
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Business and Banking
(IV). The Home
( $\nabla$ ). The Farm
(VI). Travel, Communication, and Transportation
(VII). Graphs
(VIII). Intuitive Geometry
(IX). Mensuration
b. The Eighth Year
(I). Business
(II). Investments and Banking
(III). The Home
(IV). Community
(V). Communication and Transportation
(VI). Taxation
(VII). Graphs
(VIII). Numerical and Intuitive Geometry
(IX). Ratio and Proportion
(X). The Metric System
(XI). Algebra
7. Lorain, Ohio
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Business and Banking
(IV). Community
(V). Safety and Health
(VI). Taxation
(VII). Graphs
(VIII). Intuitive Geometry
(IX). Ratio and Proportion
$(X)$. Squares and Roots
b. The Eighth Year
(I). Business, Investments, Banking
(II). The Home
(III). The Community
(IV). Communication, Transportation, and Travel
( $V$ ). Taxation and Insurance
(VI). Mensuration
(VII). Numerical Trigonometry
(VIII). Ratio and Proportion
(IX). Powers and Roots
(X). The Metric System
8. Madison, Wisconsin

## a. The Seventh Year

(I). Review of Fundamentals
(II). Reviet of Percentage
(III). Mathematios, Business, and Banking
(IV). The Home
(V). Communication, Transportation, and Travel
(VI). Graphs
(VII). Intuitive Geometry
(VIII). Mensuration
b. The Eighth Year
(I). Business, Investments, and Banking
(II). Community
(III). Insurance and Taxation
(IV). Graphs
(V). Intuitive and Numerical Geometry
(VI). Ratio and Proportion
(VII). Powers and Roots
(VIII). The Metric System
9. Providence, Rhode Island
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Business, Banking, and Investments
(IV). The Home
(V). Graphs
(VI). Intuitive Geometry
(VII). Mensuration
b. The Eighth Year
(I). Business, Investments, and Banking
(II). Community
(III). Taxation and Insurance
(IV). Statistics
(V). Graphs
(VI). Intuitive Geometry
(VII). Mensuration
(VIII). Ratio and Proportion
(IX). Powers and Roots
(X). The Metric System
(XI). Algebra
10. Salt Lake City, Utah
a. The Seventh Year
(I). Review of Fundamentals
(II). Review of Percentage
(III). Business, Banking, and Industry
(IV). The Home and Community
(V). Taxation
(VI). Intuitive Geometry
(VII). Mensuration
b. The Eighth Year
(I). Business, Investments, and Banking
(II). The Home and Community
(III). Communication, Transportation,
and Travel
(IV). Insurance and Taxation
(V). Graphs
(VI). Intuitive Geometry
(VII). Mensuration
(VIII). Ratio and Proportion
(IX). Powers and Roots
(X). The Metric System
(XI) . Algebrà
11. Terre Haute, Indiana
a. 7B Grade Level
(I). Review of Whole Numbers
(II). Review of Common and Decimal Fractions
(III). Percentage
(A). Pure Percentage
(B). Applied Percentage
b. 7A Grade Level
(I). Intuitive Geometry
(II). Mensuration
(III). Graphs
(IV). Arithmetic Review (Optional)
'c. 8B Grade Level
(I). Application of Arithmetic to:
(A). Business
(B). Banking
(C). Industry
(D). Investments
(E). Taxation
(F). Insurance
(II). The Equation in Percentage
d. 8A Grade Level
(I). Mensuration
(II). Squares and Roots
(III). Ratio and Proportion
(IV). Numerical Trigonometry
(V). General Review or Elementary

Algebra
12. Trinidad, Colorado
a. The Seventh Year
(I). Review of Fundementals
(II). Review of Peroentage
(III). Business, Industry, and Banking
(IV). The Home and Community
(V). Travel, Communication, and Transportation
(VI). Graphs
(VII). Intuitive Geometry
(VIII). Mensuration
b. The Eighth Year
(I). Business Problems
(II). Investments and Banking
(III). The Home and Community
(IV). Travel, Transportation, and Communioation
(V). Insurance Taxation
(VI). Graphs
(VII). Mensuration
(VIII). Intuitive Geometry
(IX). Ratio and Proportion
(X). Powers and Roots
(XI). The Metric System
(KII). Algebra
E. Results of the Subject

Matter Survey

1. In the seventh year the survey revealed the following tendencies:
a. A review of the fundamental processes in whole numbers, fractions, and decimals was given as the first unit of work.
b. The second unit dealt with the principles of percentage.
c. Problems that involved the application of the first two units in complex processes followed. Problems of the home, community, farm, and forest were given proper emphasis. Business forms and practices as well as problems had a very important place in units involving them.
d. The interpretation of graphs received more emphasis than the problems involved in the making of them.
e. Intuitive geometry was given before mensuration and much time was given to this unit of work.
f. The introduction of the algebraic equation as an aid to a better understanding of formulae usually concluded work for the year.
g. In a few cases, problems involving taxation, insurance, investments, ratio and proportion, squares and roots were given, but most of the authorities put these into the work
for the eighth year.
2. The eighth year mathematics disclosed these inclinations:
a. Muoh stress was placed on various kinds of investments.
b. Taxation and insurance were emphasized not as mathematical processes but as benefits to individuals and communities.
c. Review and further work in general business problems and practices were given important places.
d. A new trend of work was shown in the introduction of community and home problems involving health and safety.
e. Problems of travel, transportation, and communication have entered into the mathematics currioula as another new tendency.
f. More work in mensuration had a place in the eighth year.
g. Ratio, proportion, powers and roots, according to most authorities belonged entirely to the eighth year level.
h. The metric system was introduced as a background for further study in mathematics and other sciences.
i. Nearly all authorities agreed that the fundamental processes in algebra should be placed as the last unit of work in the eighth year.
TABER II
A SUMMARY OF THE RESULTS OF THE SURVEY OF SUBJECT MATTER UNITS


RESULTS OF THE SUBJECT MATTER SURVEY IN JUNIOR HIGH SCHOOL MATHEMATICS FOR THE EIGHTH YEAR

III. GENERAL CONCLUSIONS DRAWN FROM THE EXPERIMENTAL CURRICULA WITH PUPILS OF THE WOODROW WILSON JUNIOR HIGH SCHOOL

Classified pupils had a better opportunity to cover a required amount of work in a given time.

Tables IV and $V$ show the average number of weeks spent on each unit of work in the seventh and eighth grades by the classified groups.

Table IV reveals that the superior group was able to cover all of the eight units in the seventh year, and two weeks remained for review or enrichment. The average group covered the first six units, and the remaining two weeks was spent on the seventh unit; the slow group did not complete all of the sixth unit.

Table $V$ reveals the results for the eighth grade. The curriculum for this year of work contained more problems, hence, the superior group acquired the full amount of the time to complete it. The average group successfully covered seven units while the slow group finished about half of the work in the sixth unit.

TABLE IV

## AVERAGE AMOUNT OF TIME SPENT ON EACH UNIT IN THE SEVENTH YEAR <br> (12 CLASSES-204 PUPILS)



## TABLE V

AVERAGE AMOUNT OF TIME IN WEEKS SPENT ON EACH UNIT IN THE EIGHTH YEAR (12 CLASSES-198 PUPILS)


A high degree of efficiency in attainment was reached by the pupils in the classified groups as revealed in Table VI and Table VII.

All the tests had been arranged so that the points represented a perfect score. The tables show that the superior group made an average of 7.6 points on the seventh year units, and an average of 7.2 points on the eighth year units.

The average group maintained an average of 5.5 points on the seventh year work and 6.0 points on the seven units of the eighth year work.

The slow group kept an average of 4.4 points on the six units of the seventh year work and an average of 5.1 points on the six units of the eighth year FOrk.

The average median of the three groups for all eight units in the seventh year was 5.5 points while the average median for the three groups for all eight units in the eighth year was 5.6 points.

## TABLE VI

MEDIANS OBTAINED FROM THE SAME TESTS GIVEN AT THE END OF EACH UNIT IN THE SEVENTH YEAR TO THE VARIOUS GROUPS (12 CLASSES-204 PUPILS)

|  | n |  | 1 |  | 1 |  | 1 |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Unit | " |  | + |  | ' |  | 1 |  |  |
| of | ${ }^{\prime}$ | Superior | - | Average | , | Slow | - | Average |  |
| Work | " | Pupils | 1 | Pupils | ' | Pupils | , | Median |  |
|  | " |  | - |  | , |  | , |  |  |
|  | - |  | 1 |  | 1 |  | 1 |  |  |
| I | " | 7.8 | 1 | 6.8 | ! | 5.3 | ' | 6.6 |  |
|  | " |  | - |  | , |  | , |  |  |
| II | " | 7.5 | , | 6.5 | ' | 5.5 | ' | 6.5 |  |
|  | " |  | - |  | , |  | , |  |  |
| III | " | 7.8 | - | 6.5 | , | 5.5 | - | 6.6 |  |
|  | . |  | ! |  | , |  | ! |  |  |
| IV | " | 7.3 | , | 5.8 | - | 4.0 | ' | 5.7 |  |
|  | " |  | ' |  | ! |  | ' |  |  |
| V | n | 7.5 | , | 5.5 | - | 3.5 | ' | 5.5 |  |
|  | n |  | ! |  | ' |  | - |  |  |
| VI | " | 7.8 | ' | 6.5 | - | 3.0 | ' | 5.7 |  |
|  | n |  | - |  | - |  | P |  |  |
| VII | " | 6.8 | ' | 1.0 | ' | 0.0 | - | 2.6 |  |
|  | " |  | ! |  | ! |  | , |  |  |
| VIII | " | 8.1 | ! | 0.0 | , | 0.0 | - | 2.7 |  |
|  | n |  | 1 |  | 1 |  | ! |  |  |
| Arerage | $\cdots$ | 7.6 | ' | 5.5 | - | 4.4 | ' | 5.5 |  |
|  | \# |  | , |  | , |  | , |  |  |

## TABLE-VII

MEDIANS OBTAINED FROM THE SAME TESTS GIVEN AT THE END OF EACH UNIT IN THE EIGHTH YEAR TO THE VARIOUS GROUPS
(12 CLASSES-198 PUPILS)

|  | " |  | \% |  | 1 |  | 1 |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Unit | " |  | + |  | ! |  | , |  |  |
| of | " | Superior | - | Average | - | Slow | , | Average |  |
| Work | " | Pupils | + | Pupils | ' | Pupils | , | Median |  |
|  | n |  | , |  | P |  | , |  |  |
|  | n |  | $!$ |  | ! |  | ! |  |  |
| I | " | 8.3 | + | 7.3 | , | 6.8 | + | 7.4 |  |
|  | " |  | + |  | - |  | , |  |  |
| II | " | 7.8 | ! | 7.0 | ' | 6.5 | , | 7.1 |  |
|  | n |  | + |  | - |  | , |  |  |
| III | " | 7.0 | ' | 6.5 | ! | 5.5 | , | 6.3 |  |
|  | 4 |  | ! |  | ! |  | , |  |  |
| IV | n | 7.5 | + | 6.8 | ' | 5.3 | P | 6.5 |  |
|  | H |  | - |  | + |  | , |  |  |
| $\nabla$ | " | 6.5 | ' | 5.3 | ' | 4.0 | ! | 5.2 |  |
|  | \# |  | - |  | + |  | , |  |  |
| VI | " | 7.3 | ' | 6.0 | - | 2.0 | ' | 5.1 |  |
|  | n |  | - |  | - |  | ' |  |  |
| VII | H | 5.3 | ' | 3.0 | ' | 0.0 | ! | 2.7 |  |
|  | H |  | , |  | , |  | , |  |  |
| VIII | ${ }^{\prime \prime}$ | 8.3 | 1 | 0.0 | , | 0.0 | , | 2.7 |  |
|  | ' |  | ! |  | ! |  | ! |  |  |
| Average | " | 7.2 | 1 | 6.0 | ' | 5.1 | ' | 5.6 |  |
|  | $\cdots$ |  | $\dagger$ |  | - |  | 1 |  | - |

The classified groups maintained a higher degree of efficiency in less time than the unclassified groups.

As revealed in Tables VIII and IX, the unclassified pupils were able to cover only seven of the eight units of work in both the seventh and the eighth grades, while in the classified groups at least, one group covered all eight units in the work of both years.

The median averages showed a higher degree of efficiency in every unit of both the seventh and eighth year work for the classified groups. The tables revealed a range of 0.5 to 2.7 points difference between the averages of the two groups. Although only the superior group completed all eight units in the two years' work, yet their median was high enough to maintain an average median of 2.7 points for all three groups on the eighth unit for both the seventh and eighth year work.

No class of the unclassified group was able to reach the eighth unit in either year's work. The classified group maintained an average median of 5.5 points on all the eight units of the seventh year, whereas the unclassified group kept an average median of 3.9 points on the same work, thus making a difference of 1.6 points in the favor of the classified groups.

In the eighth year, the unclassified group made a higher average median than in the seventh year due to the seventh year fallures which were eliminated at the time of promotion. Even then, the classified group with an average median of 5.6 points excelled the unclassified group of 1.4 points.

TABLE VIII
THE COMPARISONS OF THE CLASSIFIED AND UNCLASSIFIED GROUPS OF THE SEVENTH YEAR
(16 CLASSES-m308 PUPILS)

| $\begin{aligned} & \text { Units } \\ & \text { of } \\ & \text { Work } \end{aligned}$ | " |  |  |  | $!$ |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | " | Time Averages |  |  | , | Median Averages |  |  |
|  | M Classified |  |  | $\begin{gathered} \text { Unclassified } \\ \text { Pupils } \end{gathered}$ | $\begin{aligned} & \text { Classified } \\ & \text { Pupils } \end{aligned}$ |  | : Unclassified |  |
|  | " | Pupils | , |  |  |  |  |  |
|  | $n$ |  | - |  |  |  |  |  |
| I | \% | 4.3 | ' | 4.5 | ! | 6.6 | $!$ | 5.3 |
|  | * |  | ! |  | + |  |  |  |
|  | " |  | - |  | - |  |  |  |
| II | " | 3.0 | - | 3.0 | - | 6.5 | $!$ | 5.5 |
|  | n |  | , |  | + |  |  |  |
| III | " | 3.0 | 1 | 3.5 | - | 6.6 | , | 5.5 |
|  | H |  | , |  | - |  | ' |  |
| IV | " | 5.0 | ' | 5.0 | , | 5.7 | , | 5.0 |
|  | * |  | ' |  | ! |  | + |  |
| V | " | 9.0 | ! | 10.5 | + | 5.5 | ' | 4.5 |
|  | N |  | : |  | ' |  | , |  |
| VI | " | 10.0 | ' | 11.0 | , | 5.7 | , | 4.3 |
|  | * |  | , |  | , |  | ' |  |
| VII | " | 2.0 | 1 | 1.5 | + | 2.6 | , | 1.0 |
|  | " |  | 1 |  | , |  |  |  |
| VIII | " | 1.0 | ! | 0.0 | - | 2.7 | 1 | 0.0 |
|  | n |  |  |  | 「 | 5.5 | 1 |  |
| Average | " | , |  |  | , |  | - | 3.9 |
|  | n |  | , |  | ! |  | 1 |  |

TABLE IX
THE COMPARISONS OF THE CLASSIFIED AND UNCLASSIFIED GROUPS OF THE EIGHTH YEAR (16 CLASSES-298 PUPILS)

| Units of Wark | " |  |  |  | ! |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | " | Time Averages |  |  | Median Averages |  |  |  |
|  | n | Classified | - | Unclassified | ! | $\begin{gathered} \text { Classified } \\ \text { Pupils } \end{gathered}$ | : Unclassified <br> Pupils |  |
|  | " | Pupils | ! | Pupils |  |  |  |  |
| I | H | 3.0 | ! | 3.0 | 1 | 7.4 | ! | 6.9 |
|  | " |  | ' |  | - |  | ' |  |
|  | H |  | , |  | - |  | 1 |  |
| II | " | 4.2 | ' | 4.5 | , | 7.1 | ' | 6.5 |
|  | " |  | ! |  | - |  | - |  |
| III | " | 13.3 | ' | 14.5 | - | 6.3 | ' | 5.6 |
|  | H |  | ' |  | ' |  | ' |  |
| IV | n | 1.8 | ' | 2.0 | ' | 6.5 | ' | 6.0 |
|  | + |  | - |  | - |  | ' |  |
| V | " | 5.0 | ! | 6.0 | - | 5.2 | , | 4.1 |
|  | * |  | ' |  | - |  |  |  |
| VI | n | 5.0 | ! | 5.0 | ! | 5,1 | ' | 3.9 |
|  | n |  | - |  | ' |  | ' |  |
| VII | " | 3.3 | - | 2.0 | ! | 2.7 | ! | 1.0 |
|  | " |  | - |  | - |  | , |  |
| VIII | $n$ | 2.3 | , | 0.0 | $!$ | 2.7 | 1 | 0.0 |
|  | n |  | 7 |  | 1 |  | $!$ |  |
| Average | " |  | ! |  | ' | 5.6 | ' | 4.1 |
|  | n |  | - |  | - |  | , |  |

Several outstanding group differences were revealed by the classified groups in mathematics of somewhat intangible nature.

Harry Baker in his book on The Characteristic Differences in Bright and Dull Students says, "The desire and ability to check on the correctness of their prooesses are the birthright of superior minds. Problem solving and fundamental operations are both benefited by ideals of accuracy. Bright pupils show marked superiority in their ability to reason. The ability to generalize and deal with the abstract are also characteristics of gifted minds and these qualities are traits of basio importance in mathematics."

In the case of dull pupils, Dr. Baker says, "Dull pupils in dealing with fundamental operations show many unique methods which are not characteristic of the other levels. They use 'orutches' such as counting on their fingers. In problem solving, they disclose their greatest weaknesses. Their inadequate imaginations do not permit them to translate the conditions of a situation into a concrete practical situation. Another

1
Harry J. Baker, Characteristic Differences in
Bright and Dull Students (Public School Publishing Company, 1927), p. 67.
characteristic is their limited power of
analysis."
The groups in the Woodrow Wilson Junior High School seemed to verify the above statements. The superior groups were able to carry on their own work with almost no aid from the teacher. It became her duty to remain in the background. Drill had a very small place in their program, yet, in some cases, there were individuals who had speed but were inaccurate due to insufficient drill. The superior type of pupil preferred to devise his own problems and present them to the class. This type of pupil required a wise teacher to direot skilfully the class work so as to keep it alive and interesting.

The average group had the largest number of pupils. In the larger classes, the superior average was often as good as the superior group in quality of work, while the slow average was but little better than the slow group itself. The middle classes which formed the regular average groups were composed of steady workers who plodded along showing marked improvement at the end of each semester.

2
Harry J. Baker, op. cit., pp. 64-65.

In order to obtain any success from a slow group, a superior teacher, having such characteristics as patience, sympathy, tact, and kindness, was placed in charge. The pupils in this group ranked from third to sixth grade ability. As a rule they were good workers but were easily discouraged. If they were fond of the teacher, they worked to please her. They needed constant praise, encouragement, sympathy, help, and supervision to obtain any desired results.

There were many interesting cases among different groups. One outstanding case was that of a ninth grade boy who had a superior intelligence quotient and was a genius in literary ability but ranked a 5 B in mathematical attainment. He had the ability to get the work but had been allowed to neglect it because of lack of interest in this subject. He was placed in the slow group but by the end of the year he had been promoted to the average group.

Another interesting case was that of a seventh year boy whose general intelligence placed him in the slow group, yet, he had reached the 8 A level in mathematical ability. He was placed in the superior group but by the middle of the year he asked to be placed in a lower group. He was thorough in his work but could not maintain the same speed as the other members of the superior group. However, he remained in the average group throughout the eighth
and ninth years.
The slow group produced more interesting cases than did the other two groups. The outstanding one was that of a large girl in the last half of the seventh year who had the ability of a third grade pupil. Her mathematics teacher soon discovered that she disliked the subject and spent her time during the class hour patiently waiting the dismissal bell. The girl was moved to a front seat and promoted to an honored position as helper. Her duty was to correct errors found in fundamental processes. Soon, she was working harder than any member of the class and mathematics became her favorite subject. At the end of the seventh year she had attained the fifth grade level. During the latter part of the eighth year, the family moved to the country. The girl pleaded to be allowed to remain to finish the semester but her father refused, declaring that she had enough "learning" for any girl. This girl was then ready to begin the latter part of the eighth year level. This case, as well as others that could be related, illustrates the fact that proper teacher influence often does more to help slow pupils than any other single factor.

A TENTATIVE COURSE OF STUDY IN JUNIOR HIGH SCHOOL MATHEMATICS
FOR THE SEVENTH AND EIGHTH GRADES MEETING
THE NEEDS OF PUPILS OF SUPERIOR, AVERAGE, AND LOW ABILITIES

CHAPTER IV
I. GENERAL OBJECTIVES FOR JUNIOR HIGH SCHOOL

MATHEMATICS
II. ABBREVIATIONS
"The future of our civilization depends upon the widening spread and deepening hold of the scientific habit of mind."
-------John Dewey.

# CHAPTER IV <br> I. OBJECTIVES OF́ JUNIOR HIGH SCHOOL <br> MATHEMATICS 

A. General Objectives

1. Junior high school mathematics should provide for:
a. The social needs of the child
b. Individual differences
c. A basis for quantitative thinking
d. A basis for the scientific habit of mind
B. Specific Objectives
2. Junior high school mathematics should provide for the needs of the child by providing for its direct usefulness in:
a. Helping to develop speed and accuracy in number combinations
b. Increasing the understanding of the fundamentals and giving power to
apply them to new situations
c. Increasing the ability to trace errors
d. Giving self-reliance in handing problems through the use of checks
e. Helping to understand and use mathematical language
f. Understanding graphical representations as found in every-day life
g. Helping to understand and become acquainted with geometric forms in nature
h. Solving problems that arise from immediate experience to prepare the way for the future solution of problems
3. Causing the pupil to see the major possibilities of mathematics as an equipment for better living
f. Proviaing a basis for quantitative thinking through:
(I). An understanding and use of mathematical language
(II). A development of quantitative thinking
(III). A development from the direct or particular known number value to the generalized or unknown numbers
(IV). A development of the ability to think in terms of quantitative concepts or ideas
(V). A preparation for senior high school work
k. Cultivating the scientific attitude through:
(I). The acquisition of such mental habits as:
(A). An attitude of inquiry
(B). A desire to understand
(C). Concentration
(D). Persistence
(E). Accuracy
(F). Thoroughness
(G). Clearness
(H). Order and logical arrangement
(II). An appreciation of the geometric forms in nature
(III). Showing a large field open for exploration in all the sciences
(IV). The development of the love of truth and power
(V). An appreciation and knowledge of certain mathematical history and men who devoted their lives to its making
(VI). An appreciation of the part that mathematics has played in the progress of civilization

## II. ABBREVIATIONS

## A. Current Junior High School Text-Books

1. The following abbreviations are used in the tentative curricula to refer to current funior high school text-books:

J. K. S. R. Knight-Studebaker-Ruch - Standard Service Arithmetics
k. S. C. Schorling-Clark
2. $S$.
m. S. U.
n. T.
O. W. S. B. Wentworth-Smith-Brown
p. W.

Thorndike
Stone
Strayer-Upton

Werremeyer

## Modern Mathematics

The New Mathematics
Junior Mathematics
The Thorndike Junior High School
Mathematics
Junior High School Mathematics
Cumulative Mathematics
CHAPTER-V
I. A TENTATIVE CURRICULA FOR THE SEVENTH YEAR

CHAPTER V
I. A TENTATIVE CURRICULA FOR THE SEVENTH YEAR

JUNIOR HIGH SCHOOL
MATHEMAATICS
A. General Objectives for Junior High School

Mathematics on the Seventh
Year Level

1. The general objectives for junior high school mathematics on the seventh year level are:
a. To develop speed and accuracy in number combinations;
b. To cultivate powers of generalization, clear thinking, and sound judgment;
c. To give a clear insight into the quantitative and spatial relations of objects about us;
d. To apply mathematical principles to every-day life;
e. To provide a foundation for later work in algebra and geometry.

## B. Units of Instruction for the Seventh Year Junior High School Mathematics

1. Unit I. A Review of the Fundamental Processes
2. Unit II. The Principles of Percentage
3. Unit III. The Application of Mathematics to the Home
4. Unit IV. Mathematics as an Aid to the Farm
5. Unit V. The Application of Mathematics to Industry and Business
6. Unit VI. Intuitive Geometry as a Preparation for Living Together
7. Unit VII. Graphic Representations Applied to Every-Day Life
8. Unit VIII. The Arithmetical Fquation as a Foundation for the

Algebraic Equation

Unit I. A Review of the Four Fundamental Processes

## Superior Group

A. Specific objectives:

1. To develop speed and accuracy
2. To review the fundamental processes
3. To show the value of the fundamentals in practical situations 4. To show the value of the fundamentals in pure mathematics
B. Problems:
4. The fundamental processes applied
to whole numbers

## Average Group

A. Specific objectives:

1. To develop speed and accuracy
2. To review the fundamental processes
3. To show the value of the fundamentals in practical situations 4. To show the value
of the fundamentals in pure mathematios
B. Problems:
4. The fundamental
processes applied
to whole numbers

## Slow Group

A. Specific objectives:

1. To develop speed and acouracy
2. To review the fundamental processes
3. To show the value of the fundamentals in practical situations
B. Problems:
4. The fundamental
processes applied
to whole numbers

## Superior Group

a. Addition and subtraction

## References:

B. 7, pp. 62-64; 127128; 192-199
B. P. S. I, pp. 1-27; 41-44

Br. 7, pp. 3-4
B. A. B. I, pp. 28-31
D. W. 7, pp. 34-37; 42; 47; 50
E. ©. I, pp. 1-13
G. I, pp. 7-21
H. B. K. I, pp. 39-44
H. $I$, pp. 1-5
K. S. R. 7, pp. 388397

## Average Group

a. Addition and subtraction

References:
B. 7, pp. 62-64; 127128; 192-199
B. P. S. I, pp. 1-27; 41-44

Br. 7, pp. 3-4
B. A. B. I, pp. 28-31
D. W. 7, pp. 34-37;

42; 47; 50
E. C. I, pp. 1-13
G. I, pp. 7-21
H. B. K. I, pp. 39-44
H. I, pp. 1-5
K. S. R. 7, pp. 388397

## Slow Group

a. Addition and subtraction

References:
B. 7, pp. 62-64; 127128; 192-199
B. P. S. I, pp. 1-27; 41-44

Br. 7, pp. 3-4
B. A. B. I, pp. 28-31
D. W. 7, pp. 34-37; 42; 47; 50
E. C. I, pp. 1-13
G. I, pp. 7-21
H. B. K. I, pp. 39-44
H. $I, p p$. l-5
K. S. R. 7, pp. 388397

## Superior Group

S. ${ }^{\text {© }}$. 7, pp. 240-241; 243-244
S. I, pp. 31-39
S. U. I, pp. 1-14
T. I, pp. 1-7
W. S. B. I, pp. 33-37

IT. 7, pp. 19-30
b. Multiplication and division

References:
B. 7, pp. 199-206
B. P. S. I, pp. 27-41

Br. 7, pp. 4-5; 40-49
B. A. B. I, pp. 12-25
D. IT. 7, pp. 38-41
E. C. I, pp. 13-22
G. I, pp. 24-34;

44; 50

## Average Group

S. C. 7, pp. 240-241; 343-244
S. I, pp. 31-39
S. U. I, pp. 1-14
T. I, pp. 1-7

ㅍ. S. B. I, pp. 33-37
ㅍ. 7, pp. 19-30
b. Multiplication and division

References:
B. 7, pp. 199-206
B. P. S. I, pp. 27-41

Br. 7, pp. 4-5; 40-49
B. A. B. I, pp. 12-25
D. W. 7, pp. 38-41
E. C. I, pp. 13-22
G. I, pp. 24-34;

44; 50

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S. U. I, pp. 1-14
T. I, pp. 1-7
W. S. B. I, pp. 33-37
W. 7, pp. 19-30
b. Multiplication and division

References:
B. 7. pp. 199-206
B. P. S. I, pp. 27-41

Br. 7, pp. 4-5; 40-49
B. A. B. I, pp. 12-25
D. W. 7, pp. 38-41
E. C. I, pp. 13-22
G. I, pp. 24-34;

44; 50

Superior Group
H. B. K. I, pp. 44-46
H. I, pp. 214-216
K. S. R. 7, pp. 397410
S. ․ . 7, pp. 242-246
S. I, pp. 42-49; 301308
S. U. I, pp. 15-21
T. I, pp. 10; 17-19

IW. S. B. I, pp. 37-38
F. 7, pp. 30-41
2. The fundamental processes applied to fractions
a. Apply one of the following tests

Average Group
H. B. K. I, pp. 44-46

프. I, pp. 214-216
K. S. R. 7, pp. 397410
S. ㄷ. 7, pp. 242-246
S. I, pp. 42-49; 301308
S. U. I, pp. 15-21
T. I, pp. 10; 17-19
I. S. B. I, pp. 37-38
IV. 7, pp. 30-41
2. The fundamental
processes applied to

## fractions

a. Reduction of

References:

## Slow Group

H. B. K. I, pp. 44-46
H. I, pp. 214-216
K. S. R. 7, pp. 397410
S. C. 7, pp. 242-246
S. I, pp. 42-49; 301308
S. U. I, pp. 15-21
T. I, pp. 10; 17-19
W. S. B. I, pp. 37-38
II. 7, pp. 30-41
2. The fundamental
processes applied to
Practions
a. Reduction of

## Superior Group

## Schorling-Clark-

Potter, Arithmetic
Tests, Forms A and
B
The Courtis Arithmetic

## Tests in Different

## Processes

Monroe Diagnostic Tests
in Arithmetic
Compass Diagnostic

## Series

b. Addition and subtraction

## References:

B. 7, p. 207

## Average Group

B. 7, pp. 206-207
B. P. S. I, pp. 68-73
B. A. B. I, pp. 27-30
E. C. I, pp. 24-32
G. I, p. 13

ㅍ. B. K. I, p. 48
H. I, pp. 15-18
K. S. ․ㅡ. 7, pp. 415419
S. C. 7, p. 69
S. U. I, p. 22
T. I, p. 2
W. 7, pp. 44-45
b. Addition and subtraction

References:
B. 7, p. 207

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B. 7, pp. 206-207
B. P. S. I, pp. 68-73
B. A. B. I, pp. 27-30
E. C. I, pp. 24-32
G. I, p. 13

ㅍ. B. K. I, p. 48
H. I, pp. 15-18
K. S. R. 7, pp. 415419
S. ㄷ. 7, p. 69
S. U. I, p. 22
T. I, p. 2
W. 7, pp. 44-45

> b. Addition and subtraction

References:
B. 7, p. 207

## Superior Group

B. P. S. I, pp. 68-78

Br. 7, pp. 5; 33-35
B. A. B. I, pp. 24; 27-33
D. II. 7, pp. 4-5
E. C. I, pp. 24-33
G. I, pp. 13-17; 22-23
H. B. K. I, p. 49
H. I, pp. 15-18; 26-27
K. S. R. 7, pp. 56; 415-423
S. ․ . 7, pp. 246-251
S. I, pp. 33-35; 40-42
S. U. I, pp. 22; 27; 103; 159
B. P. S. I, pp. 68-78

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B. A. B. I, pp. 24;

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D. W. 7, pp. 4-5
E. C. I, pp. 24-33
G. I, pp. 13-17; 22-23
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K. S. R. 7, pp. 56; 415-423
S. C. 7, pp. 246-251
S. I, pp. 33-35;

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S. U. I, pp. 22; 27;

103; 159

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B. P. S. I, pp. 68-78

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B. A. B. I, pp. 24;

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D. W. 7, pp. 4-5
E. C. I, pp. 24-33
G. I, pp. 13-17; 22-23
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H. I, pp. 15-18; 26-27
K. S. R. 7, pp. 56; 415-423
S. C. 7, pp. 247-251
S. I, pp. 33-35;

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S. U. I, pp. 22; 27; 103; 159

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T. I, pp. 4; 8-9
W. S. B. I, pp. 67-68
H. 7, pp. 7; 43-51
c. Multiplication and division

## References:

B. 7, p. 208
B. ㄹ. S. I, pp. 79-85

Br. 7, pp. 6; 39-40; 43-44; 50
B. A. B. I, pp. 24; 36-42
D. W. 7, pp. 54-56
E. C. I, pp. 33-40
G. I, pp. 28-29; 34-37
H. B. K. I, pp. 49-51

## Average Group

T. I, pp. 4; 8-9

파. S. B. I, pp. 67-68
W. 7, pp. 7; 43-51
c. Multiplication and division

References:
B. 7, p. 208
B. ㄹ. S. I , pp. 79-85

Br. 7, pp. 6; 39-40; 43-44; 50
B. A. B. I, pp. 24; 36-42
D. W. 7, pp. 54-56
E. C. I, pp. 33-40
G. I, pp. 28-29; 34-37
H. B. K. I, pp. 49-51

## Slow Group

T. I, pp. 4; 8-9
W. S. B. I, pp. 67-68
W. 7, pp. 43-51
c. Multiplication and division

References:
B. 7, p. 208
B. P. S. I, pp. 79-85

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43-44; 50
B. A. B. I, pp. 24;

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D. W. 7, pp. 54-56
E. C. I, pp. 33-40
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H. " I, pp. 18-25
K. S. ㄹ. 7 , pp. 57; 424-436
S. ㄷ. 7, pp. 251-252
S. $I$, pp. 46; 52; 57-61
S. U. I, pp. 27; 103; 159
T. I, pp. 8-9; 18-21; 26-27
W. S. B. I, p. 69
W. 7, pp. 51-60
3. The fundamental
processes applied to decimals
a. Addition and subtraction

References:

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K. S. R. 7, pp. 57; 424-436
S. C- 7, pp. 251-252
S. I, pp. 46; 52; 57-61
S. U. I, pp. 27; 103; 159
T. I, pp. 8-9; 18-21; 26-27
W. S. B. I, p. 69
W. 7, pp. 51-60
3. The fundamental
processes applied to decimals

> a. Addition and subtraction

## Slow Group

H. I, pp. 18-25
K. S. R. 7, pp. 57; 424-436
S. C. 7, pp. 251-252
S. I, pp. 46; 52; 57-61
S. U. I, pp. 27; 103; 159
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W. S. B. I, p. 69
W. 7, pp. 51-60
3. The fundamental
processes applied to
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a. Addition and subtraction

References:

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B. ㄹ. S. I, pp. 86-88 Br. 7, pp. 28-31
B. A. B. I, pp. 61-63; 71
D. W. 7, pp. 50-51
E. C. I, pp. 163-167
G. I, pp. 17-18; 22
H. B. K. I, pp. 41-43
K. S. R. 7, p. 436
S. C. 7, p. 101
S. I, pp. 36-38
T. I, pp. 6-10

Iㅡ. S. B. I, pp. 31-36
IV. 7, pp. 60-64
b. Multiplication and division

References:

Average Group
B. P. S. I, pp. 86-88

Br. 7, pp. 28-31
B. A. B. I, pp. 61-63; 71
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S. I, pp. 36-38
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W. S. B. I, pp. 31-36
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References:

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B. ㄹ. S. I, pp. 86-88

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E. C. I, pp. 163-167
G. I, pp. 17-18; 22
H. B. K. I, pp. 4I-43
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T. I, pp. 6-10
W. S. B. I, pp. 31-36
W. 7, pp. 60-64
b. Multiplication and division

References:

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B. 7, pp. 211-213
B. P. S. I, pp. 89-94

Br. 7, pp. 40-41; 48-49
B. 스: B. I, pp. 73-76; 81-83; 88-96
D. W. 7, pp. 38; 39; 41;

46; 54; 59; 60
E. C. I, pp. 167-173
G. I, pp. 28-29; 48-50
H. B. K. I, pp. 44-46
H. I, pp. 32-42
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S. C. 7, pp. 101-102
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D. W. 7, pp. 38; 39; 41;

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E. C. I, pp. 167-173
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H. B. K. I, pp. 44-46
H. I, pp. 32-42
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S. I, pp. 42; 50-59
S. U. I, pp. 45; 203
T. I, pp. 10-24
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81-83; 88-96
D. W. 7, pp. 38; 39; 41;

46; 54; 59; 60
E. C. I, pp. 167-173
G. I, pp. 28-29; 48-50
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K. S. R. 7, pp. 437-439
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S. I, pp. 42; 50-59
S. U. I, pp. 45; 203
T. I, pp. 10-24
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## Superior Group

4. The relation of
fractions and decimals

## References:

B. 7, pp. 208-211
B. P. S. I, pp. 95-97

Br. 7, p. 67
B. A. B. I, p. 100
D. W. 7, p. 212
E. ㄷ. I, pp. 173-174
G. I, pp. 41-45

ㅍ. B. K. I, p. 51
H. I, pp. 43-44
K. S. R. 7, pp. 374-375
S. ㄷ. 7, p. 103
S. U. I, p. 45
T. I, pp. 128-129
W. 7, pp. 68-69

## Average Group

4. The relation of
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References:
B. 7, pp. 208-211
B. P. S. I, pp. 95-97

Br. 7, p. 67
B. A. B. I, p. 100
D. W. 7, p. 212
E. C. I, pp. 173-174
G. I, pp. 41-45
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K. S. R. 7, pp. 374-375
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## Slow Group

4. The relation of
fractions and decimals

## References:

B. 7, pp. 208-211
B. P. S. I, pp. 95-97

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5. A reviev of the fundemental processes

## References:

B. 7, p. 213
B. P. S. I, p. 97

Br. 7, pp. 82-85
B. A. B. I, pp. 141-146;

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234; 282-284
D. W. 7, pp. 195-211

ㅌ. C. I, pp. 313-315;
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H. I, pp. 211-218
K. S. ㅌ. 7, pp. 41; 58;

77; 98; 125-127; 159-

## Average Group

5. A review of the fundamental processes

References:
B. 7, p. 213
B. P. S. I, p. 97

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B. A. B. I, pp. 141-146;

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234; 282-284
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77; 98; 125-127; 159-

## Slow Group

5. A review of the fundamental processes

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185; 187; 191-196
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S. I, pp. 294-308
S. U. I, pp. 3; 19; 27; 45; 81; 103; 135; 159;

181; 203; 231; 241
T. I, pp. 1; 25; 90-91; 136

IT. S. B. I, pp. 105-110
W. 7, pp. 210-228
C. Pupil-teacher activities:

1. These pupils require
a minimum amount of time on this unit.

## Average Group

161; 171; 177-178;
185; 187; 191-196
S. C. 7, pp. 238-239
S. I, pp. 294-308
S. U. I, pp. 3; 19; 27;

45; 81; 103; 135; 159;
181; 203; 231; 241
T. I, pp. 1; 25; 90-91; 136
W. S. B. I, pp. 105-110

ㅍ. 7, pp. 210-228
C. Pupil-teacher activities:

1. These pupils require
a little more time than the superior group. The teacher can soon judge the capacity of the class.

## Slow Group

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161; 171; 177-178;`
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185; 187; 191-196
S. C. 7, pp. 238-239
S. I, pp. 294-308
S. U. I, pp. 3; 19; 27;

45; 81; 103; 135; 159;
181; 203; 231; 241
T. I, pp. 1; 25; 90-91;

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W. S. B. I, pp. 105-110
W. 7, pp. 210-228
C. Pupil-teacher activities:

1. These pupils require
a great amount of time and care which should be taken, even at the expense of some other unit, if necessary.

## Superior Group

2. Speed and accuracy
is the major aim of this unit. Superior pupils do not need much drill.
3. Mental analysis of the problems should be emphasized.

## Average Group

2. Drill for speed and accuracy but care should
be taken that this is not overdone.
3. Mental analysis should be given much attention and drill.

## Slow Group

2. Drill should be themajor activity of this group. These pupils should have this opportunity to better master the fundamentals.
3. Accuracy with a limitation on speed should be the standard of this group. Mental analysis of problems should receive much time. Many of these pupils use finger or other methods of adding. The habit is hard to break and constant drill on oral calculations will help
overcome this.

Superior Group
4. Short cuts should be taught to this group as nearly all will use them.
5. Rules can be worked out with this group.

## Average Group

4. Short cuts may be taught to this group, only some will use them. The rest will rely on the longer method.
5. Rules should be explained by the teacher and then memorized for use by the average pupil.
6. The teacher of this group must keep in the background and let the pupils keep in the foreground. Let the pupils manage their class recitation. In most cases, superior pupils will
7. The kind of average class that comes under the teacher's jurisaiction should determine the type of recitation. If the class is a good average group, then the laboratory or group plan

Slow Group
4. Rules should be taught only as mechanical devices.
5. This group should have the benefit of teacher presentation to the class as a whole but the greater part of the work should be individual teaching. Here each pupil's weak points may be strengthened.
Superior Group
work better under the
laboratory method for
they like to rival other
pupils in their group.
7. Charts representing individual scores may. be posted on the bulletin board.
8. The pupil should enlarge his vocabulary

Average Group
may be used. Even if
the class is low aver-
age, the group plan will
give the teacher an opportunity to do remedial work.
7. Charts representing individual scores may be posted on the bulletin board.
8. The pupil should
enlarge his vocabulary
Average Group
may be used. Even if
the class is low aver-
age, the group plan will
give the teacher an op-
portunity to do remedial
work.
7. Charts representing
individual scores may
be posted on the bul-
letin board.

Slow Group
6. This group should
have an incentive to
arouse and keep their
interest. A chart with
certain colored stars
representing degrees of
attainment is a good plan
and will induce each pupil
to work to his maximum
capacity.
7. The pupil should
become acquainted with

## Superior Group

by the acquisition of such mathematical terms
as:
a. Addends
b. Sum
o. Minuend
d. Subtrahend
e. Difference
f. Average
g. Multiplicand
h. Multiplier

1. Factors
j. Product
k. Division
2. Dividend
m. Divisor
n. Quotient

## Average Group

by the acquisition of such mathematical terms
as:
a. Addends
b. Sum
c. Minuend
d. Subtrahend
e. Difference

1. Average
g. Multiplicand
h. Multiplier
i. Factors
j. Product
k. Division
2. Dividend
m. Divisor
n. Quotient

Slow Group
the following mathemat-
ical terms:
a. Addends
b. Sum
c. Minuend
d. Subtrahend
e. Difference
f. Average
g. Multiplicand
h. Multiplier

1. Product
J. Division
k. Dividend
2. Divisor
m. Quotient

## Superior Group

0. Remainder
p. Integer
q. Common Fraction
r. Improper Fraction
s. Mixed Numbers
t. Numerator
u. Denominator
$\nabla$. Denominate Numbers
W. Reciprocal Fractions
$x$. Invert
y. Decimal Fractions
1. This group should vary
their work by the addition
of mathematical recrea-
tions or history of
mathematics.

## Slow Group

n. Remainder
O. Common Fraction
p. Improper Fraction
q. Mixed Numbers
r. Numerator
s. Denominator
t. Denominate Numbers
u. Invert
$\nabla$. Decimal Fractions
D. Desirable outcomes:
D. Desirable outcomes:
D. Desirable outcomes:

## Superior Group

1. A habit of speed and accuracy
2. A working knowledge of effective arithmetical processes usable
in practical situations
3. A high appreciation of the need of the fundamental processes in social life
4. Considerable appreciation of the fundamental processes in pure mathematios

## Average Group

1. A habit of speed and accuracy
2. A knowledge of the application of the fundamental processes in practical situations 3. Considerable appreciation of the need of the fundamental processes in social life 4. Some appreciation of the fundamental proce esses in pure mathematics

## Slow Group

1. A habit of accuracywith a reasonable amount of speed
2. A mastery of the fundamental processes to enable interpretation of practical situations 3. Some appreciation of the need of mathematics in every-day and social life

## Unit II. The Principles of Percentage

## Superior Group

A. Specific objectives:

1. To familiarize the pupil with the percentage processes
2. To develop speed and accuracy in the percentage processes
3. To introduce the equation of the percentage processes as a preliminary concept in algebra
B. Problems:
4. Fundamental background of percentage

Average Group
A. Specific objectives:

1. To familiarize the pupil with the percentage processes
2. To develop speed and accuracy in the percentage processes
3. To introduce the equation of the percentage processes as a preliminary concept in algebra
B. Problems:
4. Fundamental background of percentage

Slow Group
A. Specific objectives:

1. To familiarize the pupil with the percentage processes
2. To develop speed and accuracy in the percentage processes
3. To introduce the equation as a percentage. process
B. Problems:
of percentage

## Superior Group

a. Decimal and fractional equivalents
b. The three prin-
ciples of percentage
(I). B. X R. $=$ P.
(II). P.
(III). P. $\div$ R. © B.

## References:

```
B. P. S. I, pp. 140-146;
    152; 169
    Br. 7, pp. 67-75; 164-166
```


## Average Group.

a. Decimal and fractional equivalents
b. The three principles of percentage
(I). B. X R. $\quad$ P.
(II). P. $\because \mathrm{B}$. $=$ R.
(III). P. $\div$ R. = B.

## Slow Group

a. Decimal and fractional equivalents
b. The three principles of percentage (I). Find a given per cent of a given number
(II). Find what per cent one number is of another number (III). Find the number when a given per cent of it is known

References:
B. P. S. I, pp. 128-140;

140-146; 152; 169
Br. 7, pp. 67-75; 164-166
B. P. S. I, pp. 128-140;

140-146; 152; 169
Br. 7, pp. 67-75; 164-166

## Superior Group

B. A. B. I, pp. 102-105; 107-112; 113-115; 120123; 128-130; 137-140
D. W. 7, pp. 78-88
E. C. I, pp. 183-189; 189-207
G. I, pp. 73-79

ㅍ. B. K. I, pp. 55-68
H. I, pp. 48-69; 80-96
K. S. ㄹ. 7, pp. 39; 451;

34-47; 51-54
S. C. 7, pp. 18-24
S. I, pp. 61-63; 209; 212; 225-227; 230
S. U. I, pp. 61-83
T. I, pp. 28-39
W. S. B. I, pp. 6-23; 121
W. 7, pp. 103-108

## Average Group

B. A. B. I, pp. 102-105; 107-112; 113-115; 120123; 128-130; 137-140
D. W. 7, pp. 78-88
E. ́. I, pp. 183-189; 189-207
G. I, pp. 73-79
H. B. K. I, pp. 55-68
H. I, pp. 48-69; 80-96
K. S. R. 7, pp. 39; 451; 34-47; 51-54
S. ㄷ. 7, pp. 18-24
S. I, pp. 61-63; 209; 212; 225-227; 230
S. U. I, pp. 61-83
T. I, pp. 28-39
W. S. B. I, pp. 6-23; 121
W. 7, pp. 103-108

## Slow Group

B. A. B. I, pp. 102-105; 107-112; 113-115; 120123; 128-130; 137-140
D. W. 7, pp. 78-88
E. C. I, pp. 183-189; 189-207
G. I, pp. 73-79
H. B. K. I, pp. 55-68
H. I, pp. 48-69; 80-96
K. S. R. 7, pp. 39; 451; 34-47; 51-54
S. ㄷ. 7, pp. 18-24
S. I, pp. 61-63; 209; 212; 225-227; 230
S. U. I, pp. 61-83
T. I, pp. 28-39
W. S. B. I, pp. 6-23; 121
W. 7, pp. 103-108

|  |  |  |
| :---: | :---: | :---: |
|  |  |  |
| 1. This group needs to | 1. This group should make | 1. Teach common percentage |
| spend very little time | a percentage table with | equivalents in fractions |
| on Practions and | decimal and Praction | and decimals. Drill a |
| equivalents. | equivalents, and drill | little on this but require |
|  | on it as these people | them to be memorized. Let |
|  | will have a greater | the pupil keep the table ${ }^{\text {d }}$ |
|  | need for this unit than | for future reference. The |
|  | the other two groups. | main objective is the use |
|  |  | of it. |
| 2. Teach the principles | 2. Teach the prinoiples | 2. The principles of per- |
| of percentage as alge- | of percentage as alge- | centage should be taught. |
| braic equations. Use the | braic equations. Some | as: |
| substitution method. | of this group will not | a. Base $X$ rate equals $P$. |
|  | be able to understand | $2 \mathrm{X} 3-6$ |
|  | the formulae. Do not | ? $\mathrm{X} 3=6$ |
|  |  |  |

Superior Group
D. Desirable outcomes:

1. A habit of accuracy
in the percentage
processes
2. A knowledge of the
fundemental percentage processes
3. A knowledge of the simple forms of the equation in percentage
4. Appreciation of percentage processes to

## Slow Group

 understand it other than using the same method suggested for the third group.D. Desirable outcomes: 1. A habit of accuracy in the percentage processes
2. A knowledge of the fundamental percentage processes
3. A knowledge of the simple forms of the equation in percentage
D. Desirable outcomes:

1. A habit of accuracy
in the percentage processes
2. A knowledge of the fundamental percentage processes
pure mathematics

Superior Group
5. An appreciation of the importance of percentage to the interests of people in general

Average Group
4. An appreciation of the importance of percentage to the interests of people in general

## Slow Group

3. An appreciation of the importance of percentage to the interests of people in general

## Superior Group

A. Specific objectives:

1. To show the relation of mathematics to the home
2. To show the value of owning a home under certain conditions
3. To make and keep within a budget
4. To be able to estimate bills for public utilities
5. To learn the value of health as an economic factor in the

## Average Group

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1. To show the relation of mathematics to the home
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2. To show the value of owning a home under certain conditions
3. To make and keep within a budget
4. To be able to estimate bills for public utilities
5. To learn the value of health as an economic factor in the

Superior Group
home
6. To teach the value of economy and thrift 7. To show the quantitative relation of the home to the community
B. Problems:

1. Owning or renting
a home---transient and permanent location--a occupations
a. The cost of
building and repair-
ing a home
b. Insurance and
taxation
c. The cost of
renting a home

## Average Group

home
6. To teach the value of economy and thrift 7. To show the quantitative relation of the home to the community
B. Problems:

1. Owning or renting
a home---transient and permanent location-aoccupations
a. The cost of
building and repair-
ing a home
b. Insurance and taxation
c. The cost of
renting a home

## Slow Group

home
6. To teach the value of economy and thrift 7. To show the quantitative relation of the home to the community
B. Problems:

1. Owning or renting
a home-a-transient and permanent location-eoccupations
a. The cost of
building and repair-
ing a home
b. Insurance and taxation
c. The cost of
renting a home

## Superior Group

## References:

Br: 7, pp. 77-79;
168-170
B. A. B. I, pp. 293-296
D. W. 7, pp. 98-102;

116-125; 166
E. C. I, pp. 292-295
G. I, pp. 132-136
S. C. 7, pp. 54; 85
T. I, pp. 40-45
W. S. B. I, pp. 203-205

Pamphlets from Local
Real Estate and
Insurance Offices
2. Making and keeping
a budget
a. Nature and use of
a cash account

Average Group
References:
Br. 7, pp. 77-79;
168-170
B. A. B. I, pp. 293-296
D. W. 7, pp. 98-102;

116-125; 166
E. C. I, pp. 292-295
G. I, pp. 132-136
S. C. 7, pp. 54; 85
T. I, pp. 40-45
W. S. B. I, pp. 203-205

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B. A. B. I, pp. 293-296
D. W. 7, pp. 98-102; 116-125; 166
E. C. I, pp. 292-295
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S. C. 7, pp. 54; 85.
T. I, pp. 40-45
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Pamphlets from Local Real Estate and Insurance Offices
2. Making and keeping
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## Superior Group

b. Budgets, as a means of living within an income
(I). The personal budget
(II). The household budget

References:
B. 7, pp. 60-62
B. P. S. I, pp. 98-100; 147-149

Br. 7, pp. 74-75; 143144
B. A. B. I, pp. 288-292; 315-316
D. W. 7, pp. 66-67
E. C. I, pp. 12-13; 287-292

## Average Group

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B. P. S. I, pp. 98-100; 147-149

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B. A. B. I, pp. 288-292; 315-316
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E. C. I, pp. 12-13;

287-292

## Slon Group

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Br. 7, pp. 74-75; 143144
B. A. B. I, pp. 288-292; 315-316
D. W. 7, pp. 66-67
E. C. I, pp. 12-13;

287-292

Superior Group
G- I, pp. 79-82; 139; 148
H. B. K. I, pp. 22-26
3. The cost of public utilities in the home a. Reading and estimating bills of:
(I). Electric
meters
(II). Gas meters
(III). Water meters

References:
B. 7, pp. 73-76
B. P. S. I, pp. 104-108

Br. 7, pp. 125-129; 131
B. A. B. I, pp. 301-314
E. C. I, pp. 296-300

## Average Group

G. I, pp. 79-82; 139; 148
H. B. K. I, pp. 22-26
3. The cost of public utilities in the home
a. Reading and estimating bills of:
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(II). Gas meters
(III). Water meters

References:
B. 7, pp. 73-76
B. P. S. I, pp. 104-108

Br. 7, pp. 125-219; 131
B. A. B. I, pp. 301-314
E. C. I, pp. 296-300

Slow Group
G. I, pp. 79-82; 139; 148
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B. 7, pp. 73-76
B. P. S. I, pp. 104-108

Br. 7, pp. 125-129; 131
B. A. B. I, pp. 301-314
E. C. I, pp. 296-300

## Superior Group

H. B. ㅈ․ I, pp. 33-35
K. S. R. 7, pp. 61-68
S. I, pp. 201-204
4. How to make a home garden pay

References:
E. C. I, pp. 44-46; 295
G. I, p. 209
H. B. K. I, pp. 35-36
K. S. R. 7, pp. 119-122
S. ㄷ. 7, pp. 88-89;

198-199; 211-218; 226
5. Purchasing for the home
a. Marketing
b. Ordering
through mail

Average Group
H. B. K. I, pp. 33-35
K. S. R. 7,'pp. 61-68
S. I, pp. 201-204
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References:
E. C. I, pp. 44-46; 295
G. I, p. 209
H. B. K. I, pp. 35-36
K. S. R. 7, pp. 119-122
S. C. 7, pp. 88-89; 198-199; 211-216; 226
5. Purchasing for the home
a. Marketing
b. Ordering
through mail

## Slow Group

H. B. K. I, pp. 33-35.
K. S. R. 7, pp. 61-68
S. I, pp. 201-204
4. How to make a home
garden pay
References:
E. C. I, pp. 44-46; 295
G. I, p. 209
H. B. K. I, pp. 35-36
K. S. R. 7, pp. 119-122
S. C. 7, pp. 88-89; 198-199; 211-218; 226
5. Purchasing for the home
a. Marketing
b. Ordering
through mail

Superior Group
c. Furnishing the home
a. Installment buying References:
B. 7, pp. 162-163
B. A. B. I, pp. 296-304
E. C. I, pp. 43-44; 300302
H. B. K. I, pp. 15-22
S. C. 7, pp. 58-60; 200-202
S. U. I, pp. 21; 24; 64; 85; 86; 88; 241
T. I, pp. 47; 55; 80
W. 7, pp. 73-74
6. Health in the home a. In foods

## Average Group

c. Furnishing the home
d. Installment buying

References:
B. 7, pp. 162-163
B. A. B. I, pp. 296-304
E. C. I, pp. 43-44; 300302
H. B. K. I, pp. 15-22
S. C. 7, pp. 58-60; 200-202
S. U. I, pp. 21; 24; 64; 85; 86; 88; 241
T. I, pp. 47; 55; 80
W. 7, pp. 73~74
6. Health in the home
a. In foods

## Slow Group

o. Furnishing the home
d. Installment buying

References:
B. 7, pp. 162-163
B. A. B. I, pp. 296-304
E. C. I, pp. 43-44; 300302
H. B. K. I, pp. 15-22
S. C. 7, pp. 58-60; 200-202
S. U. I, pp. 21; 24; 64; 85; 86; 88; 241
T. I, pp. 47; 55; 80
W. 7, pp. 73-74
6. Health in the home a. In foods

```
Superior Group
    (I). Food values
    measured in terms
    of heat and
    energy
    (II). Choice of
    foods to supply
    these values
(III). Cooking for
    the home
b. The relation of
temperature to
health
c. Disease prevention
d. Correct weight and
health
e. Acoident preven-
tion in and out the
home
```


## Superior Group

(I). Food values
measured in terms
of heat and energy
(II). Choice of
foods to supply
these values
(III). Cooking for
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d. Correct weight and
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Average Group
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d. Correct weight and health
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tion in and out the
home

Superior Group

## References:

B. ́. B. I, pp. 134-137; 314
D. W. 7, pp. 104-110
E. C. I, pp. 41-43
H. B. K. I, pp. 26-32
7. Amusements and recreation
a. The automobile
b. The radio
c. Other means of recreation

References:
S. C. 7, p. 25
S. U. I, pp. 31; 75;

90; 134
8. The home as a part
of the community

## Average Group

## References:

B. A. B. I, pp. 134-137; 314
D. W. 7, pp. 104-110
E. C. I, pp. 41-43

ㅍ. ㅌ. K. I, pp. 26-32
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S. ㄷ. 7, p. 25
S. U. I, pp. 3l; 75;

90; 134
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Slow Group

## References:

B. A. B. I, pp. 134-137; 314
D. W. 7, pp. 104-110
E. C. I, pp. 4l-43
H. B. K. I, pp. 26-32
7. Amusements and
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a. The automobile
b. The radio
c. Other means of recreation

References:

7
S. C. 7, p. 25
S. U. I, pp. 31; 75; 90; 134
8. The home as a part
of the community

## Superior Group

a. Its privileges as
a part of the
community
(I). Education
(II). Good roads
(III). Government
(IV). Amusements
(V). Protection
b. How these are
maintained

## References:

D. W. 7, pp. 116-125
G. I, pp. 132-136
S. C. 7, pp. 54; 85

## Average Group

a. Its privileges as
a part of the
community
(I). Education
(II) . Good roads
(III) . Government
(IV). Amusements
(V). Protection
b. How these are
maintained
References:
D. W. 7, pp. 116-125
G. I, pp. 132-136
S. ́. 7, pp. 54; 85
C. Pupil-teacher activities:

1. This unit, if pre-
sented in the right way,
can be the most valuable

## Slow Group

a. Its privileges 0.8
a part of the
community
(I). Education
(II). Good roads
(III). Government
(IV). Amusements
( $V$ ). Protection
b. How these are
maintained
References:
D. W. 7, pp. 116-125
G. I, pp. 132-136
S. ㄷ. 7, pp. 54; 85
C. Pupil-teacher activities:

1. This unit is one of
the most interesting and valuable units of this
C. Pupil-teacher activities:
2. This unit can be the most valuable and interesting of the whole

Superior Group
course. Care must be must be taken that too much time is not spent on this at the expense of others.
2. Most of the problems of this unit should be brought in by the pupils from actual life situations.
3. There is no one book covering the entire unit, hence the

## Average Group

and interesting units of the course. Guard against spending too much time on this unit alone.
2. Most of the problems of this unit should be brought in by the pupils from actual life situations.
3. Since there is no one book that covers the work of the entire unit,

## Slow Group

course. This is one unit which is very important to all levels but particularly this level.
2. Some of the pupils of this level will be able to bring materials for this unit, however most of the work will have to be brought in by the teacher and adjusted to the level of this group.
3. Since there is no one book that covers the work of the entire unit,

Superior Group
teacher should make
use of a mimeograph in compiling materials and reports.
4. Have committees of pupils visit different real estate offices and have them bring in reports on the various ways of buying, building, and renting homes after careful plans have been made in class.
5. Let pupils plan and hold an exhibit of all

Average Group
the teacher should
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4. Have committees of the pupils visit different real estate offices and have them bring in reports on the various ways of buying, building, and renting homes after plans have been made by the class and the teacher.
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## Slow Group

the teacher should
make use of a mimeograph in compiling materials and reports. 4. Take groups of the pupils to visit different real estate offices and have discussions the following day on the different ways of buying, building, and renting homes.
5. Let pupils plan with the : teacher and hold an exhibit

Superior Group materials pertaining to buying, building, and maintaining a home.
6. Living within one's income is one of the problems of adult life. The solution of this problem is budgeting. Personal budgets of time will be of value to the junior high school pupil as well as budgets of money. Let the pupil keep a cash account of his spending for a week and from this develop

Average Group materials pertaining to buying, building, and maintaining a home.
6. Living within one's income is one of the problems of adult life. The solution of this problem is budgeting. Personal budgets of time will be of value to the junior high school pupil as well as budgets of money. Let the pupil keep
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Slow Group of all materials pertaining to buying, building, and maintaining a home. 6. Living within one's income is one of the problems of adult life. The solution of this problem is budgeting.. Personal budgets of time will be of value to the junior high school pupil as well as budgets of money. Let the pupil keep
a cash account of his spending for a week and from this develop

## Superior Group

personal budgets.
This may then develop
a plan for household budgeting.
7. From local news-
papers, magazines, and the like, pupils may prepare posters pertaining to furnishing the home. Plan this on the economy basis. 8. Have bills for public utilities brought in and estimated. Readings from school meters may be obtained and bills estimated.

## Average Group

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7. From local newspapers, magazines, and the like, pupils may prepare posters pertaining to furnishing the home. Plan this on the economy basis. 8. Have bills for public. utilities brought in and estimated. Readings
from school meters may be obtained and bills estimated.

## Superior Group

9：The family garden
as a means of economiz－ ing on food cost and as a worthy using of lei－ sure time，should be taught．

10．Cooking and selecting foods for health as well as economy should be em－ phasized．Most schools have cafeterias，hence the pupil should not only be taught to purchase a lunch economically but intelligently for food values．

11．Better homes mean better communities．The

## Average Group

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## Superior Group

## home has a financial

obligation to the community. Here is an opportunity to teach cooperative responsibility in meeting this obligation as:
a. Paying taxes and values derived from them is the financial responsibility of the home to the community.
b. Providing worthy recreation for the community helps to make better citizens.

## Average Group

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Slow Group
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a. Paying taxes and values derived from them is the financial responsibility of the home to the community.
b. Providing worthy recreation for the community helps to make better citizens.

Superior Group

## 12. The key-note of

 this unit should be thrift and economy. The teacher can present in a financial way the benefits and privileges of thrifty homes and communities, better citizenship, and a feeling of cooperative responsibility.D. Desirable outcomes;

1. An understanding of the financial responsibility in owning or renting a home

## Average Group

12. The key-note of this unit should be thrift and economy. The teacher can present in a financial way the benefits and privileges of thrifty homes and communities, better citizenship, and a feeling of cooperative responsibility.
D. Desirable outcomes:
13. An understanding of the finencial responsibility in owning or renting a home

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of the financial responsibility in owning or renting a home

## Superior Group

2. An understanding
of the responsibilities
of the home to the community
3. An ability to read public utility meters and estimate bills 4. A habit of thrift and wise expenditures 5. A habit of participating in the mathematical affairs of
the home
4. An appreciation of the relation of food and temperature to health

## Average Group

2. An understanding
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## Superior Group

7. An appreciation of how mathematics serves the home
8. An appreciation of the advantages of better managed homes

## Average Group

7. An appreciation of how mathematics serves the home
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Unit IV. Mathematios as an Aid to the Farm

Superior Group
A. Specific objectives:

1. To show the interdependence of rural and oity communities 2. To develop an appreciation for the farm and its problems
2. To show the value of conservation
3. To prove the value of education for the farmer
B. Problems:
4. Farm accounts and records

## Average Group

A. Specific objectives:

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B. Problems:
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A. Specific objectives:

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## Superior Group

References:
ㅍ. S. B. I, pp. 55-59
2. Farm problems in general

References:
B. 7, pp. 161-162
B. A. B. I, p. 106
H. B. K. I, p. 121
3. Poultry as a part
of the farmer's
income
References:
ㅍ. B. K. I, p. 115
S. C. 7, pp. 56-58
4. The dairy as an
investment
References:
B. P. S. I, pp. 149-151

## Average Group

References:
W. S. B. I, pp. 55-59
2. Farm problems in
general
References:
B. 7, pp. 161-162
B. A. B. I, p. 106
H. B. K. I, p. 121
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of the farmer's
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S. C. 7, pp. 56-58
4. The dairy as an investment

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References:
W. S. B. I, pp. 55-59
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S. C. 7, pp. 56-58
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B. P. S. I, pp. 149-151

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B. A. B. I, pp. 112-113
H. B. K. I, pp. 116-118
I. I, pp. 131-133
W. S. B. I, pp. 59-61
5. The garden as a source of profit

## References:

B. A. B. I, pp. 321-324
E. C. I, pp. 44-46
6. Grain profits

## References:

H. B. K. I, p. 120
S. C. 7, p. 197
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W. S. B. I, p. 61
7. The conservation of soils and wood tracts

## Average Group

B. A. B. I, pp. 112-113
H. B. K. I, pp. 116-118
T. I, pp. 131-133
W. S. B. I, pp. 59-61
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B. A. B. I, pp. 112-113
H. B. K. I, pp. 116-118
T. I, pp. 131-133

파. S. B. I, pp. 59-61
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B. A. B. I, pp. 32l-324
E. C. I, pp. 44-46
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References:
H. B. K. I, p. 120
S. $\mathrm{c} .7, \mathrm{p} .197$
T. I, p. 133
W. S. B. I, p. 61
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Superior Group

## References:

B. A. B. I, pp. 277-281
H. B. K. I, pp. 118-119
IV. S. B. I, p. 63
8. Good roads as an
asset to the farmer
References:
H. S. B. I, p. 64
C. Pupil-teacher activities:

1. Material found on page 117 of H. B. K. $I$, and page 55 of
W. S. B. I, serve as good examples of the value of an education
to the farmer.
2. Appreciation and respect for the farmer

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Superior Group should be taught. 3. How the city depends upon the farm and the farm upon the city should make a good topic for discussion. 4. Conservation might be discussed from several angles, such as:
a. Waste by forest

## fires

b. City destruction
of foods
c. Destruction of wild animals and plants
d. Artificial fertilization of soils

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#### Abstract

Slow Group should be taught. 3. How the city depends upon the farm and the farm upon the city should make a good topic for discussion. 4. Conservation might be discussed from several angles, such as:


a. Waste by forest fires
b. City destruction of foods
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## Superior Group

5. Farming as an occupation showing its advantages should be a point of major importance in presenting this unit.
D. Desirable outcomes:
6. A practice of conservation
7. A habit of using mathematics in farm problems
8. A knowledge of the importance of conservation to the farm 4. A knowledge of the sources of income on

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Superior Group

## the farm

5. An appreciation of
the interdependence of the farm life and urban life
6. An appreciation of economical and mathematical interdependence of rural and city life 7. An appreciation of education for success ful living on the farm

Average Group
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A. Specific objectives:

1. To familiarize
the pupil with certain
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2. To become acquainted
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3. To know and appreci-
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## Superior Group

## B. Problems:

1. Shop problems References:
B. 7, p. 159
W. S. B. I, pp. 72-76
2. Discounts

References:

> B. 7, pp. 76-78; $166-168$
B. A. B. I, pp. 132;

353-355
D. W. 7, pp. 93-96
E. ́. I, pp. 215-222; 231-235
G. I, pp. 90-96
H. B. K. I, pp. 72-76
H. I, pp. 71-74

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G. I, pp. 90-96
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3. Banking forms, organization, and practices
a. Purpose of banks

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B. 7, pp. 149; 151157
B. A. B. I, p. 336
E. C. I, pp. 267-270
G. I, p. 65
H. B. K. I, pp. 89-92
K. S. R. 7, pp. 79-80
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S. I, pp. 252-253
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B. 7, pp. 151-157
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E. C. I, p. 269
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H. B. K. I, pp. 88-93
H. I, pp. 108-109
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money and serve the
community by giving
interest on deposits
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References:
B. 7, p. 80
B. A. B. I, pp. 115-120
E. C. I, pp. 247-265; 284-287
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e. How banks pay for the use of money by charging higher rates of interest on loans

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B. 7, pp. 80-82
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B. P. S. I, pp. 100-104; 115-116
B. A. B. I , pp. 351-353
D. 프. 7, pp. 62-72
E. C. I, pp. 278-284
G. I, pp. 51-65
H. B. K. I, pp. 183-189
K. S. R. 7, pp. 110-113

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W. 7, pp. 140-146
S. I, pp. 238-242
S. U. I, pp. 85-93
T. I, pp. 51-55
W. S. B. I, pp. 44-48
d. Business forms

References:
B. P. S. I, pp. 100-104; 115-116
B. A. B. I, pp. 351-353
D. W. 7, pp. 62-72
E. C. I, pp. 278-284
G. I, pp. 51-65
H. B. K. I, pp. 183-189
K. S. R. 7, pp. 110-113

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S. U. I, pp. 83-85
T. I, pp. 62-68
W. 7, pp. 140-146
S. I, pp. 238-242
S. U. I, pp. 85-93
T. I, pp. 51-55
W. S. B. I, pp. 44-48
d. Business forms

References:
B. P. S. I, pp. 100-104; 115-116
B. A. B. I, pp. 351-353
D. W. 7, pp. 62-72
E. C. I, pp. 278-284
G. I, pp. 51-65
H. B. K. I, pp. 183-189
K. S. R. 7, pp. 110-113

## Superior Group

S. ․ . 7, pp. 220-223
S. I, pp. 267-272; 275-278
S. U. I, pp. 93-96
T. I, pp. 45-47
W. S. B. I, pp. 42-44; 48-53
e. Pay rolls

References:
B. P. S. I, pp. 112-115

Br. 7, pp. 144-149.
B. A. B. I, p. 125
D. W. 7, pp. 72; 223
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S. C. 7, p. 90
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6. General review

## Average Group

S. ©. 7, pp. 220-223
S. I, pp. 267-272; 275-278
S. U. I, pp. 93-96
T. $I$, pp. 45-47
W. S. B. I, pp. 42-44; 48-53
e. Pay rolls

References:
B. P. S. I, pp. 112-115

Br. 7, pp. 144-149
B. A. B. I, p. 125
D. 프. 7, pp. 72; 223
H. B. K. I, p. 96
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6. General review

## Slow Group

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I. I, pp. 45-47
W. S. B. I, pp. 42-44; 48-53
e. Pay rolls

References:
B. P. S. I, pp. 112-115

Br. 7, pp. 144-149
B. A. B. I, p. 125
D. W. 7, pp. 72; 223
H. B. K. I, p. 96
S. C. 7, p. 90
W. S. B. I, pp. 70-72
6. General review

References:
B. 7, pp. 159-161; 171-173
B. A. B. I, pp. 123-125; 131; 138-140; 142-146; 350; 355
D. W. 7, pp. 74-78; 97
E. C. I, pp. 207-214; 238-240; 244-246; 275-277
G. I, pp. 88-90; 196215
H. B. K. I, pp. 77-82; 113-115; 198-200
H. I, pp. 77-80; 96100; 201-211; 218-220
K. S. R. 7, pp. 115-119; 128-130; 320-323;

References:
B. 7, pp. 159-161; 171-173
B. A. B. I, pp. 123-125; 131; 138-140; 142-146; 350; 355
D. W. 7, pp. 74-78; 97
E. C. I, pp. 207-214; 238-240; 244-246; 275-277
G. I, pp. 88-90; 196215
H. B. K. I, pp. 77-82; 113-115; 198-200
H. I, pp. 77-80; 96100; 201-211; 218-220
K. S. R. 7, pp. 115-119; 128-130; 320-323;

References:
B. 7, pp. 159-161; 171-173
B. A. B. I, pp. 123-125; 131; 138-140; 142-146; 350; 355
D. W. 7, pp. 74-78; 97
E. C. I, pp. 207-214; 248-240; 244-246; 275-277
G. I, pp. 88-90; 196215
H. B. K. I, pp. 77-82; 113-115; 198-200
H. I, pp. 77-80; 96100; 201-211; 218-220
K. S. R. 7, pp. 115-119; 128-130; 320-323;

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S. C. 7, pp. 28-36;

142-144; 145-148;
234-238
S. I, pp. 232; 237; 260-266
S. U. I, pp. 105-113;

158; 160; 249
T. $I, p p .87-92 ; 173 ;$ 175-184
W. S. B. I, pp. 65-67
W. 7, pp. 146-154;

166-176
C. Pupil-teacher activities:

1. The shop problems may be supplemented with problems from

## Average Group

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S. C. 7, pp. 28-36;

142-144; 145-148;
234-238
S. I, pp. 232; 237;

260-266
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158; 160; 249
T. I, pp. 87-92; 173;

175-184
W. S. ㄹ. I, pp. 65-67
W. 7, pp. 146-154;

166-176
C. Pupil-teacher activities:

1. The shop problems may be supplemented by problems from the school

Slow Group
451~462
S. C. 7, pp. 28-36; 142-144; 145-148; 234-238
S. I, pp. 232; 237; 260-266
S. U. I, pp. 105-113; 158; 160; 249
T. I, pp. 87-92; 173; 175-184
W. S. B. I, pp. 65-67
W. 7, pp. 146-154;

166-176
C. Pupil-teacher activities:

1. Teach fractional parts in connection

## Superior Group

the school shops, and,
if possible, get prob-
lems from commercial
shops. If possible, take these pupils to visit a big plant. 2. The value of banks, as a means of saving money and making it yield money, should be brought out clearly.
3. Let these people work out a problem estimating the amount due them at the end of the junior high school

Average Group
shop.
2. The value of banks, as a means of saving money and making it yield money, should be brought out clearly.
3. Work out with these pupils the amount due them at the end of their junior high school year if each had deposited

## Slow Group

```
Common fractions are
very much needed in
this work.
```

2. The value of banks, as a means of saving money and making it yield money, should be brought out clearly.
3. Show these people the amount they would have at the end of their junior high school if each had deposited some

Superior Group
year if each had deposited some specified amount weekly.

## 4. Make arrangements

 to Visit banks. This can be arranged during regular banking hours. 5. Teach and emphasize
## Average Group

some specified amount weekly. Bring out that deposits must be in for six months before any interest is given.

## 4. Make arrangements

to visit banks. This can be arranged during regular banking hours.
5. Teach and emphasize

## Slow Group

specified amount per week. Explain that money must be in before January and July to draw interest.
4. Do not attempt to have these people solve compound interest. There may be some who will be able to do so, then individual teaching should be done.
5. Make arrangements to visit banks. This
can be arranged during regular banking hours.

Superior Group
the use of interest tables.
6. Teach compound
interest by the hundred per cent method.

## Average Group

```
the use of interest
```

the use of interest
tables.
tables.
the use of interest
the use of interest
tables.

```
tables.
```

tables.
Slow Group
the use of interest
7. Have additional work
in building loans and
their methods. Bring
out the advantages of placing savings in them.

Contrast them with
savings in banks as
to both safety and
interest rate.
6. Teach compound
interest by the hundred
per cent method to those
who can grasp it. To
the others, the longer
method is more
satisfactory.

```
```

6. Teach compound
```
6. Teach compound
interest by the hundred
interest by the hundred
per cent method to those
per cent method to those
who can grasp it. To
who can grasp it. To
the others, the longer
the others, the longer
method is more
method is more
satisfactory.
```

satisfactory.

```

Superior Group

\section*{Average Group}

\section*{Slow Group}
7. The pupil should
become acquainted with
the following terms:
a. Amount
b. Annuel
c. Bank Discount
d. Balance
e. Currency
f. Check
g. Commercial Banks
h. Cancelled Checks
i. Cashed
J. Cashier
k. Calendar Month
1. Date of Maturity
m. Demand Note
n. Deposit
7. The following terms should be brought out:
a. Amount
b. Annual
c. Bank Discount
d. Balance
e. Currency
f. Check
g. Commercial Banks
h. Cancelled Checks
1. Cashed
j. Cashier
k. Calendar Month
1. Date of Maturity
m. Demand Note
n. Deposit

\section*{Superior Group}
0. Depositor
p. Deposit Slip
q. Draft
r. Express Money Order
s. Interest
t. Interest Book
u. Interest slip
v. Interest Rate
w. Interest Term
\(x\). Indorsement
y. Loan
2. Maker of a Note
\(a^{\prime}\). Monthly Statement
'b'. Overdrawn
c'. Outstanding Checks
\(d^{\prime}\). Principal
\(e^{\prime}\). Pass Book

Average Group
o. Depositor
p. Deposit Slip
q. Draft
r. Express Money Order
s. Interest
t. Interest Book
u. Interest Slip
v. Interest Rate
w. Interest Term
x. Indorsement
y. Loan
z. Maker of a Note
\(a^{\prime}\). Monthly Statement
b'. Overdrawn
c'. Outstanding Checks
\(d^{\prime}\). Principal
e'. Pass Book

\section*{Slow Group}
O. Depositor
p. Deposit Slip
q. Draft
r. Express Money Order
s. Interest
t. Interest Book
u. Interest slip
\(\nabla\). Interest Rate
w. Interest Term
\(x\). Indorsement
y. Loan
z. Maker of a Note
a'. Monthly Statement
b'. Overdrawn
\(c^{\prime}\). Outstanding Checks
\(d^{\prime} \cdot P\) Principal
e'. Pass Book

Superior Group
```

f'. Payee
g'. Per Annum
h'. Postal Money Order
1'. President
j'. Proceeds
k'. Promissory
1'. Rate
m'. Savings Bank
n'. Savings Account
0'. Security
p'. Secretary
q'.Semi-Annual
r'. Signature
s'.Stub
t'. Time Note
u'. Telegraph Money Order
\nabla'. Teller

```

\section*{Average Group -}
f'. Payee
g'. Per Annum
h'. Postal Money Order
i'. President
j'. Proceeds
k'. Promissory
1'. Rate
m'. Savings Bank
n'. Savings Account
0'. Security
p'. Secretary
q'. Semi-Annual
r'. Signature
\(s^{\prime}\). Stub
t'. Time Note
u'. Telegraph Money Order
v'. Teller

Slow Group
f'. Payee
g'. Per annum
h'. Postal Money Order
1'. President
j'. Proceeds
k'. Promissory
1'. Rate
m'. Savings Bank
n'. Savings Account
\(0^{\prime} \cdot\) Security
p'. Secretary
q'. Semi-Annual
r'. Signature
\(s^{\prime}\). Stub
t'. Time Note
u'. Telegraph Money Order
v'. Teller

Superior Group
```

W'. Usual Rates
x'. Legal Rates
y'. Value Received
z'. Withdrawn

```
9. This should mark the end of the first semester, however, in most cases this unit will be completed before the end of the semester. In
that case let this group take Number Puzzles, Fun with Figures, and the like.

References:
"Games", ㅌ. \(\mathbf{C} . \mathrm{I}, \mathrm{pp}\).
14; 16; 21; 30; 41;
72

\section*{Average Group}
\[
\begin{aligned}
& w^{\prime} \cdot \text { Usual Rates } \\
& x^{\prime} \cdot \text { Legal Rates } \\
& y^{\prime} \cdot \text { Value Received } \\
& z^{\prime} \cdot \text { Withdrawn }
\end{aligned}
\]
8. This should end the first semester, however, in most cases a little more time is needed. In that case finish the unit, because it is one of the general knowledge units and should, by all means, be emphasized.

\section*{Slow Group}
```

w'. Usual Rates
x'. Legal Rates
y'. Value Received
z'. Withdrawn

```
8. This will not end the first semester's
work. In some classes the semester will end when the third unit is completed. The fourth unit should then begin the second semester's work.
```

        Superior Group
        Average Group
        Slow Group
    ```
9. The following business terms should be discussed:
9. The following
business terms should be explained:
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"Voting," B. E. B. I,

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"Voting," B. E. B. I,
    p. }3
    p. }3
"Missing Facts," D. W.
"Missing Facts," D. W.
    7, pp. 110-111
    7, pp. 110-111
"Fun with Figures,"
"Fun with Figures,"
    H. B. K. I, pp. 38;
    H. B. K. I, pp. 38;
    5 4
    5 4
"Games with Numbers,"
"Games with Numbers,"
        S. I, pp. 70-72
        S. I, pp. 70-72
    "Just for Fun," S. - C.
    "Just for Fun," S. - C.
        7, pp. 138-139;
        7, pp. 138-139;
        203
        203
10. The following
10. The following
business terms should
business terms should
become a part of the
become a part of the
pupil's general
```

pupil's general

```

Superior Group
a. Bill
b. Buyer
c. Capital
d. Capitalist
e. Catalogue
f. Credit
g. Clerk
h. Commission
i. Consignor
j. Contract
k. Collector
1. Costs
m. Debit
n. Debitor
O. Gross Profit
p. Investment
q. Inventory
r. Invoice

Average Group Slow Group
a. Bill a. Bill
b. Buyer
c. Capital
d. Capitalist
e. Catalogue
f. Credit
g. Clerk
h. Commission
i. Consignor
j. Contract
k. Collector
1. Costs
m. Debit
n. Debitor
o. Gross Profit
p. Investment
q. Inventory
r. Invoice
b. Buyer
c. Capital
d. Capitalist
e. Catalogue
f. Credit
g. Clerk
h. Commission
1. Consignor
j. Contract
k. Collector
1. Costs
m. Debit
n. Debitor
O. Gross Profit
p. Investment
q. Inventory
r. Invoice

Superior Group
s. Loss
t. Merchant
u. Margin
v. Net Profit
W. Overhead Costs
x. Retail
y. Receipt
z. Sales
\(a^{\prime}\). Salesman
b'. Sales Force
\(c^{\prime}\). Sales Slip
d'. Statements
e'. Shipper
f'. Trade Discount
g'. Vouoher
h'. Wholesale
11. Send different ones

Average Group
s. Loss
t. Merchant
u. Margin
\(\boldsymbol{\nabla}\). Net Profit
w. Overhead Costs
X. Retail
y. Receipt
z. Sales
a'. Salesman
\(b^{\prime}\). Sales Force
\(c^{\prime}\). Sales Slip
d'. Statements
e'. Shipper
f'. Trade Discount
g'. Voucher
h'. Wholesale
10. Secure different

\section*{Slow Group}
s. Loss
t. Merchant
u. Margin
v. Net Profit
w. Overhead Costs
x. Retail
y. Receipt
z. Sales
\(a^{\prime}\). Salesman
\(b^{\prime}\). Sales Force
\(c^{\prime}\). Sales Slip
d'. Statements
\(e^{\prime}\). Shipper
f'. Trade Discount
g'. Voucher
h'. Wholesale
10. Secure different
\(\quad\) Superior Group
of this group to visit
large stores and secure
different kinds of bus-
iness forms. Have these
brought in as special
reports.
Average Group
kinds of sales slips
and let these pupils
have experience in
filling them in.
12. A pay roll should be brought in and worked out in addition to the ones given in the textbooks.

Average-Group
D. Desirable outcomes:
1. A habit of economy
and thrift
2. A habit of checking all bills and purchases
3. An ability to apply
the percentage proc-
esses to problems of
the industrial and the
business world
4. A knowledge of
general business and

Slow Group
Teach these pupils
how to keep a check
on their own time
and the amount due them.
D. Desirable outcomes: 1. A habit of economy and thrift
2. A habit of checking all bills and purchases 3. An ability to apply the percentage processes to problems of the industrial and the business world
4. A knowledge of

\section*{Superior Group}
banking forms

\section*{Average Group} banking forms

Slow Group
banking forms
5. An appreciation of
the recreational value
of mathematics

Unit VI. Intuitive Geometry as a Preparation for Living Together

\section*{Superior Group}
A. Specific objectives:
1. To familiarize the pupil with forms found in nature, art, architecture, home, and the industrial world
2. To acquaint the pupil with the tools of geometry
3. To teach construc* tion and mensuration
4. To lay a foundation for later work in geometry

\section*{Average Group}
A. Specific objectives:
1. To familiarize the pupil with forms found in nature, art, archi* tecture, home, and the industrial world
2. To acquaint the pupil with the tools of geometry
3. To teach construction and mensuration
4. To lay a foundation for later work in geometry

\section*{Slow Group}
A. Specific objectives:
1. To familiarize the pupil with forms found in nature, art, architecture, home, and the industrial world
2. To acquaint the pupil with the tools of geometry
3. To teach construction and mensuration
4. To lay a foundation for those very few that might try to go on with
further work in
geometry
B. Problems:
1. What is geometry?

References:
B. P. S. I, pp. 170-173
B. A. B. I, pp. 147-150
E. C. I, pp. 75-76

ㅍ. B. K. I, p. 123
H. \(I, p .112\)
S. C. 7, pp. 104; 105; 117; 178
S. U. I, pp. 161-164
W. S. B. I, pp. 111-112
2. Tools of geometry and their uses

\section*{Superior Group}

B: 7, p: 84
B. P. S. I, pp. 170-173

Br. 7, pp. 18; 24; 93; 101; 103-109
B. A. B. I, p. 159
D. II. 7, pp. 133-135; 140

ㅌ. C. I, pp. 80-81; 87-88
G. I, pp. 239-240
H. B. K. I, pp. 124-125
H. I, pp. 112-113
K. S. 르. 7, pp. 342; 352
S. C. 7, pp. 1; 77; 107
S. I, pp. 4; 5; 9; 10; 22
T. I, pp. 93; 103; 107
W. S. B. I, p. 115
B. 7, p. 84
B. P. S. I, pp. 170-173

Br. 7, pp. 18; 24; 93; 101; 103-109
B. A. B. I, p. 159
D. W. 7, pp. 133-135; 140

ㅌ. ․ . I, pp. 80-81; 87-88
G. I, pp. 239-240

ㅍ. B. K. I, pp. 124-125
H. I, pp. 112-113
K. S. ㄹ. 7, pp. 342; 352
S. G. 7, pp. 1; 77; 107
S. I, pp. 4; 5; 9; 10; 22
T. I, pp. 93; 103; 107
W. S. B. I, p. 115
B. 7, p. 84
B. P. S. I, pp. 170-173

Br. 7, pp. 18; 24; 93; 101; 103-109
B. A. B. I, p. 159
D. W. 7, pp. 133-135; 140
E. C. I, pp. 80-81; 87-88
G. I, pp. 239-240
H. B. K. I, pp. 124-125
H. I, pp. 112-113
K. S. R. 7, pp. 342; 352
S. ́. 7, pp. 1; 77; 107
S. I, pp. 4; 5; 9; 10; 22
T. I, pp. 93; 103; 107
W. S. B. I, p. 115

Superior Group
3. Geometric forms
and constructions
a. The line
(I). Kinds
(A). Straight
(B). Broken
(C). Curved
(D). Oblique
(E). Horizon-
tal
(F). Vertical
(II). The line as
a measure
(III). Line con-
structions
(A). Perpendicular to a given line

\section*{Average Group}
3. Geometric forms and constructions
a. The line
(I). Kinds
(A). Straight
(B). Broken
(C). Curved
(D). Oblique
(E). Horizon-
tal
(F). Vertical
(II). The line as
a measure
(III). Line con-
structions
(A). Perpen-
dicular to a
given line

\section*{Slow Group}
3. Geometric forms
and constructions

\section*{a. The line}
(I). Kinãs
(A). Straight
(B). Broken
(C). Curved
(II). The line as
a measure
(III). Line constructions
(A). Perpen-
dicular to a
given line

Superior Group
(B). Parallel
to a given
line
(1). By
means of:
(a). Compass
(b). Protrac-
tor
(c). Square
(C). Sum of
two lines
(D). Difference
of two lines
(IV). Line proofs
(A). In proof
form

\section*{Average -Group}
(B). Parallel
to a given
line
(1). By
means of:
(a). Compass
(b). Protrac-
tor
(c). Square
(C). Sum of
two lines
(D). Difference
of two lines
(IV). Line proofs
(A). As statements

\section*{Slow Group}
(B). Parallel
to a given
line
(1). By
means of:
(a). Ruler.
(b). Square
(IV). Line proofs (A). As statements

Superior Group
B. 7, pp. 95-97
B. P. S. I, pp. 174-182; 191-196

Br. 7, pp. 14-24; 109-114
B. A. B. I, pp. 150-154; 160-165; 192-196
D. W. 7, pp. 126-128; 132-133; 140-144
E. C. I, pp. 76-80; 93; 102-105; 107
G. I, pp. 215-232; 242-244

ㅍ. B. K. I, pp. 126-130
H. \(I, p p .113-122 ;\) 189~190
K. S. R. 7, pp. 132-138
S. C. 7, pp. 1-15; 109; 111-115; 121

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B. 7, pp. 95-97
B. P. S. I, pp. 174-182; 191-196

Br. 7, pp. 14-24; 109-114
B. A. B. I, pp. 150-154 160-165; 192-196
D. W. 7, pp. 126-128; 132-133; 140-144
E. C. I, pp. 76-80; 93; 102-105; 107
G. I, pp. 215-232; 242-244
H. B. K. I, pp. 126-130
H. \(I, p p .113-122 ;\)

189-190
K. S. R. 7, pp. 132-138
S. ́. 7, pp. 1-15; 109;

111-115; 121
B. 7, pp. 95-97
B. P. S. I, pp. 174-182; 191-196

Br. 7, pp. 14-24; 109-114
B. A. B. I, pp. 150-154; 160-165; 192-196
D. W. 7, pp. 126-128; 132-133; 140-144
E. C. I, pp. 76-80; 93; 102-105; 107
G. I, pp. 215-232; 242-244
H. B. K. I, pp. 126-130
H. I, pp. 113-122; 189-190
K. S. R. 7, pp. 132-138
S. ㄷ. 7, pp. 1-15; 109;

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S. U. I, pp. 164-180
S. I, pp. 17; 24; 29; 127; 130; 134; 136; 182-186; 198-205
T. I; pp. 106-112
W. S. B. I, pp. 121-124; 128-132; 156-162
b. The angle
(I). Kinds
(A). Right
(B). Obtuse
(C). Acute
(D). Adjacent
(E). Complementary
(F). Supplementary

\section*{Average Group}

\section*{Slow Group}
S. U. I, pp. 164-180
S. U. I, pp. 164-180
S. I, pp. 17; 24; 29;

127; 130; 134; 136;
182-186; 198-205
T. I, pp. 106-112
W. S. B. I, pp. 121-124;

128-132; 156-162
b. The angle
(I). Kinds
(A). Right
(B). Obtuse
(C). Acute
(D). Adjacent
(E). Complementary
(F). Supplementary
S. I, pp. 17; 24; 29;

127; 130; 134; 136;
182-186; 198-205
T. I, pp. 106-112
W. S. B. I, pp. 121-124;

128-132; 156-162
b. The angle
(I) . Kinds
(A). Right
(B). Obtuse
(C). Acute
(D). Adjacent
(E). Complementary
(F). Supple-

\section*{Superior Group}
(G). Vertical
(II). Construction of angles
(III). The importance of angles as a measure
(A). Mariner's Compass
(IV). Relation of
angles
(A). When two
lines inter-
sect the ver-
tical angles are equal.

\section*{Average Group}
(G). Vertical
(II). Construction of angles
(III) . The importance of angles as a measure
(A). Mari-
ner's Compass

\section*{Slow Group}
(G). Vertical
(II). Construction
of angles
(III) . The importance of angles as a measure
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(A). Kinds
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(2). Right
(3). Acute

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(4). Right
(5). Acute
(6). Obtuse
(B). Triangle
constructions
(C). Measure
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(1). Per-
imeter
(2). Area
(3). As a
land mea-
sure
(D). Use in re-
lation to sur-
veying
(B). Triangle
(C). Measure of triangles
constructions
(I). Per-
imeter
(2). Area
(4). Right
(5). Acute
(6). Obtuse
(4). Obtuse
(B). Triangle constructions (C). Measure of triangles
(1). Perimeter
(2). Area

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(2). Rec-
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(4). Rhom-
bus
(5). Trap-
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(A). Classes
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tangle
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(4). Trap-
ezold

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(B). Construction of quadrilaterals (C). Measure of quadrilaterals
(1). Perimeter
(2). Area

\section*{Average Group}
(B). Construc-
tion of quad-
rilaterals
(C). Measure
of quadrilaterals
(1). Perimeter
(2). Area

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(B). Construc* tion of quadrilaterals (C). Measure of quadrilaterals
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(A). Construction of circles (B). Uses of circles (C). Measure of circles
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(2). Diam-
eter
(3). Radius
(4). Area
(D). Its use as
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(III). Circles
(A). Construction of circles (B). Uses of circles (C). Measure of circles
(1). Cir-
cumference
(2). Diam-
eter
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a measure
(III). Circles
(A). Construc-
tion of circles
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(A). In
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\hline figures & figures & figures \\
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\hline (A). Cubes & (A). Cubes & (A). Cubes \\
\hline (B). Rec- & (B). Prisms & (B). Prisms \\
\hline tangular & & \\
\hline Prisms & & \\
\hline (C). Tri- & (C) . Pyr- & (c). Pyr- \\
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\hline Prisms & & \\
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(E). Spheres
(F). Cones
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(B). Cyl-
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(E). Spheres
(F). Cones
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(II). Surface
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(A). Rec-
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science that con-
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(VII). Methods of

Measuring Time
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(IX). How Nature

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to Greece and Rome
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\section*{Mathematics}
C. Pupilitteacher activities:
1. The pupil should become acquainted with and learn to use properly the tools of geometry.
2. The teacher will find H. II, a very good book for reference. 3. At least two lessons should be spent on design work.
C. Pupil-teacher activities:
1. The pupil should become acquainted with and learn to use properly the tools of geometry.
2. The teacher will find H. II, a very good book for reference.
3. At least two
lessons should be spent on design work.
C. Pupil-teacher activities:
1. The pupil should
become acquainted with
and learn to use prop-
erly the tools of geometry.
2. The teacher will
find H. II, a very
good book for
reference.
3. At least two
lessons should be

\section*{Superior Group}
4. The teacher should stress measurement.
5. Have this group plan and draw original
plans for a house.
6. Teach these pupils the steps in proving a problem.

\section*{Average Group}
4. The teacher should stress measurement.
5. This group might plan and draw plans for a house as a whole class project.

\section*{Slow Group}
4. The teacher should
\$tress measurement.
5. Teach this group
only interpretations
of blue prints.
6. This group will
have difficulty in understanding this unit, so more time will have to be given to it.
7. Have the pupils
construct figures

\section*{Superior Group representing the different geometrical planes and solids.}
8. Bring in mensuration tables when needed.
9. The following terms should be added to the pupil's vocabulary:

Average Group
representing the different geometrical planes and solids. 7. If this class is a slow average, the special reports may be omitted.
8. Introduce the mensuration tables when needed.

Slow Group
representing the different geometrical planes and solids.
8. Do not try to do much with mensuration with this group. If there is time, discuss the mensuration tables as a separate part of this unit.
9. The following terms should be brought out
in class:

\section*{Superior Group}
a. Concentric Circles
b. Vertical
c. Parallel
d. Horizontal
e. Oblique
f. Secant
g. Radius
h. Cord
1. Tangent
f. Diameter
k. Arc
1. Acute
m. Right
n. Obtuse
o. Straight Angle
p. Compass
q. Degree

Average Group
a. Vertical
b. Parallel
c. Horizontel
d. Oblique
e. Radius
f. Cord
g. Arc
h. Diameter
i. Acute
j. Right
k. Obtuse
1. Straight Angle
m. Compass
n. Degree
o. Protractor
p. Transit
q. Minute

Slow Group
a. Parallel
b. Radius
c. Diameter
d. Circumference
e. Acute
f. Right
g. Arc
h. Obtuse
i. Straight Angle
J. Compass
k. Degree
1. Protractor
m. Equilateral
n. Equiangular
- Quadrilateral
p. Hexagon
q. Bisect

Superior Group
r. Protractor
s. Transit
t. Minutes
u. Seconds
V. Equilateral
w. Isosceles
x. Scalene
y. Equiangular
2. Hexagon
a'. Estimate
b'. Approximate
c'. Vertex
d'. Bisect
e'. Perpendicular
f'. Parallelogram
g'. Scale
h'. Diagonal

\section*{Average Group}
r. Second
s. Equilateral
t. Isosceles
u. Scalene
v. Equiangular
w. Hexagon
x. Octagon
y. Estimate
z. Approximate
a'. Vertex
b'. Disect
c'. Perpendicular
d'. Parallelogram
e'. Scale
f'. Diagonal
g'. Rectangle
h'. Square

\section*{Slow Group}
r. Parallelogram
s. Diagonal
t. Octagon
u. Rectangle
v. Square
W. Cube
x. Prism
y. Dimensions
\(z\). Length
a'. Width
\(b^{\prime}\). Depth
\(c^{\prime}\). Base
d'. Altitude
e'. Pyramid
\(f^{\prime} \cdot\) Cone
g'. Pentagon

1'. Rectangle
j'. Square
\(k^{\prime}\). Cube
1'. Prism
m'. Dimensions
n'. Pyramid
\(0^{\prime}\). Cone
\(p^{\prime}\). Length
\(q^{\prime} \cdot\) Width
r'. Depth
\(s^{\prime}\). Base
t'. Altitude
u'. Octagon
\(\nabla^{*}\). Pentagon
w'. Heptagon
\(x^{\prime}\). Nonagon
\(y^{\prime}\). Decagon

1'. Cube
j'. Prism
\(k^{\prime}\). Pyramid
1'. Cone
m'. Dimensions
\(n^{\prime}\). Length
o'. Width
p'. Depth
\(q^{\prime}\). Base
\(r^{\prime}\). Altitude
\(s^{\prime} \cdot\) Pentagon

Superior Group
D. Desirable outcomes:
1. A habit of recognizing the various geometric forms in nature, art, and industry
2. A habit of accurate construction
3. A habit of using tools for accurate construction
4. A habit of applying construction processes to other fields 5. A habit of orderly arrangement
6. A knowledge of geometric terms

Average Group
D. Desirable outcomes: 1. A habit of recognizing the various geometric forms in nature, art, and industry 2. A habit of accurate construction 3. A habit of using tools for accurate construction 4. A habit of applying construction processes to other fields 5. A habit of orderly arrangement
6. A knowledge of geometric terms

\section*{Slow Group}
D. Desirable outcomes:
1. A habit of recognizing the various geometric forms in nature, art, and
industry
2. A habit of accurate construction 3. A habit of using tools for accurate construction
4. A habit of apply-
ing construction processes to other fields
5. A knowledge of geometric terms

\section*{Superior Group}
7. A knowledge of geometric forms
8. A knowledge of the proper use of geometric tools
9. An appreciation of the interdependence of geometrical form to art, architecture, and industry
10. An appreciation of geometry as a separate branch of mathematics 11. An appreciation of the possibilities of
7. A knowledge of
simple geometric

\section*{forms}
8. A knowledge of the proper use of geometric tools
9. An appreciation of the interdependence
of geometrical form
to art, architecture, and industry

\section*{Slow Group}
6. A knowledge of simple geometric forms
7. A knowledge of the proper use of geometric tools
8. An appreciation of the interdependence of geometrical form to art, architecture, and industry
field of learning
geometry as a major

\section*{Superior Group}

\section*{Average Group}
12. An appreciation for
the part that geometry
plays in the history
and progress of
civilization

\section*{Superior Group}
A. Specific objectives:
1. To study graphs
2. To interpret graphs
3. To appreciate the application of arithmetic as a social and economic value
B. Problems:
1. Pictographs

References:
B. A. B. I, pp. 48-50

Br. 7, pp. 173-178
D. W. 7, p. 11
H. B. K. I, pp. I-2
K. S. ㄹ. 7, pp. 297-298

Average Group
A. Specific objectives:
1. To study graphs
2. To interpret graphs
3. To appreciate the social and economic value of graphs
B. Problems:
1. Pictographs References:
B. A. B. I, pp. 48-50

Br. 7, pp. 173-178
D. W. 7, p. 11
H. B. K. I, pp. I-2
K. S. ㅍ. 7 , pp. 297-298

\section*{Slow Group}
A. Specific objectives:
1. To study graphs
2. To interpret graphs
3. To appreciate the social and economic value of graphs
B. Problems:
1. Pịctographs

References:
B. A. B. I, pp. 48-50

Br. 7, pp. 173-178
D. W. 7, p. 11
H. B. K. I, pp. 1-2
K. S. R. 7, pp. 297-298

\section*{Average Group}

\section*{Slow Group}
S. ㄷ. 7, p. 38
S. I, p. 80
S. U. I, pp. 49-51
2. Bar graphs

\section*{References:}
B. P. S. I, pp. 50-56

Br. 7, pp. 178-187
B. A. B. I, pp. 225-228
E. C. I, pp. 11; 26;

105; 219-224
D. H. 7, pp. 5-8; 9-10
G. I, pp. 5-7

ㅍ. ㄹ. K. I, pp. 3-4
K. S. R. 7, pp. 292-294
S. C. 7, pp. 41-45
S. I, pp. 81-87
S. U. I, pp. 49-51
S. C. 7, p. 38
S. C. 7, p. 38
S. I, p. 80
S. U. I, pp. 49-51
2. Bar graphs

References:
B. P. S. I, pp. 50-56

Br. 7, pp. 178-187
B. A. B. I, pp. 225-228
E. C. I, pp. 11; 26;

105; 219-224
D. W. 7, pp. 5-8; 9-10
G. I, pp. 5-7
H. B. K. I, pp. 3-4
K. S. ․ . 7, pp. 292-294
S. C. 7, pp. 41-45
S. I, pp. 81-87
S. U. I, pp. 49-5l
S. I, p. 80
S. U. I, pp. 49-51
2. Bar graphs

References:
B. P. S. I, pp. 50-56

Br. 7, pp. 178-187
B. A. B. I, pp. 225-228
E. C. I, pp. 11; 26;

105; 219-224
D. W. 7, pp. 5-8; 9-10
G. I, pp. 5-7
H. B. K. I, pp. 3-4
K. S. R. 7, pp. 292-294
S. C. 7, pp. 41-45
S. I, pp. 81-87
S. U. I, pp. 49-51

\section*{Superior Group}
3. Circle graphs References:
B. 7, pp. 81-84
B. P. S. I, pp. 57-62

Br. 7. pp. 195-201
B. A. B. I, pp. 225-228
E. C. I, pp. 91-93
D. W. 7, pp. 8-9

ㅍ. ㄹ. K. I, pp. 8; 9; 164
K. S. ㄱ. 7, pp. 294-295
S. ㄷ. 7, pp. 126-130
S. I, pp. 136-138
S. U. I, pp. 214-216
4. Line graphs

References:
B. P. S. I, pp. 57-62

\section*{Average Group}
3. Circle graphs References:
B. 7, pp. 81-84
B. P. S. I, pp. 57-62

Br. 7, pp. 195-201
B. A. B. I, pp. 225-228
E. C. I, pp. 91-93
D. W. 7, pp. 8-9
H. B. K. I, pp. 8; 9; 164
K. S. 르. 7, pp. 294-295
S. C. 7, pp. 126-130
S. I, pp. 136-138
S. U. I, pp. 214-216
4. Line graphs

References:
B. P. S. I, pp. 57-62

\section*{Slow Group}
3. Circle graphs

References:
B. 7, pp. 81-84
B. P. S. I, pp. 57-62

Br. 7, pp. 195-201
B. A. B. I, pp. 225-228
E. C. I, pp. 91-93
D. W. 7, pp. 8-9
H. B. K. I, pp. 8; 9; 164
K. S. R. 7, pp. 294-295
S. C. 7, pp. 126-130
S. I, pp. 136-138
S. U. I, pp. 214-216
4. Line graphs

References:
B. ㄹ. S. I, pp. 57-62

Superior Group
B. 7, pp. 187-195
B. A. B. I, pp. 215-219
E. C. I, pp. 61-68
D. W. 7, pp. 1-5
G. I; pp. 3-5; 10; 200205
H. B. K. I, pp. 5-7
K. S. R. 7, pp. 296-297
S. C. 7, pp. 51-54
S. I, pp. 87-90
S. U. I, pp. 5; 6; 9; 10; 58-60
5. Map distribution

References:
B. P. S. I, pp. 64-66
B. A. B. I, pp. 214; 228231

\section*{Average Group}
B. 7, pp. 187-195
B. A. B. I, pp. 215-219
E. C. I, pp. 61-68
D. W. 7, pp. 1-5
G. I, pp. 3-5; 10; 200205
H. B. K. I, pp. 5-7
K. S. R. 7, pp. 296-297
S. ©. 7, pp. 5l-54
S. I, pp. 87-90
S. U. I, pp. 5; 6; 9; 10; 58-60
5. Map distribution

References:
B. P. S. I , pp. 64-66
B. A. B. I, pp. 214; 228231

\section*{Slow Group}
B. 7, pp. 187-195
B. A. B. I, pp. 215-219
E. C. I, pp. 61-68
D. W. 7, pp. l-5
G. I, pp. 3-5; 10; 200205
H. B. K. I, pp. 5-7
K. S. R. 7, pp. 296-297
S. C. 7, pp. 51-54
S. I, pp. 87-90
S. U. I, pp. 5; 6; 9; 10; 58-60
5. Map distribution

References:
B. P. S. I, pp. 64-66
B. A. B. I, pp. 214; 228231

Superior Group

\section*{D. W. 7, p. 12}
H. B. K. I, p. 10
C. Pupil-teacher activities:
1. Have the pupils make a graph of their personal record, using different colors for the different periods, then make a comparative study.

Average-Group
D. W. 7, p. 12
H. B. K. I, p. 10
C. Pupil-teacher activities:
1. Have the pupils
make a graph of their personal record, using different colors for
the different periods,
then make a compara-
tive study.

\section*{Slow Group}

\section*{D. W. 7, p. 12}
H. B. K. I, p. 10
C. Pupil-teacher activities:
1. This group will have
time to learn only the .
different types of graphs
and their interpretation.
The simplest forms of
graphs should be re-
quired to be made by
these pupils.

Superior Group
2. Graphs should be brought from newspapers and magazines by the pupils and interpreted by the pupils.
3. Explain the graph as an aid to the industrial world for keeping records.
4. Make graphs of the athletic games of the school.
D. Desirable outcomes:
1. A habit of compiling
data in the form of graphs

\section*{Average Group}
2. Graphs should be
brought from news-
papers and magazines by the pupils and interpreted by the pupils.

\section*{Slow Group}
2. The pupils should
be encouraged to bring graphs from newspapers and magazines and interpret them.
3. Make graphs of the athletic games of the school.
D. Desirable outcomes: D. Desirable outcomes:
1. A habit of compiling
data in the form of
graphs

Superior Group
2. A knowledge of how
to make graphs
3. How to make a graph
as a check for
efficiency
4. A knowledge of five different types of graphs
5. An appreciation of
the graph in every-day life
6. An appreciation of the use of the graph as an effective time saving device for
presenting or
keeping data

Average Group
2. A knowledge of how
to make graphs
3. How to make a graph
as a check of
efficiency
4. A knowledge of five different types of graphs
5. An appreciation of
the graph in every-day
life

\section*{Slow Group}
1. A knowledge of how graphs are made
2. A knowledge of five different types of graphs
3. An appreciation of the graph in every-day 11fe

Unit VIII. The Arithmetical Equation as a Foundation for the Algebraic Equation

Superior Group
A. Specific objectives:
1. To show the relation of arithmetic and algebra
2. To prove the equation is a shorter method of computation 3. To lay a foundation for future work in algebra
B. Problems:
1. Review formulae
a. Percentage
b. Mensuration

Average Group
A. Specific objectives:
1. To show the relation of arithmetic and algebra
2. To give the equation as a shorter method of computation
3. To lay a foundation
for future work in
algebra
B. Problems:
1. Review formulae
a. Percentage
b. Mensuration

\section*{Slow Group}
A. Specific objectives:
B. Problems:

\section*{Superior Group}
2. The equation method of solving problems
a. Meaning of equations
b. Truths about equations
c. How to solve problems by means of equations

References:
B. P. S. I, pp. 117-127

Br. 7, p. 52
E. C. I, pp. 309-312

ㅁ. W. 7, pp. 24-27
H. B. K. I, pp. 47; 5861
K. S. ㄹ. 7 , pp. 144-147

Average Group
Slow Group
2. The equation method
of solving problems
a. Meaning of equations
b. How to solve problems by means of equations

References: References:

Br. 7, p. 52
E. C. I, pp. 309-312
D. W. 7, pp. 24-27

ㅍ. ․․ K. I, pp. 47; 5861
K. S. R. 7, pp. 144-147

Superior Group
S. I, pp. 164-166
T. I, pp. 140-143

ㅍ. 7, pp. 164-166
C. Pupil-teacher activities:
1. Bring out the
equation as a state-
ment of an arithmetical
fact to be solved.
2. This group will like
original problems. Have
the pupils present them
to the group and take
charge of the class.

Average Group
S. I, pp. 164-166
T. I, pp. 140-143
W. 7, pp. 164-166
C. Pupil-teacher activities: C. Pupil-teacher activities:
1. Bring out the idea of the equation being an arithmetical fact to be solved.
2. Only a few average
classes will reach
this unit and then
very few of those

Superior Group
D. Desirable outcomes:
1. A habit of exactness
2. A habit of applying the equation to arithmetical situations
3. A knowledge of the equation
4. A knowledge of the equation as an easy method of computation 5. An appreciation of

Average Group
will finish it. In
that case take only
the review of the
formulae.
D. Desirable outcomes: D. Desirable outcomes:
1. A habit of
exactness
2. A habit of
applying the equa-
tion to arithmetical
situations
3. A knowledge of the
equation
4. A knowledge of the
equation as an easy
method of computation

Slow Group
D. Desirable outcones:
and arithmetic
6. An appreciation of
the value of the equa-
tion in solving
problems


CHAPTER VI.
I. A TENTATIVE CURRICULA FOR THE EIGHTH YEAR

JUNIOR HIGH SCHOOL MATHEMATICS
A. General Objectives for Junior High School

\section*{Mathematics on the Eighth}

Year Level
1. The general objectives for junior high school mathematics on the eighth year level are:
a. A growth in ability to think quantitatively and abstractly;
b. A knowledge of mathematical processes and information needed in problems of every-day living;
c. An increased accuracy and speed in the use of the four fundamental processes and their applications;
d. An understanding and appreciation of the use of the formula;
e. An understanding and appreciation of geometrical relations;
f. A background for further study in mathematics;
g. A provision for guidance in mathematics as a major field of learning.
B. Units of Instruction for the Eighth Year

Junior High School Mathematics
1. Unit I. A Review of the Fundamental Processes as an Aid in Advanced Work in Mathematics
2. Unit II. The Application of Arithmetical Processes to Practical Situations
3. Unit III. The Principles of Percentage Applied to Banking, Installment Buying, Investments, Taxation; and Insurance
4. Unit IV. The Metric System as an Easy Method of Computation
5. Unit V. Arithmetical Algebra as a Foundation for Arithmetical Geometry
6. Unit VI. Arithmetical Geometry
7. Unit VII. The Graph as a Foundation for Algebraic Graphs
8. Unit VIII. The Fundamental Processes in Algebra

Unit I. A Review of the Fundamental Processes as an Aid in Advanced Work in Mathematics

\section*{Superior Group}
A. Specific objectives:
1. To increase speed and accuracy 2. To give a better foundation for advanced work 3. To find individual weak points and master them
B. Problems:

References:

\section*{Average Group}
A. Specific objectives:
1. To increase speed and accuracy 2. To give a better foundation for advanced work 3. To find individual weak points and master them
B. Problems:

References:

\section*{Slow Group}
A. Specific objectives:
1. To increase speed and accuracy 2. To give a better foundation for advanced work 3. To find individual weak points and master them.
B. Problems:
1. Review of whole numbers

References:
B. 8, pp. 223-230
\[
\begin{aligned}
& \text { B. P. S. II, pp. 1-10 } \\
& \text { Br. 8, pp. 2-4; 7-10 } \\
& \text { B. A. B. II, pp. 5-6 } \\
& \text { E. ㄷ. II, pp. 13-14 } \\
& \text { D. Wु. 8, pp. 9-14; 22- } \\
& \text { 35; 236-239; 241-244; } \\
& \text { 245-249; 249-253 } \\
& \text { H. B. K. II, pp. 203- } \\
& 204 \\
& \text { H. II, pp. 1-4; 5; 9- } \\
& \text { 11; 233-240 } \\
& \text { K. S. R. 8, pp. 401-420 } \\
& \text { S. ㄷ. 8, pp. 274-282 } \\
& \text { S. II, pp. 283-297 } \\
& \text { S. U. II, pp. 23; 81; } \\
& \text { 133; 177; } 211 \\
& \text { 2. Decimals }
\end{aligned}
\]

\section*{Superior Group}

\section*{References:}
1. Fractions

\section*{Average Group}

\section*{Slow Group}

\section*{References:}

> B. \(8, \mathrm{pp} \cdot 230-233 ;\) \(234-235\)
B. ㄹ. S. II, pp. 11-12; 15-18

Br. 8, pp. 5-6
B. A. B. II, pp. 31-41
E. C. II, pp. 3-6; 15;

20
D. W. 8, pp. 18-21; 254
H. B. K. II, pp. 203-204
H. II, pp. 4-9; 233-240
K. S. R. 8, pp. 434-437
S. ㄷ. 8, pp. 286-288
S. II, p. 302
S. U. II, pp. 49; 239
2. Fractions
3. Fractions

Superior Group
Average Group

References:
B. 8, pp. 232; 235;

238-242
B. P. S. II, pp. 10-12

Br. 8, pp. 4-5
B. A. B. II, pp. 14-26
E. ́. II, pp. 6-12; 14
D. W. 8, pp. 14-18; 239;

244; 247-248; 253-254
H. B. K. II, pp. 203-204
H. II, pp. 241-242
K. S. R. 8, pp. 420-434
S. C. 8 , pp. 282-286
S. II, pp. 297-302
S. U. II, pp. 65; 111; 193
3. Percentage

\section*{Slow Group}

\section*{References:}
B. 8, pp. 232; 235;
\[
238-242
\]
B. P. S. II, pp. 10-12

Br. 8, pp. 4-5
B. A. B. II, pp. 14-26
E. C. II, pp. 6-12; 14
D. W. 8, pp. 14-18; 239; 244; 247-248; 253-254
H. B. K. II, Dp. 203-204
H. II, pp. 241-242
K. S. 즈. 8, pp. 420-434
S. ́. 8, pp. 282-286
S. II, pp. 297-302
S. U. II, pp. 65; 111; 193
4. Percentage

\section*{References:}
B. 8, pp. 233-234;

236; 338
ㅌ. P. S. II, pp. 12-14
Br. 8, p. 6
B. A. B. II, pp. 41-51
E. ㄷ. II, pp. 329-332
D. W. 8, p. 260
H. B. K. II, p. 206
H. II, pp. 242-243
K. S. R. 8 , pp. 441-450
S. C. 8, p. 90
S. II, pp. 151-159
S. U. II, pp. 145; 259
T. 8, pp. 105-108
C. Pupil-teacher activities:
1. Tests should be given

\section*{Average Group}

\section*{References:}
B. 8, pp. 233-234;

236; 338
B. P. S. II, pp. 12-14

Br. 8, p. 6
B. A. B. II, pp. 41-51
E. ㄷ. II, pp. 329-332
D. W. 8, p. 260
H. B. K. II, p. 206
H. II, pp. 242-243
K. S. R. 8, pp. 441-450
S. C. \(8, p .90\)
S. II, pp. 151-159
S. U. II, pp. 145; 259
W. 8, pp. 105-108
C. Pupil-teacher activities:
1. Tests should be given

References:
B. 8, pp. 233-234;

236; 338
B. P. S. II, pp. 12-14

Br. 8, p. 6
B. A. B. II, pp. 41-51
E. ㄷ. II, pp. 329-332
D. W. 8, p. 260
H. B. K. II, p. 206
H. II, pp. 242-243
K. S. R. 8, pp. 441-450
S. C. \(8, \mathrm{p} .90\)
S. II, pp. 151-159
S. U. II, pp. 145; 259
W. 8, pp. 105-108
C. Pupil-teacher activities:
1. Tests should be given

Hequevis givin
Superior Group and records of each individual pupil should be made. If any pupil shows a need for any remedial work in whole numbers or decimals, then teach them to the individual pupil. 2. The work should be entirely individual teaching.
3. Do not spend too much time on this unit.
4. Supplement the work with club work as formation of magic squares

\section*{Slow Group} and records of each individual pupil should be made. If a pupil does not need some parts of this review, then leave that part out and give the topics that are needed to the individual pupil.
2. The work should be entirely individual teaching.

ENOGLIOL GLOMN

\section*{Superior Group}

Average Group

Sue ructu
Slow Group and number puzzles.
3. Keep a chart of individual progress.
```

3. Keep a chart of
individual progress
and post on the bul-
letin board.
4. Use the baseball
game, calling, each
perfect score, a hit;
each process perfected,
a run; and each part
perfected, a home run.
Divide the group into
teams. This will
stimulate and keep
interest as well as
promote good work.
5. Give frequent tests.

Wemberroelotox GLOMA

## Superior Group

## D. Desirable outcomes:

1. A mastery of
weak points
2. A better under-
standing of
percentage
3. A habit of speed
and accuracy
4. An appreciation for accuracy and exactness

## Average Group

D. Desirable outcomes:

1. A mastery of
weak points
2. A better under-
standing of
percentage
3. A habit of speed and accuracy
4. An appreciation for accuracy and exactness

Slow Group
D. Desirable outcomes:

1. A mastery of
weak points
2. A better under-
standing of
percentage
3. A habit of speed
and accuracy
4. An appreciation for accuracy and exactness

Unit II. The Application of Arithmetical Processes to Practical Situations

Superior Group
A. Specific objectives:

1. To solve problems
in the social and
business life of
the pupil
2. To develop clear thinking
3. To develop sound
judgment of
generalization

| 4. To show the impor- | 3. To show the impor- | 2. To show the impor- |
| :--- | :--- | :--- |
| tance of mathematics | tance of mathematics | tance of mathematics |
| in the general life | in the general life | in the general life |
| of the individual | of the individual | of the individual |

## Slow Group

A. Specific objectives:

1. To solve problems
in the social and
business life of
the pupil
2. To develop clear thinking
A. Specific objectives:
3. To solve problems
in the social and business life of the pupil

## Average Group

## Slow Group

## 5. To learn the value

 of conservationB. Problems:

1. Buying and selling
a. For cash
b. At a discount
c. On the installment plan

References:
B. 8, pp. 38-49; 5258; 61-68; 185-194
B. P. S. II, pp. 18-29
B. A. B. II, pp. 24; 45-61; 147-149
D. W. 8, pp. 114-116
H. B. K. II, pp. 33-40; 103-110
4. To learn the value
of conservation
B. Problems:

1. Buying and selling
a. For cash
b. At a discount
c. On the installment plan

References:

$$
\begin{aligned}
& \text { B. 8, pp. 38-49; 52- } \\
& \text { 58; 61-68; 185-194 } \\
& \text { B. P. S. II, pp. 18-29 } \\
& \text { B. A. B. II, pp. 24; } \\
& \text { 45-62; 147-149 } \\
& \text { D. W. 8, pp. 114-116 } \\
& \text { ㅍ. ㄹ. K. II, pp. 33-40; } \\
& \text { 103-110 }
\end{aligned}
$$

3. To learn the value
of conservation
B. Problems:
4. Buying and selling
a. For cash
b. At a discount
c. On the installment plan

References:

$$
\begin{aligned}
& \text { B. 8, pp. 38-49; 52- } \\
& \text { 58; 61-68; 185-194 } \\
& \text { B. P. S. II, pp. 18-29 } \\
& \text { B. A. B. II, pp. } 24 \text {; } \\
& \text { 45-62; 147-149 } \\
& \text { D. W. 8, pp. 114-116 } \\
& \text { H. B. K. II, pp. 33-40; } \\
& \text { 103-110 }
\end{aligned}
$$

## Superior Group

H. II, pp. 42-62
K. S. ㅌ. 8, pp. 85-102; 242-244
S. II, pp. 1-4; 8-18; 154-156; 162-172
S. U. II, pp. 84-88; 98-107; 147-152
W. S. B. II, pp. 148-162
2. Education
a. Value to the individual
b. Cost to the community
c. The necessity of higher education

Average Group
H. II, pp. 42-62
K. S. R. 8, pp. 85-102; 242-244
S. II, pp. 1-4; 8-18; 154-156; 162-172
S. U. II, pp. 84-88; 98-107; 147-152
W. ́. ㅌ. II, pp. 148-162
2. Education
a. Value to the individual
b. Cost to the community
c. Why a high school
education is
necessary

Slow Group
H. II, pp. 42-62
K. S. R. 8, pp. 85-102;

$$
242-244
$$

$$
\begin{aligned}
& \text { S. II, pp. } 1-4 ; 8-18 ; \\
& 154-156 ; 162-172
\end{aligned}
$$

S. U. II, pp. 84-88; 98-107; 147-152
W. S. B. II, pp. 148-162
2. Education
a. Value to the individual
b. Cost to the community
c. The value of the special vocational education to the individual
(I). The earnpower of the
college graduate
compared to the
non-graduate

References:
B. 8, pp. 214-219
E. C. II, p. 59
D. W. 8, p. 44
H. B. K. II, p. 210
S. C. 8, p. 201
3. Better living
a. Needed food for energy for health
b. Value of health
to the community
c. Cost and value

References:
B. 8, pp. 214-219
E. C. II, p. 59
D. W. 8, p. 44
H. B. K. II, p. 210
S. C. 8, p. 201
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E. C. II, p. 59
D. W. 8, p. 44

ㅍ. B. K. II, p. 210
S. C. 8, p. 201
3. Better living
a. Needed food for energy for health
b. Value of health
to the community

Superior Group
of sanitation in
the community
d. Safety

References:
B. A. B. II, pp. 2l-23; 210-216

ㅌ. C. II, pp. 20-22; 239-241
H. B. K. II, p. 94
S. ©. 8, pp. 138-140
T. II, pp. 56; 69-73
W. S. B. II, pp. 136138
W. 8, pp. 189-192
4. Travel
a. How to interpret
a time-table

Average Group
Slow Group
of sanitation in
the community
d. Safety

References:
B. A. B. II, pp. 21-23; 210-216
E. C. II, pp. 20-22; 239-241
H. B. K. II, p. 94
S. C. $8, \mathrm{pp} .138-140$
T. II, pp. 56; 69-73
W. ㄹ. B. II, pp. 136138
W. 8, pp. 180-192
4. Travel
a. How to interpret
a time-table of sanitation in the community d. Safety

References:
B. A. B. II, pp. 21-23;

210-216
E. C. II, pp. 20-22; 239-241
H. B. K. II, p. 94
S. C. $8, \mathrm{pp}$. 138-140
T. II, pp. 56; 69-73
W. S. B. II, pp. 136138
W. 8, pp. 189-192
4. Travel
a. How to interpret
a time-table

## Superior Group

b. Different means
of travel
c. Planning a budget
for the trip
d. How to carry
money safely
e. Changes of time (I). Different standard times (II). Daylight savings time
f. Interpreting the road map for mileage

References:

$$
\begin{aligned}
& \text { B. ․ . ․ ․ II, pp. } 35 ; \\
& \text { 91-97; 257-259 }
\end{aligned}
$$

## Average Group

b. Different means
of travel
c. Planning a budget
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d. How to carry
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f. Interpreting the road map for mileage

References:

$$
\begin{aligned}
& \text { ㅌ. A. ㅂ. II, pp. } 35 ; \\
& \text { 91-97; } 257-259
\end{aligned}
$$

Slow Group
b. Different means
of travel
c. Planning a budget
for the trip
d. How to carry
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(I). Different standard times (II). Daylight savings time
f. Interpreting the road map for mileage

References:

$$
\begin{aligned}
& \text { ㅌ. ́. ․ ․ II, pp. } 35 ; \\
& \text { 91-97; 257-259 }
\end{aligned}
$$

Superior Group
E. C. II, pp. 80-83; 204-206

ㅁ. … 8, pp. 134-144
H. B. K. II, pp. 96-99
K. S. R. 8, pp. 255-258
5. Transportation and
communication
a. Transportation
(I). Means of:
(A). Roads
(B). Rail
(C). Water
(D). Air
(II). Cost of
b. How to send parcels

$$
\begin{aligned}
& \text { (I). Express } \\
& \text { (II). Postal }
\end{aligned}
$$

## Average Group

E. C. II, pp. 80-83;

204-206
D. W. 8, pp. 134-144
H. B. K. II, pp. 96-99
K. S. R. 8, pp. 255-258
5. Transportation and communication
a. Transportation
(I). Means of:
(A). Roads
(B). Rail
(C). Water
(D). Air
(II). Cost of
b. How to send parcels
(I). Express
(II). Postal
E. C. II, pp. 80-83;

204-206
D. W. 8, pp. 134-144

ㅍ. B. K. II, pp. 96-99
K. S. R. 8, pp. 255-258
5. Transportation and communication
a. Transportation
(I). Means of:
(A). Roads
(B). Rail
(C). Water
(D). Air
(II). Cost of
b. How to send parcels
(I). Express
(II). Postal

Superior Group

## c. Means of

communication

(I). Wire<br>(II). Air

(A). Wireless
telegraphy
(III). Postal
d. Comparative cost of

References:
B. 8, pp. 194-197
B. A. B. II, pp. 193196
D. W. 8, pp. 116-130
E. ㄷ. II, pp. 105-107
H. B. K. II, pp. 99-102; 261
K. S. R. $8, \mathrm{p} .258$

Average Group
c. Means of
communication

$$
\begin{aligned}
& \text { (I). Wire } \\
& \text { (II). Air }
\end{aligned}
$$

(A). Wireless
telegraphy
(III). Postal
d. Comparative cost of

References:
B. 8, pp. 194-197
B. A. B. II, pp. 193196
D. W. 8 , pp. 116-130
E. C. II, pp. 105-107
H. B. K. II, pp. 99-102; 261
K. S. R. 8, p. 258

## Slow Group

c. Means of
communication
(I). Wire
(II). Air
(A). Wireless
telegraphy
(III). Postal
d. Comparative cost
of
References:
B. 8, pp. 194-197
B. A. B. II, pp. 193196
D. W. 8, pp. 116-130
E. C. II, pp. 105-107
H. B. K. II, pp. 99-102;
K. S. ㄹ. 8, p. 258

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## Superior Group

6. Temperature
a. Kinds
(I). Fahrenheit
(II). Centigrade
(III) Clinic
b. How to read each kind of thermometer
c. Relation of temperature to health

References:
B. A. B. II, pp. 196200
S. C. II, pp. 256-260
T. II, pp. 74-77
7. Conservation of
farm and forest

## Average Group

6. Temperature
a. Kinds
(I). Fahrenheit
(II). Centigrade
(III). Clinic
b. How to read each kind of thermometer c. Relation of temperature to health

References:
B. A. B. II, pp. 196200
S. C. II, pp. 256-260
T. II, pp. 74-77
7. Conservation of
farm and forest

Slow Group
6. Temperature
a. Kinds
(I). Fahrenheit
(II). Centigrade
(III). Doctor's instrument
b. How to read the weather thermometer c. Relation of temperature to health

References:
B. A. B. II, pp. 196200
S. C. II, pp. 256-260
T. II, pp. 74-77
7. Conservation of

EnDEITOL GIONO

## Superior Group

## Average Group

a. Expenses of the
farm
(I). Seeds and stock
(II). Farm implements
(III). Spraying
(IV). Harvesting
b. Keeping expense
accounts
c. Conserving the
so11
d. Forests
(I). Our dependence on them (II). Cost of forest fires

Slow Group
a. Expenses of the farm
(I). Seeds and stock
(II). Farm implements
(III). Spraying
(IV). Harvesting
b. Keeping expense
accounts
c. Conserving the
soil
d. Forests
(I). Our dependence on them (II). Cost of forest fires
(III). Preservation of forests

References:
B. A. B. II, pp. 29-31
E. C. II, pp. 60-63
D. W. 8, pp. 87; 150159; 206-208
H. B. K. II, pp. 1ll120
8. The home
a. Buying the lot
b. Planning the building
c. Building the home
d. Paying for the home
(III). Preservation of forests

References:
B. A. B. II, pp. 29-31
E. C. II, pp. 60-63
D. W. 8, pp. 87; 150159; 206-208
H. B. K. II, pp. 111120
8. The home
a. Buying the lot
b. Planning the building
c. Building the home
d. Paying for the home

## Superior Group

e. Furnishing the home
f. Managing the home

References:
B. 8, pp. 172-176
B. P. S. II, pp. 264271
B. A. B. II, pp. 173180; 201-210; 302310
D. W. 8, pp. 145-150
G. II, pp. 288-295
H. B. K. II, pp. 89-93; 95
K. S. R. 8, pp. 249-252
S. II, pp. 159-162

## Average Group

## e. Furnishing the

 homef. Managing the home

References:
B. 8, pp. 172-176
B. P. S. II, pp. 264271
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D. W. 8, pp. 145-150
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H. B. K. II, pp. 89-93; 95
K. S. R. 8, pp. 249-252
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## Slow Group

e. Furnishing the home
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References:
B. 8, pp. 172-176
B. P. S. II, pp. 264271
B. A. B. II, pp. 173180; 201-210; 302310
D. W. 8, pp. 145-150
G. II, pp. 288-295
H. B. K. II, pp. 89-93; 95
K. S. R. 8, pp. 249-252
S. II, pp. 159-162

## Superior Group

S. U. II, pp. 153-160
T. II, pp. 1-3; 64-69; 73
W. S. B. II, pp. 131136; 138-142; 235244
W. 8, pp. 184-189
C. Pupil-teacher activities:

1. Thrift should be the key-note of buying and selling.
2. Show how keeping accounts will promote thrift while money spent recklessly is money wasted.
3. Emphasize problems

## Average Group

## Slow Group

S. U. II, pp. 153-160
T. II, pp. 1-3; 64-69; 73
W. S. B. II, pp. 131-

136; 138-142; 235-
244
W. 8, pp. 184-189
C. Pupil-teacher activities:

1. Thrift should be the key-note of buying and selling.
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3. Bmphasize problems
S. U. II, pp. 153-160
T. II, pp. 1-3; 64-6.9; 73
W. S. B. II, pp. 131136; 138-142; 235244
W. 8, pp. 184-189
C. Pupil-teacher activities:
4. Thrift should be the key-note of buying and selling.
5. Show how keeping accounts will promote thrift while money spent recklessly is money wasted.

## Superior Group

on generalized thinking; introduce the "problem solving" attitude. 4. The value of an education from an economic view-point should be stressed. Every failure is a loss financially to the home, government, and individual.
5. Every one expects to travel. There is a small relation between the quantitative thinking and travel experience. The following

Average Group
introduce the "problem solving" attitude. 4. The value of an education from an economic view-point should be stressed. Every failure is a loss financially to the home, government, and individual.
5. Every one expects to travel. There is a small relation between the quantitative thinking and travel experience. The following
3. The value of an education from an economic view-point should be stressed.
4. Every one expects to travel. There is a small relation between the quantitative thinking and travel experience. The following

Superior Group
topics might be

## discussed:

a. Budgets for

Motor Trips
b. Advantages of

All Expense Trips
c. Travel by Air
d. Going Abroad
(I). Passport

Charges
(II). Exchange of Money
(III). Custom Duties

Average Group
topics might be
discussed:
a. Budgets for

Motor Trips
b. Advantages of

All Expense Trips
c. Travel by Air
d. Going Abroad
(I). Passport

Charges
(II). Exchange of Money
(III). Custom Duties
6. If any of the pupils
are interested, have them
make a budget for a farm.

## Slow Group

topics might be
discussed:
a. Budgets for

Motor Trips
b. Advantages of

All Expense Trips
c. Travel by Air
d. Going Abroad
(I). Passport

Charges
(II). Exchange of

Money
(III). Custom Duties
5. If any of the pupils are interested in the farm, have as a class project the making of
a farm budget.
7. Show the value of modern machinery to the farmer.
8. Make a graph showing forest wastes.
9. Emphasize conservation.
10. Buying and building a home should be emphasized. Buying homes on the payment plan should be worked out carefully. If time permits, draw plans and discuss the

of material that this group will bring in for
discussion. Let them
actually plan a house,
find actual costs, and
estimate the cost of
building. Compare this
with buying a house
that has been built.
and can be purchased.
Plan the financing
of the home.
D. Desirable outcomes:

1. Habit of a careful
check on the mathe-
matical aspects of
the home
D. Desirable outcomes:
2. Habit of a careful check on the mathematical aspects of the home
D. Desirable outcomes:
3. Habit of a careful check on the mathematical aspects of the home

## Superior Group

2. Habit of using
arithmetical processes
in business and social
life
3. Habit of practicing economy on the farm
4. Disposition to
protect the forests
5. Knowledge of the
value of good health
6. How to buy and sell
7. How to travel
8. Knowledge of methods
and values in
transportation
9. How to mail letters and parcels

## Average Group

Slow Group
2. Habit of using
arithmetical processes
in business and social life
3. Habit of practicing economy on the farm
4. Disposition to
protect the forests
5. Knowledge of the
value of good health
6. How to buy and sell
7. How to travel
8. Knowledge of methods
and values in
transportation
9. How to mail letters
and parcels
2. Habit of using
arithmetical processes
in business and social
life
3. Habit of practicing economy on the ferm
4. Disposition to protect the forests
5. Knowledge of the value of good health
6. How to buy and sell
7. How to travel
8. Knowledge of methods and values in
transportation
9. How to mail letters

## Average Group

10. Knowledge of the cost, amount of labor, farm implements, etc., needed for the farm
11. An ability to budget and keep a record of income and expenditures
12. Disposition to handle one's financial affairs
13. An appreciation of the arithmetical processes in social and business life
14. An appreciation of the advantages of an education

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## Slow Group

10. Knowledge of the cost, amount of labor, farm implements, etc.,
needed for the
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11. An ability to budget and keep a record of income and expenditures
12. Disposition to handle
one's financial affairs
13. An appreciation of the arithmetical processes in social and business life
14. An appreciation of the advantages of an education

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## Superior Group

Average Group
15. An appreciation of good health
16. An appreciation of the advantages of travel and means of transportation
17. An appreciation of the farm as a source of food supply
18. Responsibility for the protection of forests
19. A desire for better homes

Slow Group
15. An appreciation of good health
16. An appreciation of the advantages of travel and means of transportation
17. An appreciation of the farm as a source of food supply
18. Responsibility for the protection of forests
19. An appreciation of the home

Unit III. The Principles of Percentage Applied to Banking, Installment Buying, Investments, Taxation, and Insurance

Superior Group
A. Specific objectives:

1. To learn the principles of percentage and their use in personal
financial language
2. To appreciate the services rendered by banks
3. To learn how to make wise investments
4. To know when
installment buying
is wise

Average Group
A. Specific objectives:

1. To learn the principles of percentage and their use in personal financial language 2. To appreciate the services rendered by banks
2. To learn how to make wise investments
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## Slow Group

A. Specific objectives:

1. To learn the principles of percentage and their use in personal financial language
2. To appreciate the services rendered by banks
3. To learn how to make wise investments
4. To know when
installment buying
is wise

## Superior Group

5. To instil a feeling of responsibility in governmental support 6. To know the values and appreciate the benefits of insurance
B. Problems:
6. Bánking
a. Money used in the United States (I). Origin of the dollar sign

References:

$$
\text { B. P. S. II, p. } 94
$$

D. W. 8, pp. 102-105
(II). History of money

## Average Group

5. To instil a feeling of responsibility in governmental support
6. To know the values and appreciate the
benefits of
insurance
B. Problems:
7. Banking
a. Money used in
the United States (I). Origin of the dollar sign

References:
B. P. S. II, p. 94
D. W. 8, pp. 102-105 (II). History of money

## Slow Group

5. To instil a feeling of responsibility in. governmental support
6. To know the values and appreciate the
benefits of
insurance
B. Problems:
7. Banking

> a. Money used in
> the United States
> (I). Origin of
> the dollar sign

References:
B. P. S. II, p. 94
D. W. 8, pp. 102-105

## Superior Group

(III). Money used by other countries b. How to deposit and draw out money

References:
B. 8, pp. 49-53
B. ㄹ. S. II, pp. 68-74
B. A. B. II, pp. 221227
Br. 8, pp. 151-153
E. ㄷ. II, pp. 187-189; 196
D. W. 8, pp. 105-112
H. B. K. II, pp. 140145
H. II, pp. 92-101
K. S. R. 8, pp. 454456
(III). Money used by other countries b. How to deposit and draw out money

References:
B. 8, pp. 49-53
B. P. S. II, pp. 68-74
B. A. B. II, pp. 221227
Br. 8, pp. 151-153
E. C. II, pp. 187-189; 196
D. W. 8, pp. 105-112
H. B. K. II, pp. 140145
H. II, pp. 92-101
K. S. ㄹ. 8, pp. 454456
b. How to deposit and draw out money

## References:

B. 8, pp. 49-53
B. P. S. II, pp. 68-74
B. A. B. II, pp. 221227

Br. 8, pp. 151-153
E. C. II, pp. 187-189; 1.96
D. W. 8, pp. 105-112

ㅍ. B. K. II, pp. 140145
H. II, pp. 92-101
K. S. 즈. 8, pp. 454456

Superior Group
S. II, pp. 177-184
s. U. II, pp. 114-119
T. II, pp. 10-12
W. S. B. II, pp. 164170
c. How to borrow money from a bank
References:
B. 8, pp. 200-203
B. ㄹ. S. II, pp. 34-40; 180-184

ㅂ. A. B. II, pp. 230-244
Br. 8, pp. 155-159
E. C. II, pp. 174-182; 199-204
D. W. 8, pp. 161-182
H. B. K. II, pp. 145-150

Average Group

## Slow Group

S. II, pp. 177-184
S. II, pp. 177-184
S. U. II, pp. 114-119
S. U. II, pp. 114-119.
T. II, pp. 10-12
T. II, pp. 10-12
W. S. B. II, pp. 164170
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B. P. S. II, pp. 34-40; 180-184
B. A. B. II, pp. 230-244

Br. 8, pp. 155-159
E. C. II, pp. 174-182; 199-204
D. W. 8, pp. 161-182
H. B. K. II, pp. 145-150
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B. ㄹ. S. II, pp. 34-40; 180-184
B. A. B. II, pp. 230-244

Br. 8, pp. 155-159
E. C. II, pp. 174-182;

199-204
D. W. 8, pp. 161-182
H. B. K. II, pp. 145-150

## Superior Group

H. $\mathrm{II}, \mathrm{pp}$. 101-114
K. S. R. 8, pp. 133-143
S. C. 8 , pp. 152-168
S. II, pp. 185-189
S. U. 8, pp. 124-134
T. II, pp. 12-22
W. S. B. II, pp. 172180
d. Savings accounts
in banks
References:
B. 8, pp. 203-205
B. P. S. II, pp. 74-80
B. A. B. II, pp. 227-230; 259-268
E. C. II, pp. 182-187; 189-195

## Average Group

H. II, pp. 101-114
K. S. ㄹ. 8, pp. 133-143
s. ㄷ. 8, pp. 152-168
S. II, pp. 185-189
S. U. 8, pp. 124-134
T. II, pp. 12-22
W. S. B. II, pp. 172~ 180
d. Savings accounts
in banks
References:
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B. ㄹ. S. II, pp. 74-80
B. A. B. II, pp. 225-230; 259-268
E. ․ II, pp. 182-187; 189-195

Slow Group
H. II, pp. 101-114
K. S. R. 8 , pp. 133-143
S. ㄷ. 8, pp. 152-168
S. II, pp. 185-189
S. U. 8, pp. 124-134
T. II, pp. 12-22
W. S. B. II, pp. 172180
d. Savings accounts
in banks
References:
B. 8, pp. 203-205
B. P. S. II, pp. 74-80
B. A. B. II, pp. 225-230; 259-268
E. C. II, pp. 182-187;

189-195

## Superior Group

D. W. 8, pp. 182-188
H. II, pp. 23-35
K. S. R. 8, pp. 106109; 116-132
S. ㄷ. 8, pp. 184-201
S. II, pp. 191-195
S. U. II, pp. 135-145
e. Services rendered
by the bank
(I). Acts as an agent in the exchange of money between individuals and firms (II). Lends money (III). Provides for installment buying
D. W. 8, pp. 182-188
H. II, pp. 23-35
K. S. R. 8 , pp. 106-

## 109; 116-132

S. C. 8 , pp. 184-201
S. II, pp. 191-195
S. U. II, pp. 135-145
e. Services rendered
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Slow Group
D. W. 8, pp. 182-188
H. II, pp. 23-35
K. S. R. 8, pp. 106109; 116-132
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（A）．Commer－
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（B）．Trade
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（V）．Aids the travel－ er by：
（A）．Letters of credit
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（A）．Cormer－
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（B）．Trade
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（V）．Aids the travel－ er by：
（A）．Letters of credit
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H. B. K. II, pp. 135-138
H. II, pp. 69-72
K. S. R. 8, pp. 149-162
S. ㄷ. 8, pp. 238-244
S. II, pp. 225-229
S. U. II, pp. 183-190
W. S. B. II, pp. 218-222
W. 8, pp. 115-118
(III). Accident and health insurance

References:
S. U. II, pp. 194-196
K. S. R. 8, pp. 150 ; 175
(IV). Workman's compensation insurance

References:
S. C. 8, p. 247
E. C. II, p. 260
(V). Burglar
insurance
References:

> E. C. II, p. 261
> (VI). Automobile insurance
(A). Fire and theft

References:
B. A. B. II, p. 348
E. ́. II, pp. 252-253
H. II, pp. 67-69
K. S. 즈. 8, pp. 176-177
S. C. 8, p. 246
S. U. II, pp. 190-192

Average Group
References:
S. C. 8, p. 247
E. C. II, p. 260
(V). Burglar
insurance
References:
E. C. II, p. 261
(VI). Automobile
insurance
(A). Fire and theft

References:
B. A. B. II, p. 348
E. C. II, pp. 252-253
H. II, pp. 67-69
K. S. R. 8, pp. 176-177
S. C. 8, p. 246
S. U. II, pp. 190-192

## Slow Group

## References:

S. C. 8, p. 247
E. C. II, p. 260
(V). Burglar
insurance
References:
E. C. II, p. 261
(VI). Automobile
insurance
(A). Fire and theft

References:
B. A. B. II, p. 348
E. C. II, pp. 252-253
H. II, pp. 67-69
K. S. R. 8, pp. 176-177
S. C. 8, p. 246
S. U. II, pp. 190-192

## Superior Group

## (B). Public <br> liability

References:
B. A. B. II, p. 349
E. C. II, pp. 252-255
H. II , pp. 67-69
K. S. ㄹ. 8, pp. 150; 178; 179-181
S. U. II, p. 191

## (C). Property collision

References:
B. A. B. II, pp. 348-349
E. C. II, pp. 252-253
K. S. R. 8, p. 177
S. U. II, p. 191
(VII). Review

## Average Group

(B). Public
liability
References:
B. A. B. II, p. 349
E. C. II, pp. 252-255
H. II, pp. 67-69
K. S. R. 8, pp. 150; 178; 179-181
S. U. II, p. 191
(C). Property collision

References:
B. A. B. II, pp. 348-349
E. C. II, pp. 252-253
K. S. R. 8, p. 177
S. U. II, p. 191
(VII). Review

## Slow Group

(B). Public
liability

References:
ㄹ. A. B. II, p. 349
E. C. II, pp. 252-255
H. II, pp. 67-69
K. S. R. 8, pp. 150; 178; 179-181
S. U. II, p. 191
(C). Property
collision
References:
B. A. B. II, pp. 348-349
E. C. II, pp. 252-253
K. S. R. 8, p. 177
S. U. II, p. 191
(VII). Review

## Superior Group

## References:

B. ㄹ. S. II, pp. 221223
E. ́. II, p. 263
K. S. R. 8 , pp. 171-173
S. U. II, p. 196
W. S. B. II, pp. 221-223
C. Pupil-teacher activities: 1. The following points should be brought up for discussion and reports:
a. How banks aid the depositor and community
b. How banks aid the business man

## Average Group

References:
B. P. S. II, pp. 221223
E. C. II, p. 263
K. S. R. 8, pp. 171-173
S. U. II, p. 196

IT. S. B. II, pp. 221-223
C. Pupil-teacher activities:

1. The following points should be brought up for discussion and reports:
a. How banks aid the depositor and community
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References:
B. P. S. II, pp. 22I223
E. C. II, p. 263
K. S. R. 8, pp. 171-173
S. U. II, p. 196
W. S. B. II, pp. 221-223
C. Pupil-teacher activities:

1. The following points should be brought up for discussion and reports:
a. How banks aid the depositor and community
b. How banks aid the business man

## Superior Group

c. Why a thrifty person should keep both a checking and savings account
d. Price of renting
a safety deposit box and nature of what to place in such
a box
e. Difference between
a cashier's check and
a certified check
f. Devices that may be used to prevent forgery or raising checks
g. Three safe ways of carrying money on a journey

## Average Group

c. Why a thrifty person should keep both a checking and savings account
d. Price of renting
a safety deposit box and nature of what to place in such
a box
e. Difference between
a cashier's check and
a certified check
f. Devices that may be used to prevent forgery or raising checks g. Three safe ways of carrying money on a journey

## Slow Group

c. Why a thrifty person should keep both a checking and savings account d. Price of renting a safety deposit box and nature of what to place in such
a box
e. Difference between
a cashier's check and
a certified check
f. Devices that may be used to prevent forgery or raising checks
g. Three safe ways of carrying money on a journey

## Superior Group

h. Why a bank makes
a community a safer
place in which to
live

1. State banks
j. National banks
k. Usury
2. The protectograph
3. The following terms should become a part
of the pupil's
vocabulary:
a. Federal Reserve
b. Rediscounting
c. Legal Tender
d. Negotiable Notes
e. Sight Draft

## Average Group

h. Why a bank makes
a community a safer
place in which to
live
i. State banks
j. National banks
2. The following terms should become familiar to the pupil:
a. Federal Reserve
b. Rediscounting
c. Legal Tender
d. Negotiable Notes
e. Sight Draft

## Slow Group

h. Why a bank makes
a community a safer
place in which to
live
2. The following terms should be discussed in class:
a. Federal Reserve
b. Rediscounting
c. Drafts
d. Clearing House
e. Travelers' Cheques

## Superior Group

P. Time Draft
g. Commercial Drafts
h. Travelers' Cheques
i. Bank Endorsement
j. Endorsement in Full
k. Restricted Endorsement

1. "Greenbacks"
m. National Bank Notes
n. Silver Certificates
o. Federal Reserve Notes
p. Protectograph
q. Usury
r. Board of Directors
s. Bank Discount
t. Proceeds
u. Trade Acceptance
v. Letter of Credit

Average Group
f. Time Draft
g. Commercial Drafts
h. Travelers' Cheques
i. Bank Endorsement
f. Endorsement in Full
k. Restricted Endorsement

1. "Greenbacks"
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## Slow Group

f. Endorsement
g. Bank Notes
h. Silver Certificates
i. Board of Directors
J. Bank Discount
k. Proceeds

1. Trade Acceptance
m. Letter of Credit

## Superior Group

w. Collateral
3. Bring out the high rate of interest charged for installment buying. Discuss the fairness of this high rate to the merchant in consideration of his risk. How does this plan aid both the merchant and consumer? When should installment buying be used?
4. Actually form a stock company and in this way bring out the advantages and disadvantages of investing

Average Group
w. Collateral
3. Bring out the high rate of interest charged for installment buying Discuss the fairness of this high rate to the merchant in consideration of his risk. How does this plan aid both the merchant and consumer? When should installment buying be used?
4. Discuss the organization of a stock company, bringing out the advantages and disadvantages of investing

## Slow Group

3. Bring out the high rate of interest charged for installment buying. Discuss the fairness of this high rate to the merchant in consideration of his risk. Show that this plan aids both the merchant and consumer. Discuss wise and unwise installment buying.
4. Discuss the organization of a stock company, bringing out the advantages and disadvantages of investing .

## Superior Group

money in stock.
5. Bring out the fact
that real estate is the safest investment.
6. Have examples of poor investments brought to class. Show the value of proper investigation and advice.
7. The following points should be brought out in the review of investments:
a. Bonds issued by the city
b. The fluctuations
in market value of

## Average Group

money in stock.
5. Bring out the fact
that real estate is the
safest investment.
6. Have examples of poor
investments brought to class. Show the value
of proper investigation and advice.
7. The following points
should be brought out
in the review of
investments:
a. Bonds issued by
the city
b. The fluctuations

## Slow Group

money in stock. 5. Bring out the fact that real estate is the safest investment.
6. Have examples of poor
investments brought to class. Show the value of proper investigation and advice.

## Superior Group

certain stocks and
bonds from day to day as given in the local newspapers.
c. The price of one hundred shares of stock purchased a month ago and the amount of money lost or gained if sold to-day.
d. The value of stock issued by local corporations.
e. The history of the stock exchange

## Average Group

bonds from day to
day as given in the local newspapers.
c. The price of one
hundred shares of
stock purchased a
month ago and the
amount of money lost
or gained if sold
to-day.
d. The value of stock
issued by local cor-
porations.
e. The "ticker"

## Superior Group

g. How a person may borrow funds
to aid in building
a home.
h. Buying mortgages
i. How a building
and loan operates
8. The following terms should be added to the pupil's vocabulary:
a. Stock
b. Bond
c. Corporation
d. Preferred
e. Broker
f. Common Stock
g. Stock Exchange

Average Group
f. How a person
may borrow funds
to aid in building
a home.
g. How a building
and loan operates
8. The following terms
should be discussed in class:
a. Stock
b. Bond
c. Corporation
d. Preferred
e. Broker
f. Common Stock
g. Stock Exchange

Slow Group
7. The following terms should be brought out in the recitation:
a. Stock
b. Bond
c. Corporation
d. Preferred
e. Broker
f. Common Stock
g. Stock Exchange

## Superior Group

h. Bar
i. Brokerage
j. Stock Quotation
k. Rate of Return

1. Stockholder
m. Capital
n. Dividends
o. Coupon
p. Speculation
q. Speculator
r. "Wildcat Stock"
s. Market Value
2. Have tax receipts brought to class and discussed.
3. The following topics, some of which are

Average Group
h. Bar
i. Brokerage
J. Stock Quotation
k. Rate of Return

1. Stockholder
m. Capital
n. Dividends
o. Coupon
p. Speculation
q. Speculator
r. "Wildcat Stock"
s. Market Value
2. Have tax receipts
brought to class and
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3. The following topics, some of which are

## Slow Group

h. Bar

1. Brokerage
j. Stock Quotation
k. Rate of Return
2. Stockholder
m. Capital
n. Dividends
o. Coupon
p. Speculation
q. Speculator
r. "Wildcat Stock"
s. Market Value
3. Have tax receipts brought to class and discussed.
4. The following topics,

Superior Group
indirectly related to taxation, may be
discussed:
a. A Deed for a

Piece of Property
b. Why and How

Deeds Are
Registered
c. What Happens

When Taxes Are
Not Paid
d. The Function of Real Estate Firms
e. The First Steps
in the Purchase or
Sale of Property
f. Insuring the Title
to a Piece of Property

## Average Group

indirectly related to taxation, may be
discussed:
a. A Deed for a

Piece of Property
b. Why and How

Deeds Are
Registered
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## Slow Group

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discussed:
a. A Deed for a

Plece of Property
b. Why and How

Deeds Are
Registered
c. What Happens

When Taxes Are
Not Paid
d. The Function of

Real Estate Firms
e. The First Steps
in the Purchase or
Sale of Property
f. Insuring the Title
to a Piece of Property

## Superior Group

g. Precautions to

Take in Buying
Property
h. Foreclosing a

Mortgage
i. Tariff on Articles

Imported into this
Country
11. The following terms should be added to the pupil's vocabulary:
a. Taxes
b. Assessed Valuation
c. Assessor
d. Tax Levy or Rate
e. Mill
f. Special Assessment

## Average Group

g. Precautions to

Take in Buying
Property
h. Foreclosing a

Mortgage
11. The following terms should be discussed in class:
a. Taxes
b. Assessed Valuation
c. Assessor
d. Tax Levy or Rate
e. Mill
f. Special Assessment

## Slow Group

g. Precautions to

Take in Buying
Property
h. Foreclosing a

Mortgage
10. The following terms should be brought out in class:
a. Taxes
b. Assessed Valuation
c. Assessor
d. Tax Levy or Rate
e. Mill
f. Special Assessment

## Superior Group

g. Revenue
h. Customs
i. Tariff
j. Income Tax
k. Surtax

1. Bonded Indebtedness
m. Exemptions
n. Gross Income
2. Have the pupils
bring in examples of
the value of
insurance.
3.:: The following topics
may be used for class
.discussion or reports:
a. Fire Hazards and

Their Effect on

## Average Group

g. Revenue
h. Customs
i. Tariff
j. Income Tax
k. Surtax

1. Exemptions
m. Gross Income
2. Have the pupils
bring in examples of
the value of insurance.
3. The following topics may be used for class discussion or reports:
a. Fire Hazards and Their Effect on

## Slow Group

g. Revenue
h. Customs
i. Tariff
j. Income Tax
k. Exemptions
11. Have the pupils bring in examples of the value of insurance.
12. The following topics may be used for class discussion or reports:
a. Fire Hazards and

Their Effect on
Superior Group
Premium Rates
b. Common Causes
of Fires
c. Fire Preventions
d. Four Kinds of Life
Insurance Policies
e. How a Life Insurance
Company Uses the Pre-
miums Paid to Them
f. Marine Insurance
g. Old Age Insurance
h. Employer's Liability
Insurance
i. Total and Partial
Disability Clauses
in Insurance
Policies

Superior Group

## Preaiun Rates

of Fires
c. Fire Preventions
d. Four Kinds of Life

Insurance Policies
e. How a Life Insurance

Company Uses the Premiums Paid to Them
f. Marine Insurance
g. Old Age Insurance
h. Employer's Liability

Insurance
i. Total and Partial

Disability Clauses
in Insurance
Policies

## Average Group

## Premium Rates

b. Common Causes
of Fires
c. Fire Preventions
d. Four Kinds of Life

Insurance Policies
e. How a Life Insurance Company Uses the Premiums Paid to Them
f. Marine Insurance
g. Old Age Insurance
h. Employer's Liability Insurance
i. Total and Partial

Disability Clauses
in Insurance
Policies

## Slow Group

Premium Rates
b. Common Causes
of Fires
c. Fire Preventions
d. Four Kinds of Life

Insurance Policies
e. How a Iife Insurance

Company Uses the Pre-
miums Paid to Them
f. Marine Insurance
g. Old Age Insurence
h. Employer's Liability

Insurance
i. Total and Partial

Disability Clauses
in Insurance
Policies

## Superior Group

f. Tornado Insurance
k. Hail and Rain

Insurance
14. The following terms should be added to the pupil's vocabulary:
a. Contract
b. Policy
c. Insurer
d. Insured
e. Premiums
f. Face of the Policy
g. Policy Holder
h. Beneficiary
i. "Law of Averages"
j. Dividends
k. Risk

## Ayerage Group

J. Tornado Insurance
k. Hail and Rain

Insurance
14. The following terms should be discussed in class:
a. Contract
b. Policy
c. Insurer
d. Insured
e. Premiums
f. Face of the Policy
g. Policy Holder
h. Beneficiary
i. "Law of Averages"
f. Dividends
k. Risk

## Slow Group

j. Tornado Insurance
k. Hail and Rain

Insurance
13. The following terms should be brought out
in class:
a. Contract
b. Policy
c. Insurer
d. Insured
e. Premiums
f. Face of the Policy
g. Policy Holder
h. Beneficiary

1. "Law of Averages"
j. Dividends
k. Inventory

## Superior Group

1. Sharing of Risks
m. Inventory
n. Ticket Accident

Policy

- Pilferage
p. Liability
q. Collision
r. Distribute the Loss

15. Much time should be spent on this unit.

## Average Group

1. Sharing of Risks
m. Inventory
n. Pilferage
o. Liability
p. Collision
q. Distribute the Loss
2. Much time should be spent on this unit. This group will complete this work at the end of the semester.

## Slow Group

1. Sharing of Risks
m. Liability
n. Collision
O. Adjuster
p. Distribute the Loss
2. Much time should be spent on this unit. At the end of the semester, this group will not have quite completed this unit. Finish
this work as it is
important to all
people.

## Superior Group

D. Desirable outcomes:

1. Habit and disposition of investing savings
2. Habit of checking one's personal financial affairs
3. A disposition to pay taxes willingly 4. Habit of getting proper financial advice
4. Knowledge of banks and banking processes
5. Knowledge of how
to make wise
investments

## Average-Group

## D. Desirable outcomes:

1. Habit and disposition of investing savings
2. Habit of checking one's personal financial affairs
3. A disposition to pay taxes willingly
4. Habit of getting proper financial advi ce
5. Knowledge of banks and banking processes
6. Knowledge of how
to make wise
investments

## Slow Group

D. Desirable outcomes:

1. Habit and disposition of investing savings
2. Habit of checking one's personal financial affairs
3. A disposition to pay taxes willingly
4. Habit of getting
proper financial
advice
5. Knowledge of banks and banking processes
6. Knowledge of how
to make wise
investments

Superior Group
7. Knowledge of wise
installment buying
8. Knowledge of the
advantages of being
protected with
insurance
9. Knowledge of the expenditures of public money
10. Appreciation of the services rendered by the bank
11. The proper attitude towards installment buying
12. Appreciation of the value of insurance

## Average Group

7. Knowledge of wise installment buying
8. Knowledge of the advantages of being protected with
insurance
9. Knowledge of the expenditures of public money
10. Appreciation of
the services rendered by the bank
11. The proper attitude towards install-
ment buying
12. Appreciation of
the value of insurance

## Slow Group

7. Knowledge of wise installment buying 8. Knowledge of the advantages of being protected with insurance
8. Knowledge of the expenditures of
public money
9. Appreciation of
the services rendered
by the bank
10. The proper attitude towards install-
ment buying
11. Appreciation of
the value of insurance
Superior Group
as a protection and
as an investment
12. Appreciation for
all the benefits
derived from
taxation

Average Group
as a protection and
as an investment
13. Appreciation for
all the benefits
derived from
taxation

Slow Group
as a protection and
as an investment
13. Appreciation for
all the benefits
derived from
taxation

Superior Group
A. Specific objectives:

1. To show that the metric system is a simpler method of computation
2. To prepare the way for the use of this system in the sciences
3. To show the possibility of the adoption of this system by the United States

## Average Group

A. Specific objectives:

1. To show that the metric system is a simpler method of computation
2. To prepare the way for the use of this system in the sciences
3. To show the pos-
sibility of the
adoption of this
system by the
United States

## Slow Group

A. Specific objectives:

1. To show that the metric system is an easy method of computation

## Superior Group

B. Problems:

1. Origin of the system
2. Comparison with other systems
3. Units used in the system
4. Tables and problems involving:
a. Length
b. Surface
c. Volume and capacity d. Weight

References:
B. 8, pp. 153-157;

257-258

## Average Group

B. Problems:

1. Origin of the system
2. Comparison with other systems
3. Units used in the system
4. Tables and problems involving:
a. Length
b. Surface
c. Volume and
capacity
d. Weight

References:
B. 8, pp. 153-157;

257-258

Slow Group
B. Problems:

1. Origin of the system
2. Comparison with other systems
3. Units used in the system

References:

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B. 8, pp. 153-157;
    257-258
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## Superior Group

Br. 8, pp. 95-97
D. W. 8, pp. 92-102
E. C. II, pp. 144-147; 363-365
H. B. K. II, pp. 185-192
H. II, pp. 165-171
K. S. R. 8, pp. 278-292
S. II, pp. 50-52
S. U. II, pp. 205-211
T. II, pp. 103-110

프. S. B. II, pp. 250-254
W. 8, pp. 203-211
C. Pupil-teacher activities:

1. Special reports and
class discussion on:
a. The History of

## Slow Group

Br. 8, pp. 95-97
D. W. 8, pp. 92-102
E. C. II, pp. 144-147;
H. B. K. II, pp. 185-192
H. II, pp. 165-171
K. S. R. 8, pp. 278-292
S. II, pp. 50-52
S. U. II, pp. 205-211
T. II, pp. 103-110
W. S. B. II, pp. 250-254
W. 8, pp. 203-211
the Metric System

## Superior Group

b. The Uses of the

Metric System
c. Attempts to Adopt
I.t in the United

States
d. Its Possibility
of Becoming a
Universal
System
2. Discuss the ad-
vantages and disad-
vantages of using
the system.
3. Work problems involving the system.

## Average Group

## Slow Group

1. Discuss the advantages and disadvantages of using the system.
2. Work a few problems involving the system.
3. Discuss the advantages and disadvantages of using the system.
4. Work out with the class as a project a few problems involving

## Superior Group

## Average Group

## Slow Group

the system. Discuss
these. Do not give
any to individuals
to solve unless the
class is a superior
slow group.
3. Spend very little
time on this unit.
4. Spend the remainder
of the semester on this
unit. It can be made
very interesting and practical.
5. The following terms
should be discussed:
a. Deca
b. Hecto
c. Kilo
3. Spend only a few days on this unit. It should begin the next semester's work.
d. Myria
e. Deci

## Superior Group

## Average Group

## Slow Group

f. Centi
g. Milli
h. Meter
i. Tare
j. Gram
k. Liter
D. Desirable outcomes:
D. Desirable outcomes:
D. Desirable outcomes:

1. Habit of using the
metric system as a
method of mea-
surement
2. Ability to use the
metric system for
exact measure in
science
3. Knowledge of terms
used in the metric
system

| 1. Knowledge of terms | 1. Knowledge of terms |
| :--- | :--- |
| used in the metric | used in the metric |
| system | system |

## Superior Group

4. Knowledge of the uses of the metric system
5. Appreciation of the uses and advantages of the system
6. Appreciation of this system as one of the best to adopt for
a universal method
of measurement

Average Group
2. Knowledge of the uses of the metric system
3. Appreciation of the uses and advantages of the system

## Slow Group

2. Knowledge of the uses of the metric system
3. Appreciation of the uses and advantages of the system

Unit V. Arithmetical Algebra as a Foundation for Arithmetical Geometry

## Superior Group

A. Specific objectives:

1. To think mathematically
2. To show the relation between
arithmetic and
algebra
3. To introduce the
first principles of trigonometry
4. To introduce the equation and formula
in geometric measure
5. To begin to think
in terms of logical

Average Group
A. Specific objectives:

1. To think mathematically
2. To show the re-
lation between
arithmetic and
algebra
3. To introduce the
first principles of
trigonometry
4. To introduce the equation and formula in geometric measure

Slow Group
A. Specific objectives:

1. To think mathematically

## Superior Group

content rather than
particular things
6. To teach the value and use of tables for computation
7. To bridge the gap between arithmetic and algebra
B. Problems:

1. Ratio as an introduction to the equation

References:
B. 8, pp. 102-105
B. P. S. II, pp. 214-217
B. A. B. II, p. 128
E. C. II, pp. 63-65

## Average Group

5. To teach the value and use of tables for computation
6. To bridge the gap
between arithmetic
and algebra
B. Problems:
7. Ratio as an introduction to the equation

References:
B. 8, pp. 102-105
B. P. S. II, pp. 214-217
B. A. B. II, p. 128
E. C. II, pp. 63-65
2. To teach the value and use of tables for computation
B. Problems:

1. Ratio as a new form of division

References:
B. 8, pp. 102-105
B. P. S. II, pp. 214-217
B. A. B. II, p. 128
E. ́. II, pp. 63-65

## Superior Group

G. II, pp. 90-92; 243
H. B. K. II, pp. 47-48
H. II, pp. 172-174
K. S. R. 8, pp. 318-324
S. II, pp. 25-27
S. U. II, pp. 231-235
2. The equation as a basis for proportion References:
B. 8, p. 105
B. P. S. II, pp. 217-219
B. A. B. II, pp. 129-138
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2. Proportion and its
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2. Proportion as the relation of two ratios

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a. The geometric method
b. The algebraic method
(I). The binomial method
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3. Squaring numbers
a. The algebraic method
(I). The binomial method
b. Arithmetical
method
c. Using tables

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3. Squaring numbers
a. Arithmetical method
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4. Square roots of numbers
a. Geometric
method
b. Algebraic
method
c. Factoring
đ. Arithmetical method
e. Use of the table

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4. Square roots of numbers
a. Factoring
b. Arithmetical me thod
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## Slow Group

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5. The Pythagorian Theorem
W. 8, pp. 40-45; 216-217
5. The Pythagorian Theorem

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a. History of
b. What it concerns
c. The theorem itself
(I). Geometric concept (II). Algebraic concept

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B. P. S. II, pp. 202-214

Br. 8, pp. 82-87
B. A. B. II, pp. 157-160
D. W. 8, pp. 44-54
E. C. II, pp. 119-126
G. II, pp. 60-68; 136-141

## Average Group

a. What it concerns
b. The theorem itself
(I). Geometric concept
(II). Algebraic concept
(III). Arithmetical

References:
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E. ㄷ. II, pp. 119-126
G. II, pp. 60-68; 136-141

## Slow Group

a. What it concerns
b. The theorem itself
(I). Arithmetical concept

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K. S. R. 8, pp. 344-349
s. ㄷ. 8, pp. 102-106; 108-113
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S. U. II, pp. 256-261
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C. Pupil-teacher activities:

1. Teach ratio as abstract numbers.

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S. II, pp. 82-84
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W. 8, pp. 37-39
C. Pupil-teacher activities:

1. Teach ratio as
abstract numbers.

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K. S. R. 8, pp. 344-349
S. ㄷ. 8, pp. 105-106;

108-113
S. U. II, pp. 257-259
C. Pupil-teacher activities:

1. Teach ratio as abstract numbers.
2. Ratio to this group
should mean another
form of division or
fractions.
Superior Group
definite mathematical
language. The follow-
ing terms should be
emphasized and made
a part of the pupil's
vocabulary:
a. :, meaning, is to
or divided by
b. : : , meaning, equals
c. $\frac{1}{4}$, meaning, one
divided by four
d. Means, meaning,
middle terms
e. Extremes, meaning,
the outside terms

Average Group
definite mathematical
language. The follow-
ing terms should be
emphasized and made
a part of the pupil's

## vocabulary:

a. : , meaning, is to
or divided by
b. ::, meaning, equals
c. $\frac{1}{4}$, meaning, one
divided by four
d. Means, meaning
middle terms
e. Extremes, meaning,
the outside terms

## Slow Group

Superior Group
Average Group

```
    Slow Group
equality of two ratios.
Review reducing fractions
to lower terms and rais-
ing them to higher
denominations.
```

3. In the geometric
method of squaring
numbers, have accurate
scale drawings made
to represent the
squares of
numbers.

| 4. In the algebraic | 3. In the algebraic |
| :--- | :--- |
| method use the "t $+u "$ | method use the "t $+u "$ |
| symbols. Use this | method only with tho se |
| method as a mental | who can grasp it. Here |
| process as far as | the class may have to be |

Superior Group possible.

## Average Group

divided into two groups. However, present the method to both groups and after several attempts divide the group, presenting the regular arithmetical method to those who can not get the other. Show to the other group that this new method may be used for mental work in some cases.

Slow Group
4. Use the arithmetical process in finding the square root except in

## Superior Group

## Slow Group

rare cases where a
few average people
may be in the group.
Try the other method
( $t+u$ ) in individual
cases.
5. In finding roots
of numbers, if the
class is a superior
class that does rapid
work, then from the
squares of numbers,
the table of a few
of the cubes of
numbers may be
worked out. In

Superior Group
may be divided in groups;
then to the better group
the cube roots of numbers
may be touched lightly.
However, teach both groups
the use of the table in
finding the cube root.
6. Have pupils solve problems by the two methods using one as
a check of the other.
7. In problems concerning the Pythagorean
theory have accurate
drawings made. Use
these as checks on the

Average Group
4. Have pupils solve problems by the two methods using one as a check of the other. 5. In problems concerning the Pythagorean theory have accurate scale drawings made. Use these as checks on the
6. In the Pythagorean theory tell the pupils its value and give them a general knowledge of its use. Have them make

Superior Group
other solutions.
8. The following terms should be added to the pupil's vocabulary:
a. Power
b. Root
c. Base
d. Exponent
e. Square
f. Cube
g. Extract Roots
h. Factor
i. Radical Sign
j. Pythagoras
k. Hypotenuse

1. Legs of a Triangle

## Average Group

other solutions.
6. The following terms should be added to the pupil's vocabulary:
a. Power
b. Root
c. Base
d. Exponent
e. Square
f. Cube
g. Extract Roots
h. Factor
i. Radical Sign
j. Pythagoras
k. Hypotenuse

1. Legs of a Triangle

## Slow Group <br> drawings illustrating the problems solved.

7. The following terms should be added to the pupil's vocabulary:
a. Root
b. Exponent
c. Square
d. Extract Roots
e. Radical Sign
f. Pythagoras
g. Hypotenuse
h. Base of a Triangle
i. Altitude of a Triangle

## Superior Group

m. Base of a Triangle
n. Altitude of
a Triangle
D. Desirable outcomes:

1. Habit of using abstractions and generalizations, as opposed to concreteness and particularity in problem solving situations
2. Knowledge of new terms and new methods
3. How to square numbers geometrically and
algebraically.

## Average Group

m. Base of a Triangle
n. Altitude of
a Triangle
D. Desirable outcomes:

1. Knowledge of new methods and terms
2. How to square numbers algebraically and arithmetically

## Slow Group

D. Desirable outcomes:

1. Knowledge of new terms and application of old methods to new situations
2. How to square numbers arithmetically

## Superior Group

4. How to interpret and use a table for square and cubic measure
5. An understanding of the first steps in factoring
6. A knowledge of the Pythagorean Theorem as an introduction to trigonometry
7. An appreciation of the interdependence of algebra, arithmetic, and geometry
8. An appreciation of mathematical history and its influence on the advancement of cịvilization

## Average Group

3. How to interpret and
use a table for square
measure
4. An understanding of
the first steps in
factoring
5. A knowledge of the Pythagorean Theorem as
an introduction to
trigonometry
6. An appreciation of
the interdependence of
algebra, arithmetic, and geometry

## Slow Group

3. How to interpret and use a table for square measure
4. A knowledge of the Pythagorean Theorem and its uses to the surveyor

Unit VI. Arithmetical Geometry

## Superior Group

A. Specific objectives:
l. To review intuitive geometry
2. To develop a concept
of measure and measure values
3. To give an insight into spatial relations 4. To develop and use the algebraic formulae in terms of geometric language
B. Problems:

1. Review of intuitive geometry

## Average Group

A. Specific objectives:

1. To review intuitive geometry
2. To develop a concept
of measure and measure values
3. To give an insight into spatial relations
4. To develop and use the algebraic formulae in terms of geometric language
B. Problems:
5. Review of intuitive geometry

## Slow Group

A. Specific objectives:

1. To review intuitive geometry
2. To develop a concept of measure and measure values
3. To introduce the solids
4. To teach how to find the values of surfaces and volumes
B. Problems:
5. Review of intuitive geometry

Superior Group
a. Forms and
measurements
b. Surfaces
c. Triangle
constructions
d. Other
constructions
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K. S. R. 8, pp. 369-381
S. II, pp. 48-78; 108121
S. U. II, pp. 213-230
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2. Similar figures
a. Meaning of
b. Examples in nature

## Average Group

a. Forms and
measurements
b. Surfaces
c. Triangle
constructions
d. Other
constructions
References:
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S. U. II, pp. 213-230
W. 8, pp. 1-38
2. Similar figures
a. Meaning of
b. Examples in nature

## Slow Group

a. Forms and
measurements
b. Surfaces
c. Triangle
constructions
d. Other
constructions
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d. Similar triangles (I). Relation between
(II). How related to surveying

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c. Principles gov-
erning all similar
figures
d. Similar triangles
(I). Relation between
(II). How related to surveying

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3. Measuring areas and volumes
a. Areas of parallelograms

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3. Measuring areas and volumes
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b. Areas of triangles

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b. Areas of triangles

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## Slow Group

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W. 8, pp. 94-96
h. Volumes and sur-
faces of pyramids and cones

Slow Group
E. C. II, pp. 164-167
G. II, pp. 187-193;

195-196
H. B. K. II, pp. 77-80
H. II, pp. 146-150
K. S. R. 8, pp. 267; 271272
S. II, pp. 125-127
S. U. II, pp. 59-64
I. II, pp. 91-95
W. S. B. II, pp. 26-27
W. 8, pp. 94-96
h. Volumes and surfaces of pyramids and cones

## Superior Group

## References:

B. 8, pp. 161-165
B. P. S. II, pp. 252-257

Br. 8, pp. 97; 110-117
B. A. B. II, pp. 184-187
D. W. 8, p. 77
E. ́. II, pp. 164-16.7
G. II, pp. 202-207
H. B. K. II, pp. 77-80
H. II, pp. 163-165
K. S. 그. 8, pp. 267-268; 273-275
S. II, pp. 127-128
S. U. II, pp. 66-69
T. II, pp. 95-98
W. S. B. II, pp. 22-24; 27
W. 8, pp. 92-94; 96-99

## Average Group

References:
B. 8, pp. 161-165
B. P. S. II, pp. 252-257

Br. 8, pp. 97; 110-117
B. A. B. II, pp. 184-187
D. W. 8, p. 77
E. C. II, pp. 164-167
G. II, pp. 202-206
H. B. K. II, pp. 77-80
H. II, pp. 163-165
K. S. R. 8, pp. 267-268
S. II, pp. 127-128
S. U. II, pp. 66-69
T. II, pp. 95-98
W. S. B. II, pp. 22-24
W. 8, pp. 92-94

## Slow Group

## References:

B. 8, pp. 161-165
B. P. S. II, pp. 252-257

Br. 8, pp. 97; 110-115
B. A. B. II, pp. 184-187
D. W. 8, p. 77
E. C. II, pp. 164-167
G. II, pp. 202-206
H. B. K. II, pp. 77-80
H. II, pp. 163-165
K. S. R. 8, pp. 267-268
S. II, pp. 127-128
S. U. II, pp. 66-69
T. II, pp. 95-98
W. S. B. II, pp. 22-24
W. 8, pp. 92-94

## Superior Group

1. Volumes and surfaces of spheres

References:
B. 8, pp. 167-169
B. P. S. II, pp. 257-259

Br. 8, pp. 97; 117-121
B. A. B. II, p. 187
E. C. II, pp. 165-167
H. B. K. II, pp. 80-82
H. II, pp. 163-165
S. II, pp. 128-131
S. U. II, pp. 69-72
T. II, pp. 96-102
W. S. B. II, p. 28
W. 8, pp. 99-101
4. General review

References:

## Average Group

i. Volumes and surfaces of spheres

References:
B. 8, pp. 167-169
B. ㄹ. S. II, pp. 257-259

Br. 8, pp. 97; 117-121
B. A. B. II, p. 187
E. C. II, pp. 165-167
H. B. K. II, pp. 80-82
H. II, pp. 163-165
S. II, pp. 128-131
S. U. II, pp. 69-72
T. II, pp. 96-102
W. S. B. II, p. 28
W. 8, pp. 99-101
4. General review

References:

## Slow Group

i. Volumes and surfaces of spheres

References:
B. 8, pp. 167-169
B. P. S. II, pp. 257-259

Br. 8, pp. 97; 117-121
B. A. B. II, p. 187
E. C. II, pp. 165-167
H. B. K. II, pp. 80-82
H. II, pp. 163-165
S. II, pp. 128-131
S. U. II, pp. 69-72
T. II, pp. 96-102
W. S. B. II, p. 28
W. 8, pp. 99-101
4. General review

References:

## Superior Group

B. 8, pp. 25-32; 176-185
B. ㄹ. S. II, pp. 235-236; 259-264

Br. 8, pp. 121-123
B. A. B. II, pp. 104-106; 188
D. W. 8, pp. 74-77; 8.2-87; 89-92
E. C. II, pp. 170-172
G. II, pp. 196-199
H. B. K. II, pp. 82-85; 88
S. II, pp. 131-134
S. U. II, pp. 72-80
W. S. B. II, pp. 262-264
W. 8, pp. 73-75; 101-105
C. Pupil-teacher activities:

Average Group
B. 8, pp. 25-32; 176-185
B. P. S. II, pp. 235-236; 259-264

Br. 8, pp. 121-123
B. A. B. II, pp. 104-106; 188
D. W. 8, pp. 74-77; 82-87; 89-92
E. ㄷ. II, pp. 170-172
G. II, pp. 196-199
H. B. K. II, pp. 82-85; 88
S. II, pp. 131-134
S. U. II, pp. 72-80
W. S. B. II, pp. 262-264
W. 8, pp. 73-75; 101-105

Slow Group
B. 8, pp. 25-32; 176-185
B. P. S. II, pp. 235-236; 259-264

Br. 8, pp. 121-123
B. A. B. II, pp. 104-106; 188
D. W. 8, pp. 74-77; 82-87; 89-92
E. ́. II, pp. 170-172
G. II, pp. 196-199
H. B. K. II, pp. 82-85; 88
S. II, pp. 131-134
S. U. II, pp. 72-80

IT. S. B. II, pp. 262-264
W. 8, pp. 73-75; 101-105
C. Pupil-teacher activities:
C. Pupil-teacher activities:

Superior Group

1. Have the pupils make solids out of paper.
2. A pageant may be prepared by this group representing the geometric figures. This would be excellent for an assembly program.
3. Stress should be placed on areas and volumes instead of construction.

## Average Group

1. Have the pupils make solids out of paper.

Slow Group

1. Have the pupils make solids out of paper after a lesson or game on recognition of the
figure.
2. Stress should be placed on areas and volumes instead of construction in this unit.

## Superior Group

4. The following terms should be added to the pupil's vocabulary:
a. Pyramid
b. Similar
c. Volume
d. Congruent
e. Altitude

Average Group
3. This group will
complete this unit
before the term ends.
The amount of time left will vary according to the type group.
4. The following terms should be added to the pupil's vocabulary:
a. Pyramid
b. Similar
c. Volume
d. Congruent
e. Altitude

## Slow Group

3. This group will
do well if this unit
is completed before
the semester ends.
In the case of a
superior slow group,
a part of the seventh
unit will be
completed.
4. The following terms should be added to the pupil's vocabulary:
a. Pyramid
b. Similar
c. Volume
đ. Altitude
e. Cylinder

| Superior Group | Average Group | Slow Group |
| :---: | :---: | :---: |
| P. Cylinder | f. Cylinder | f. Rectangular Solid |
| g. Rectangular Solid | g. Rectangular Solid | g. Prism |
| h. Prism | h. Prism | h. Sphere |
| i. Sphere | 1. Sphere | i. Silo |
| J. Silo | j. Silo | j. Board Feet |
| k. Broad Feet | k. Broad Feet |  |
| D. Desirable outcomes: | D. Desirable outcomes: | D. Desirable outcomes: |
| 1. an understanding | 1. An understanding | 1. An ability to |
| and ability to use the | and ability to use the | find the area or sur- |
| formulae in the mea- | formulae in the mea- | face and volume of a |
| suring of areas, sur- | suring of areas, sur- | geometric figure |
| faces, and volumes | faces, and volumes |  |
| of geometric | of geometric |  |
| figures | figures |  |
| 2. Knowledge of the | 2. Knowledge of the |  |
| principles governing | principles governing |  |
| similar figures | similar figures |  |

## Slow Group

f. Rectangular Solid
g. Prism
h. Sphere
i. Silo
j. Board Feet
D. Desirable outcomes:

1. An ability to
find the area or sur-
face and volume of a
geometric figure

## Superior Group

3. Knowledge of the application of geometry to practical situations
4. An appreciation of
the algebraic concept
in geometry
5. An appreciation of
the use of geometry
in every-day
life
6. An appreciation
for spatial
relations

## Average Group

3. Knowledge of the
application of geometry to practical situations
4. An appreciation of the use of geometry in every-day life
5. An appreciation
for spatial
relations

## Slow Group

2. Knowledge of the application of geometry to practical situations
3. An appreciation of the use of geometry
in every-day
life

| Superior Group | Average Group | Slow Group |
| :--- | :--- | :--- |
| A. Specific objectives: | A. Specific objectives: | A. Specific objectives: |
| 1. To review graphs | 1. To review graphs | I. To review graphs |
| 2. To teach the use | 2. To teach the use | 2. To show the use |
| of graphs | of graphs | of graphs |
| 3. To increase the | 3. To increase the | 3. To increase the |
| mastery of graph- | mastery of graph- | mastery of graph- |
| ical relations | ical relations | ical relations |
| 4. To develop the | 4. To develop the | 4. To develop the |
| ability to read and | ability to read and | ability to interpret |
| use scale drawing in | use scale drawing in | graphs |
| indirect measurement | indirect measurement |  |
| 5. To provide a basis | 5. To provide a basis |  |

## Superior Group

## Average Group

## B. Problems:

1. Review of graphs
a. Pictographs
b. Bar graphs
c. Map distribution
d. General line graphs
e. Circle graphs

References:

```
B. 8, pp. 2-7; 52-54;
186-191; 194; 196;
213
```

Br. 8, pp. 29-31
ㅂ. A. ㅂ. II, pp. 6-13; 26-29; 51
D. W. 8, pp. 146; 230234
B. Problems:

1. Review of graphs
a. Pictographs
b. Bar graphs
c. Map distribution
d. General line graphs
e. Circle graphs

References:

```
B. 8, pp. 2-7; 52-54;
186-191; 194; 196;
213
```

Br. 8, pp. 29-31
B. A. B. II, pp. 6-13; 26-29; 51
D. W. 8, pp. 146; 230234

## Slow Group

B. Problems:

1. Review of graphs
a. Pictographs
b. Bar graphs
c. Map distribution
d. General line graphs
e. Circle graphs

References:

```
B. 8, pp. 2-7; 52-54;
        186-191; 194; 196;
        213
```

Br. 8, pp. 29-31
B. A. B. II, pp. 6-13; 26-29; 51
D. W. 8, pp. 146; 230234

## Superior Group

E. C. II, pp. 70-72;

141; 265
G. II, pp. 96-101
K. S. R. 8, pp. 28-29;

210; 360-364
S. ㄷ. 8, pp. 23-26
S. II, pp. 135-145
S. U. II, pp. 9; 97; 103; 235
T. II, pp. 40-42; 44; 55; 99; 174

프. S. B. II, pp. 61-66; 74-76
2. Applied line graphs a. Straight line graphs
b. Curved line graphs

## Average Group

E. C. II, pp. 70-72; 141; 265
G. II, pp. 96-101
K. S. R. 8, pp. 28-29;

210; 360-364
S. ㄷ. 8, pp. 23-26
S. II, pp. 135-145
S. U. II, pp. 9; 97; 103; 235
T. II, pp. 40-42; 44; 55; 99; 174
W. S. B. II, pp. 6l-66; 74-76
2. Applied line graphs
a. Straight line graphs
b. Curve line

Slow Group
E. C. II, pp. 70-72; 141; 265
G. II, pp. 96-101
K. S. R. 8, pp. 28-29;

210; 360-364
S. ㄷ. 8, pp. 23-26
S. II, pp. 135-145
S. U. II, pp. 9; 97;

103; 235
T. II, pp. 40-42; 44; 55; 99; 174
W. S. B. II, pp. 61-66;

74-76

## Superior Group

c. Two straight line
graphs on the same
diagram
d. Price graphs
e. Interest and wage graphs
f. Graphical terms
(I). $x$ and $y$ axis (II). One number as
a function of another
g. Graphing formulae
h. Graphing the equation

References:
B. 8, pp. 133-134;

149; 153-155; 158

## Average Group

c. Two straight line
graphs on the same
diagram
d. Price graphs
e. Interest and wage graphs
f. Graphical terms
(I). $x$ and $y$ axis
(II). One number as
a function of
another
g. Graphing formulae

References:
B. 8, pp. 133-134;

[^0]
## Superior Group

B. P. S. II, pp. 132-138

Br. 8, pp. 158-159
D. W. 8, pp. 1-9
E. C. II, pp. 49-57; 176; 189
G. II, pp. 252-254

ㅍ. B. K. II, pp. 24-32
H. II, pp. 224-228
K. S. R. 8, p. 130
S. C. 8, pp. 26-30;

156-157; 192-193
S. II, pp. 145-151
S. U. II, pp. 10-14; 25-30
T. II, pp. 60; 74-77; 97; 175
W. S. B. II, pp. 66-74

Average Group
Slow Group
B. P. S. II, pp. 132-138
$\mathrm{Br} .8, \mathrm{pp} .158-159$
D. W. 8, pp. 1-9
E. C. II, pp. 49-57; 176; 189
G. II, pp. 252-254
H. B. K. II, pp. 24-32
H. II, pp. 224-228
K. S. R. 8, p. 130
S. C. 8, pp. 26-30; 156-157; 192-193
S. II, pp. 145-151
S. U. II, pp. 10-14;

$$
25-30
$$

T. II, pp. 60; 74-77; 97; 175
T. S. B. II, pp. 66-74

Superior Group
C. Pupil-teacher activities:

1. Have the pupils make original graphs of their own interests. Such topics as health, attendance, school banking, and athletic. contests may be suggested.
2. Have graphs from other school subjects, current magazines, and newspapers brought to class for classification and interpretation.
3. Attention should be

Average Group
C. Pupil-teacher activities:

1. Have the pupils make original graphs of their own interests. Such topics as health, attendance, school banking, and athletic contests may be suggested.
2. Have graphs from other school subjects, current magazines, and newspapers brought to class for classification and interpretation.
3. Attention should be

## Slow Group

C. Pupil-teacher activities:
l. Have the pupils make original graphs of their own interests. Such topics as health, attendance, school banking, and athletic contests may be suggested.
2. Have graphs from other school subjects, current magazines, and newspapers brought to class for classification and interpretation.

Superior Group
called to the danger
of misrepresentation
in the pictograph;
therefore, it should
be the one least
used.
4. Emphasize accuracy. and neatness.
5. Use the following rules in the construction of graphs:
a. The printed title should be carefully
placed.
b. Each bar in a bar graph should be labelled.

## Average Group

called to the danger
of misrepresentation
in the pictograph;
therefore, it should
be the one least
used.
4. Emphasize accuracy and neatness.
5. Use the following rules in the construction of graphs:
a. The printed title should be carefully placed.
b. Each bar in a bar graph should be labelled.

Slow Group
3. Emphasize accuracy and neatness.
4. Use the following rules in the construction of graphs:
a. The printed title should be carefully placed.
b. Each bar in a bar graph should be labelleđ.

## Superior Group

c. Each part of the circle graph should be labelled.
d. In the line graph the following suggestions are advisable to use:
(I). Decide on a convenient scale and use it consistently. (II). Draw the axis and label each. (III). Place numbers on the axis beginning with zero.

## Average Group

c. Each part of the circle graph should be labelled. d. In the line graph the following suggestions are advisable to use:
(I). Decide on a convenient scale and use it consistently.
(II). Draw the axis and label each.
(III). Place numbers on the axis beginning with zero.

## Slow Group

c. Each part of the circle graph should
be labelled.
D. Desirable outcomes:
D. Desirable outcomes:

## Superior Group

1. A habit of accuracy and neatness in using tools of graphic measure
2. Ability to read and use graphs
3. Ability to read and use scale drawings in indirect measure 4. Ability to use the formula in the graph 5. Ability to interpret the algebraic graph
4. An appreciation of the graphic representation as a form

## Average Group

1. A habit of accuracy and neatness in using tools of graphic measure
2. Ability to read and use graphs
3. Ability to read and
use scale drawings in
indirect measure
4. Ability to use the
formula in the graph
5. An appreciation of the graphic representation as a form

Slow Group

1. A habit of accuracy and neatness in using tools of graphic
measure
2. Ability to read and use graphs
3. An appreciation of the graphic repres-

Superior Group
of expression
7. An appreciation of graphic relations in pure mathematics

## Average Group

of expression

Slow Group
of expression

## Superior Group

A. Specific objectives:

1. To bridge the gap between arithmetic and algebra 2. To establish the usefulness of literal notation
2. To broaden algebraic concepts through extended operations with equations
3. To introduce negative numbers needed for the solution of common types of equations

## Average Group

A. Specific objectives: 1. To bridge the gap between arithmetic and algebra
2. To establish the usefulness of literal notation
3. To broaden algebraic concepts through extended operations with equations

## Slow Group

A. Specific objectives:

Superior Group
5. To help the pupil make a better selection in his ninth grade work 6. To give a basis for further work in algebra
B. Problems:

1. Algebraic terms and processes

References:
B. 8, p. 25
B. P. S. II, pp. 116-118

Br. 8, pp. 219-221; 248
B. A. B. II, p. 63
E. ́. II, p. 26
G. II, pp. 104-106
H. B. K. II, pp. I-2
H. II, pp. 181-183

## Average Group

Slow Group
make a better selection
in his ninth grade work
5. To give a basis for
further work in algebra
B. Problems:

1. Algebraic terms and processes

References:
B. 8, p. 25
B. P. S. II, pp. ll6-118

Br. 8, pp. 219-221; 248
B. A. B. II, p. 63
E. C. II, p. 26
G. II, pp. 104-106
H. B. K. II, pp. 1-2
H. II, pp. 181-183

## Superior Group

K. S. R. 8, pp. 353; 297300
S. C. 8, p. 30
S. II, p. 244
S. U. II, p. 261
W. 8, pp. 135; 143
2. The equation
a. Forming the equation
b. How to change the form of the equation c. Solving and checking equations by:
(I). Subtraction (II). Addition (III). Division (IV). Multiplication.

Average Group
K. S. R. 8, pp. 353; 297300
S. ㄷ. $8, \mathrm{p} .30$
S. II, p. 244
S. U. II, p. 261
W. 8, pp. 135; 143
2. The equation
a. Forming the equation
b. How to change the form of the equation c. Solving and checking equations by:
(I). Subtraction
(II). Addition
(III). Division
(IV). Multipli-
cation

## Superior Group

d. The formula as an equation
(I). Geometric
formulae
(II). Interest

## formulae

References:
B. 8, pp. 25-35; 134-144
B. P. S. II, pp. 118-138

Br. 8, pp. 221-224; 228236; 246-255; 259-268
B. A. B. II, pp. 63-81
D. W. 8, pp. 65-74
E. C. II, pp. 26-38; 4049
G. II, pp. 92-94

## Average Group

## Slow Group

 d. The formula as an equation(I). Geometric
formulae
(II). Interest
formulae
References:
References:

134-144
B. P. S. II, pp. 118-138

Br. 8, pp. 221-224; 228236; 246-255; 259-268
B. A. B. II, pp. 63-81
D. W. 8, pp. 65-74
E. ́. II, pp. 26-38; 4049
G. II, pp. 92-94

## Superior Group

H. B. K. II, pp. 2-19
H. II, pp. 183-186
K. S. R. 8, pp. 300-306; 310-316
S. ㄷ. 8, pp. 31-46
S. II, pp. 258-262
T. II, pp. 119-132; 136138
W. S. B. II, pp. 121-130
W. 8, pp. 132-134; 139141
3. Addition of literal numbers

References:
E. C. II, pp. 38-40
G. II, pp. 105-119
H. B. K. II, pp. 172-173

## Average Group

Slow Group
H. B. K. II, pp. 2-19
H. II, pp. 183-186
K. S. R. 8, pp. 300-306; 310-316
S. ㄷ. 8 , pp. 31-46
S. II, pp. 258-262
I. II, pp. 119-132; 136138
W. S. B. II, pp. 121-130
W. 8, pp. 132-134; 139141

## Slow Group

T. II, p. 132
W. S. B. II, p. 90
W. 8, pp. 134-137
4. Subtraction of
literal numbers
References:
H. B. K. II, p. 174
T. II, p. 132
W. 8, pp. 137-139
5. Multiplication of
literal numbers
References:
References:
References:
G. II, pp. 105-119
H. B. K. II, p. 175
T. II, p. 133
W. S. B. II, p. 91
W. 8, pp. 141-146

Superior Group
6. Division of literal numbers

## References:

G. II, pp. 119-133
H. B. K. II, p. 176
T. II, p. 134
W. 8, pp. 148-153
7. Negative and positive numbers in algebra
a. What they
represent
b. Practical ap-
plication of
c. Fundamental
processes with
positive and
negative numbers

```
(I). Addition
(II). Subtraction
(III). Multiplication
(IV). Division
```

References:
B. P. S. II, pp. 140-192

Br. 8, pp. 276-286
B. A. B. II, pp. 196-200
E. C. II, pp. 291-305

ㅍ. B. K. II, pp. 177-184
H. II, pp. 186-222
S. II, pp. 244-258
S. U. II, pp. 261-270
T. II, pp. 141-160
II. S. B. II, pp. 77-116
8. General review of

References:
algebraic concepts

## Superior Group

References:
B. 8, p. 242
B. P. S. II, pp. 138; 150-192
B. A. B. II, p. 84
E. C. II, pp. 62; 309311
G. II, pp. 241-250
H. B. K. II, pp. 184205
T. II, pp. 135-139; 141; 161-170
W. S. B. II, pp. 118121
W. 8, pp. 146-148; 155-161

## Slow Group

## References:

C. Pupil-teacher activities: C. Pupil-teacher activities: C. Pupil-teacher activities:

## Superior Group

1. Begin the teaching
of literal numbers from
the concrete to the abstract, as 12 apples and 14 apples equals 26 apples. (12a + 14a = 26a)
2. Stress the equation.
3. Each pupil should memorize the rules governing the equation.
4. Written problems
involving thought and forming algebraic equations should be stressed

## Average Group

1. Begin the teaching
of literal numbers from
the concrete to the
abstract, as 12 apples
and 14 apples equals
26 apples. (12a +
$14 a=26 a)$
2. Stress the
equation.
3. Each pupil should
memorize the rules
governing the
equation.
4. The remainder of the
semester should be spent
on written problems.
Teach the pupil to

Superior Group
even at the expense of the rest of the unit.
5. Have each pupil
make a positive and
negative number
scale.
6. The following new
terms should be
brought out in
class:
a. Algebra
b. Literal Number
c. Integer
d. Coefficient
e. Signed Number
f. Exponent

Average Group
interpret them.
5. The following new
terms should be
brought out in
class:
a. Algebra
b. Literal Number
c. Integer
d. Coefficient
e. Terms
f. Balanced Equation

Slow Group

## Superior Group

## Average Group

g. Radical Sign
h. Terms
i. Monomial
J. Binomial
k. Trinomial

1. Polynomial
m. Parenthesis
n. Negative Number
o. Positive Number
D. Desirable outcomes:
2. Habit of thinking abstractly
3. Habit of using the generalization in the
problem solving
situations
4. An understanding of
D. Desirable outcones:
5. Habit of using the generalization in the problem solving situations

Superior Group
the algebraic equation 4. Ability to use algebraic notation
5. Knowledge of the fundamental processes in algebra
6. Knowledge necessary to make intelligent choice of a mathematics course in
the ninth year
7. An appreciation of
the usefulness of literal notation
4. Knowledge necessary
to make intelligent
choice of a mathe-
matics course in
the ninth year
5. An appreciation of
the usefulness of
literal notation

Average Group
the algebraic equation
3. Ability to use
algebraic notation

## APPENDIX

A. Bibliography

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