DEREK WHORDLEY

Ph. D.

TEACHING THE RESEARCH STUDY SKILLS
IN A TEAM TEACHING SITUATION
AT THE SIXTH GRADE LEVEL

Dissertation for the Degree of Ph. D.
MICHIGAN STATE UNIVERSITY
DEREK WHORDLEY
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This is to certify that the

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Major professor

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ABSTRACT

TEACHING THE RESEARCH STUDY SKILLS IN A TEAM TEACHING SITUATION AT THE SIXTH GRADE LEVEL

By

Derek Whordley

This study was designed to analyze the competencies of two groups of sixth grade students in the research study skills by means of a standardized diagnostic instrument (Research Study Skills Test, Form 1). Selected students were given individualized instruction based on practice exercises to meet particular deficiencies measured by the diagnostic instrument. The effects of these practice materials on student competencies were examined by means of an alternative form of the diagnostic instrument used as a post-test (Research Study Skills Test, Form 2).

The study was conducted using seventy-four sixth grade students from two combined sixth and seventh grade classes. Each class was vertically-grouped and team-taught. The students were randomly assigned to an experimental or control group within their respective classes.

Practice exercises were only administered to the experimental groups on each class, and these were designed

to meet individual needs. An analysis of the pre-test results was used to determine the nature and extent of the materials to be completed by each student. Two teachers from each team accepted primary responsibility for instituting instructional procedures in the requisite skills.

The program came to an end following the administration of the post-test. Comparisons were then made between all the students in the experimental groups and all the students in the control groups. The experimental and control groups within each class were also compared with each other. The basis for each comparison was an analysis of variance on the means of the weighted sub-skills and means of the individual sub-skill sections on the post-test results. No significant differences at the .05 level of probability were found in any of these relationships.

TEACHING THE RESEARCH STUDY SKILLS IN A TEAM TEACHING SITUATION AT THE SIXTH GRADE LEVEL

By

Derek Whordley

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Dedicated to:

Mr. and Mrs. Fred Whordley for
their love and understanding as
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TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

STATEMENT OF THE PROBLEM

The purposes of this study were as follows:

1. To analyze the competencies of two groups of sixth grade students in selected research study skills by means of a standardized diagnostic instrument.
2. To provide individualized instruction through practice materials to selected students who exhibited deficiencies in skills measured by the diagnostic instrument.
3. To examine the effects of the practice materials on student competencies by means of an alternative form of the diagnostic instrument as a post-test.

Importance of the Study

Of the many problems confronting education, the question of curriculum content has posed a particularly difficult dilemma. While some significant curricular changes have occurred to meet the rapid transitions evident in advanced societies, it has been impossible for schools to continually reflect the vast output of information which

has characterized technological and scientific progress. The following summary by a distinguished educator reflects the position in which many teachers find themselves:

> Almost every fact I was taught from the first grade through law school is no longer a fact. Almost every tendency that was proclaimed has failed to materialize. The facts and tendencies of today are those nobody foresaw fifty years ago [Hutchins 1965:66].

The speed at which information becomes obsolescent is of concern. Schools are unable to provide the type of factual information which may be accumulated for use and application throughout a student's lifetime (Phenix 1964: 335; Spring 1973:138-47; Toffler 1970:363).

The urgency and complexity of the situation is expressed by Carl Rogers in the following statement:

> The world is changing at an exponential rate. If our society is to meet the challenge of the dizzying changes in science, technology, communications and social relationships, we cannot rest on the answers provided in the past, but must put trust in the process by which new problems are met. For so quickly does change overtake us that answers, "knowledge," methods, skills, become obsolete almost at the moment of their achievement [Rogers 1969:303].

Nevertheless, a traditional and fundamental task of education has been to deal with the vacillation, diversity and variability of modern life. This primary consideration is echoes by Postman and Weingartner:

> . . . there is no more important function for education to fulfill than that of helping us to recognize the world we actually live in and, simultaneously, of helping us to master concepts that will increase our ability to cope with it. This is the

> essential criterion for judging the relevance of all education [Postman and Weingartner 1969:212].

The problems inherent in the explosion of knowledge are unlikely to be addressed and solved by a panacea. This study has been directed towards one small but significant and practical aspect of the curriculum of elementary and middle schools, with the object of providing students with the skills to become more self-sufficient and independent in searching for, interpreting, and accumulating information. These have been termed the "research study skills [Shores 1970]" and may be directed to partially accommodate the broad criteria expressed by Postman and Weingartner.

While the "research study skills" may be readily applied to several "content areas" of a school curriculum, notably social studies, mathematics, science and the communication arts, they have been most generally incorporated into reading. This position has been justified on the basis that children who lack the skills which lead to competencies in basal or developmental reading programs are unlikely to be able to pursue the specialized reading requirements demanded in the "research study skills" in other areas. It has been left to reading teachers to provide solutions which lead to the acquisition of a range of reading skills appropriate to many differing reading situations.

The terminology "research reading skills" as expressed in the ensuing glossary has been useful in

delineating this study into five major areas: library skills, dictionary skills, reference skills, reading graphs and tables, and map reading skills. These areas are also included in the "basic study skills." This less precise term has attracted a conglomeration of materials and subjects but provides a satisfactory background to illustrate the development of the "research study skills."

Commentaries by a number of authorities in reading education: Bond and Wagner (1966:12), Dawson and Bannan (1963:249), Russell (1960:355), DeBoer and Dallman (1960: 125), and Spache (1964:339) help to illustrate the range of possibilities inherent in the "basic study skills." The following extract indicates that the "research study skills" are regarded as components of the "basic study skills":

> The skills often thought of as basic study skills are those included in locating information through the use of library aids, tables of contents, the indexes within a book, and the like, the use of basic reference material, such as the dictionary, encyclopedia, atlas, almanac, telephone book, city directory, Who's Who, and newspaper and magazine files; the reading and effective use of tabular and pictorial material, such as maps, graphs, charts and tables, and schematic drawing, systems of organizing material, such as outlines, classification charts, time lines, and taking notes of materials read; and reading special notations such as formulas, abbreviations and symbols [Bond and Wagner 1966: 225-26].

It may be, as Smith has suggested (1963:306) that the expression "study skills" is not sufficiently well understood in the context of elementary and middle schools,

and that difficulties have been met in deciding what it entails.

Problems of definition have been paralleled by problems of instruction in school settings even when study skills have been identified and shown to have utility. This may be attributed to several factors. In the first instance, reading instruction has been directed to other concerns:

> The study skills have been neglected in favor of concentration on the mechanics of reading or the development of reading as a means of securing relaxation and satisfying curiosities [Yoakam 1955:227].

The failure of teachers to offer programs of instruction in study skills due to their lack of competence or awareness is equally significant. The following comment remains both pertinent and appropriate:

> The reason why more people have not become proficient in the use of reading for information and guidance is the neglect of skillful instruction in the abilities involved in this kind of reading by the schools of the past [Yoakam 1955:37].

The lack of systematic instruction throughout the basic study skills may be regarded as lamentable (McKee 1966:224). Efficiency in locating and using information is an essential tool in finding out about the world we live in and in problem solving (Bond and Wagner 1966:13; Russell 1958:7); it also helps in "satisfying personal needs and in promoting social awareness and growth [Smith and Dechant 1961:1]." A "reservoir of ideas in printed

materials [Russell 1958:12-17]" may be denied to those students who receive inadequate instruction in basic study skills.

An additional major problem in teaching any type of study skill is related to the variant notions of when it should be taught. This difficulty is complicated by involved ideas, assumptions and evaluative processes which fail to clarify whether or not a skill has been mastered. The following statement reinforces a common dilemma:

> There is no level at which we can assume the complete mastery of a study skill has been attained, nor is there a level at which a particular skill is most needed [Dawson and Bamman 1962:242].

The interrelationship of curriculum content in elementary and middle schools would seem to indicate that study skills are immediately applicable in several content areas. This supposition is not borne out by research studies and, therefore, complicates questions of diagnosis and remediation of student error. L. Katz, noted in Bond and Wagner, stated that:

> The study skills appear to be rather specific to the fields to which they relate. They do not appear to be generally applicable. Therefore, the appraisal of a particular study skill should include items taken from several content areas if an overall estimate of a child's level in that skill is to be obtained [L. Katz in Bond and Wagner 1966:342].

As a partial resolution Cuff (1937:301) suggests the creation of a "study habits inventory." Huebner (1966:5) offers cautionary remarks about using related

materials which accompany basal reading materials. Bond and Tinker (1967:420) discuss the need for teacher-made tests and informal observations of student progress. This approach is also included in the work of Tinker and McCullough (1968:351) who go on to state that standardized tests have utility in upper grade levels.

A number of recent studies have been closely concerned with classroom instruction of research study skills at the fifth grade level (Nold 1971) and at the sixth grade level (Snoddy 1967, Stinson 1970). Among their major findings have been definite indications that the research study skills can be taught systematically with positive results. Nold's work also added credence to the fact that a research study skills test devised by Shores and Newland (1967) could provide a satisfactory diagnostic instrument to detect student problems in specific sub-skill areas. The possibilities for individualized instruction through practice exercises then became more feasible.

Those studies which have been addressed specifically to the research study skills have been carried out in self-contained classrooms where children have been grouped horizontally according to grade-level-age. This study is concerned with team teaching situations in which sixth and seventh graders are part of the same teams, although the study skills activities are addressed only to the sixth grade children. It encompasses the practice exercises,

used as treatments, which were devised by Snoddy and Stinson and found equally suitable by Nold. The Research Study Skills Test was used as a primary source of information in the diagnosis of problems, but its use was expanded to cover a wider range of student response than Nold dealt with. In this instance, the identification of student difficulty throughout the five areas (library, dictionary, reference, graph and table, and map skills) was followed by treatments for all the students involved in the study rather than for a selected group of them.

Procedures of the Study

The sixth grade children of two vertically grouped sixth and seventh grade teams were selected and used in this study. They were all tested in late February, 1973, using a short diagnostic test of research study skills which will be described in Chapter III.

The sixth grade members of the selected teams were assigned to experimental and control groups within their teams by a system of random numbers. All of the information gained from the pre-test was then scrutinized further.

The pre-test results of the experimental groups were analyzed to determine those questions which were answered incorrectly. This was a prerequisite to subsequent individual treatments through practice exercises in sub-skill areas, where lack of competence was indicated. The selected students in the experimental groups were given

instruction using the practice exercises on a daily basis during mathematics or social studies team time.

The researcher visited with the teachers involved at least three times each week to discuss problems with implementing the exercises, and observed children working on the practice exercises at least once each week. Individualized instruction and individualized pacing characterized teacher and student response. Post-test information was gathered from an alternate form of the Research Study Skills Test taken by the students in the experimental and control groups at the end of May, 1973.

A complete description of these procedures may be found in Chapter III.

Limitations of the Study

Although an attempt was made to describe the teachers and their teaching situation in this study, teacher performances are difficult variables to describe or control. Different teachers might have produced dissimilar results.

Unlike previous studies in the area of research study skills, this work was undertaken in a unique team teaching situation heavily dependent upon individualized instruction throughout the curriculum. This detracts from precise time limitations and structured instruction which might be more readily achieved in a self-contained

classroom in which a whole group of children could be taught at the same time, for a prescribed amount of time. Any conclusions drawn from this study must reflect this specialized organizational pattern.

Minimum time allotments per student in the experimental group was set at fifteen minutes per day. This did not restrict students who wished to devote more time to the materials. Attempts to control this variable were impractical in this setting. However, attempts to describe them were made.

Hypotheses to be Tested

The null hypotheses to be tested in this study are:

Hypothesis 0

There is no significant difference in the mean scores of the experimental and control groups on the weighted sub-skills and on individual sub-skill sections of the Research Study Skills Test, Form 2.

Hypothesis 1

There is no significant difference on the mean scores of the experimental group and mean scores of the control group of Class One on the weighted sub-skills and on individual sub-skill sections of the Research Study Skills Test, Form 2.

Hypothesis 2

There is no significant difference in the mean scores of the experimental group and the mean scores of the control group of Class Two on the weighted sub-skills and on individual sub-skill sections of the Research Study Skills Test, Form 2.

Glossary of Terms

The Research Study Skills

The five major sub-skill areas denoted by this expression are library skills, dictionary skills, reference skills, reading graphs and tables skills and map reading skills. They may be defined more precisely as follows:

1. Library Skills

   --the purpose of the card catalogue

   --the use of the card catalogue to locate information

   --the use of encyclopedic and reference works

   --the placement of fiction and non-fiction books on library shelves

   --understanding of parts of a book

   --understanding the Dewey Decimal System of Classification

2. Dictionary Skills

   --alphabetizing

   --guide words

   --correct spelling of words

   --use of a pronunciation guide

   --meanings of words

   --syllabication

3. Reference Skills

   --use of a table of contents

   --use of an index

   --the use of key words in locating information

4. Reading Graphs and Tables Skills

   --interpreting bar or column graphs

   --interpreting line graphs

   --interpreting picture graphs

   --interpreting circle or "pie" graphs

   --interpreting tabular information

5. Map Reading Skills

   --drawing information and inferences from physical-political maps and product maps used independently or in conjunction with each other

   --drawing information and inferences from town plans

   --drawing information and inferences from population, elevation and rainfall maps, used independently or in conjunction with each other

The Basic Study Skills or Study Skills

The basic study skills are generalizable abilities which include research study skills and also embrace broader considerations. Their diversity is exemplified in the following references:

Previewing

Skimming and scanning

Reading graphic materials

Map and globe skills

Reading charts and graphs

Library skills

Organizing and reporting

Notetaking (Spache 1964:201-14)

and

1. Selecting and evaluating information with reference to a particular problem or purpose.
2. Organizing what is read according to the particular task in hand.
3. Remembering what is read, after a decision has been made regarding those parts which should be retained.
4. Following directions (Dawson and Bamman 1959: 215)

Reading in the Content Areas

Reading in the content areas may be defined as: "The reading of books that contain needed information, such as textbooks or reference books on geography, history or science; to be contrasted with the reading of books for recreation or fun only [Good 1959:443]."

Class Numbers

The sixth grade components of the teams used in this study were categorized as Class One and Class Two in Chapter III for purposes of statistical analysis. They are also noted as Team Two and Team Three in the "Population" section of Chapter III.

Vertically Grouped Teams at Hannah Middle School

"A vertically-grouped team is an organization of grouping students across grade lines for instruction. A vertically-grouped team or a grade level team is not an end in itself, but a means to an end. The end we seek to accomplish is the individualization of learning and instruction." (Circular to parents from Hannah Middle School, April 25, 1973.)

CHAPTER II

REVIEW OF THE LITERATURE

The organizational pattern of this chapter is as follows:

1. The Relationship of Basic Study Skills to Developmental Reading Programs
2. Reading with Reference to the Content Subjects
3. Teaching the Research Study Skills
4. Evaluation of Research Study Skills

This approach is intended to develop those major considerations which most logically and clearly impinge upon this study.

As a substantial amount of attention has been devoted to basic study skills by educators in the area of reading, it is appropriate to begin this review with an overview of the relationship between basic study skills and more broadly-defined, developmental reading programs. Particular problems which arise in reading in the content areas will then be considered as an extension of the first section. A more precise determination of research study skills will follow, and the chapter will be concluded with

a commentary concerning the evaluation of research study skills.

The Relationship of Basic Study Skills to Developmental Reading Programs

The use of basal reading programs constitutes the most common approach to reading instruction in the primary and intermediate grades. This may be seen as a necessary developmental approach and a prerequisite for teaching basic study skills. Alternate views see the basic study skills as an inherent aspect of developmental reading programs, but indicate concern about the relative unimportance of the skills as expressed in the content materials of these programs. When the variant purposes of reading are discussed, the consequences of meaningful instruction in basic study skills with regard to "functional reading" are also apparent.

Shores (1966:89) argues that as the field of reading enjoys high priorities throughout elementary and high school education, the inclusion of research and instruction in study skills is extremely important. Snoddy (1967:25) sees the basic study skills as an "extension of the reading skills of the developmental program" heavily dependent on the pupil's ability with both word recognition and comprehension skills. Spache also feels that the general reading abilities which are stressed in basal programs offer support to work in subject matter areas,

but he adds a cautionary note in suggesting that: " . . . because a pupil continues to develop in basic reading skills, we cannot assume that he will therefore grow in subject matter achievement (Spache 1964:200).

Berg is even more critical in stating quite categorically that: "Most of the previous training in the basal reading program does not prepare the child for the types of reading tasks that he has to do in the content areas [Berg 1960:37]."

The inadequacy of basal texts may lie in the teacher's guides which accompany them. Huebner (1966:5) suggests that their content is often determined by the personal viewpoints and experiences of their authors and not on firmly supported research studies. The criticism by Heilman (1963:43) has broader connotations in that the treatment of study skills, and the context in which they are treated, is often inadequate. Yoakam has also identified "failure to acquire common study skills" as a common deficiency in the teaching of reading skills in Schubert and Torgerson (1968:145).

The underlying problems may be even more basic if the observation of Smith is accurate:

> Perhaps because our recognition of the study skills area of reading instruction is recent, we are not yet sure exactly what skills belong under this heading. This fact may explain why, at the present time, there is so much confusion in regard to what the study skills are [Smith 1963:366].

The ineffectual identification of basic study skills by basal textbook writers has resulted in adverse reactions by teachers in classroom settings. Without cohesion in determining content, a major consequence has been the absence of systematic instruction in the study skills. The following remarks reinforce this view:

> In some schools such skills have not been identified and no teaching of them occurs except that which may take place feebly, incidentally, and unconsciously through the teacher's proper use of questions raised in a group or class discussion or selections read in the basal reader [McKee 1966:224].

Total reading programs have been analyzed as having a number of constituent parts. For example, Russell (1961:323) includes: developmental reading, functional reading, recreational reading and personal reading for enjoyment. Using this framework, he sees the study skills as an aspect of functional reading.

The notion of functional reading is widely held, and its importance for other school work strongly supported:

> No pupil can succeed in school unless he has acquired skill in functional reading, i.e., reading for information. Functional reading requires that the comprehension and study skills be added to the foundations acquired in word recognition and basic comprehension. In reading for information, it becomes necessary to use the specialized skills required for effective reading in the content areas [Tinker and McCullough 1968:221].

Gans (1963:174-75) is supportive of these ideas and makes the additional charge that without the extension of these

skills, a student may fail to reach his potential. Yoakam (1955:221) offers a similar reminder that competencies in reading stories for pleasure, which constitute one portion of a total reading program, do not result in students achieving competencies in reading factual material to gather information. The complete success of a reading program is predicated upon the degree to which students react both voluntarily and spontaneously to a variety of materials (Tinker 1952:264).

The complexity of the task may be put into perspective by reference to the extensive list of basic study skills outlined by Dawson and Bamman which follows. It is indicative of the scope of the study skills and illustrates the problem of precise attention to content materials, the placement of study skills teaching in a total reading program, and the diversity of activities contingent upon them.

> As he gains the ability to read for himself, he is reaching the stage where he needs to learn to use books efficiently: the table of contents and index for locating desired information; chapter titles and topical headings as a means of forecasting main ideas and later receiving them; the captions of pictures to facilitate their interpretation; legends so that lines and shadings on maps or graphs have meaning; the figures in tables so that their significant ideas will be abstracted. Through the intermediate grades, children typically become ready for learning the successive steps in using a dictionary; locating words according to their alphabetical arrangement; determining the correct spelling or pronunciation of a word; selecting the meaning that best fits the context in which a word is used and so on. Children should be shown how to use

> encyclopedias, atlases, card catalogues and the Reader's Guide in the library, and other reference books as soon as they are ready [Dawson and Bamman 1962:61].

Reading with Reference to the Content Subjects

Nila Banton Smith indicated that interest in reading in the content subjects became noticeable in the 1940s (Smith 1961:145). That interest has increased with the extended acknowledgement among researchers that special skills are needed to read in a wide variety of curriculum areas. Quoting the work of Artley, Bond and Tinker (1967:400) state that differences in requirements from subject to subject "occur because each kind of content material has its own special accumulation of concepts and vocabulary, its unique relationships, and its own logic, characteristic form of presentation, distinctive assumptions and fundamental principles." These generalizations are supported by Berg (1960:16), Spache (1964:200), Whipple (1941:13), and led Fay to add that " . . . reading is not a generalized ability but a composite of many skills [1950:541-47]."

The reasons for reading in the content areas are varied, and in terms of total reading programs they are most readily seen in the context of functional reading. As purposes for reading change from subject to subject, students require specific instruction which is appropriate to their needs (Schubert and Torgerson 1968:143). In an

investigation into reading for problem solving, for example, Husbands and Shores concurred that "reading is differentiated into abilities to do specific jobs for specific purposes within selected content areas [1950: 464]." These ideas are in some contrast to those of Harris (1956:447) who wrote that locating information in printed sources, reading graphic and tabular materials, and outlining and summarizing, are generalizable to most subject areas.

More specific research with regard to designated subjects is supportive of the existence of specific skills in different content areas. Relating the work of Krantz, Bond and Wagner (1966:342) note that reading study skills in social studies do not necessarily indicate a child's proficiency in study skills related to science or other areas. Maney (1958:57-64) and Socher (1958:49-56) completed research on literal and critical reading skills in science and social studies respectively, and expressed concern that the specific skills needed for specialized reading tasks are not met by teaching reading as a generalized ability. Earlier research comparing reading efficiency in social studies, science and arithmetic, indicated uneven student performances in differing areas (McMahon 1943:228-33).

There is evidence to suggest that the particular skills needed to read in the content subjects is neglected

by teachers and researchers. Berg and Rentel found that little attention is being given to the problem other than "preachments based on opinion rather than research [1966: 348]." There is a particular discrepancy between the desire of teachers to improve their efforts in coping with the situation, and in observations of what is happening in their classrooms.

Rauch (1968:212-17) found that teachers enrolled in graduate courses were concerned with helping their students improve reading skills in content areas. This is in juxtaposition to earlier reports that teachers were taking no practical steps to develop the special skills required in the content subjects (Howell 1950:384-89; Austin and Morrison 1963:48-77).

These matters are of special concern to teachers at the upper elementary level and beyond. Gray (1952: 8-11) has indicated that these people often have little training in reading, and assume no responsibility for teaching the subject. As content subjects become more readily defined at these upper levels, a special liability accrues to these teachers. Shores (1965:174) has suggested that providing reading skills are given high priority in the subject areas, they may be taught more efficiently there. This is in accord with the writing of Veatch and her contention that: "All the skills related to the upper levels of reading can be taught, and indeed,

should be taught as part of the content areas that form the basis of the curriculum at the older age levels [Veatch 1966:302]."

Teaching the Research Study Skills

The research study skills understood in the context of library, dictionary, reference, graph and table, and map reading skills provides a restricted framework from which to view the basic study skills, and to analyze specific problems in teaching.

The overall situation with regard to these materials is summarized in a negative vein by Yoakam:

> Few children understand either the nature or the purpose behind textbooks, reference materials, maps, pictures, indexes, dictionaries, encyclopedias, news magazines, editorials, book pages and supplements, and other useful materials of great value in everyday living [Yoakam 1955:247-48].

This position is reiterated by Spache in a lengthy commentary which outlines the incorrect assumptions which are made about basic study skills, and the training that is necessary to acquire them:

> Texts commonly employ such devices as headings, summaries, illustrations, glossaries, indexes, diagrams, charts, and other graphic aids. Both the authors of these texts and the teachers who use them often assume that the textual aids simplify the reading task for the pupil and assist him in his learning. Unfortunately, this assumption is not true, for research shows that these visual and graphic aids do not insure better understanding or retention for most pupils [Spache 1964:201].

Spache continues by saying that careful training is required to develop student proficiency and that, without such training, textbooks become more difficult to read because of the inclusion of the textual aids. Students also benefit from understanding that skills have practical applications, and in knowing when they have made progress in learning skills (Durr 1967:135).

In a seven-week British study, Aspurua-Arrillaga (1968:10) noted the responses of thirteen and fourteen-year olds in experimental groups to study skill training in comprehending and recalling written material. Positive results were recorded. Basic study skills were defined and developed in a larger study by Cheyney (1962:330-32) and evidence of improvement was noted. At the college level, Entwisle (1960:243-51) found that successful completion of a study skills course resulted in grade point improvement in other courses.

In the narrower definition of research study skills, there are a number of considerations which infringe upon each sub-skill. These will be considered separately in the following paragraphs.

A major problem in teaching library skills has been created by a paucity of library facilities to the extent that one-third of all elementary schools have no library facilities at all (Barnes 1966:392-94). The presence of the facility is not an end in itself as "the

mere existence of a school library is, of course, no guarantee that it will be effectively used [DeBoer and Dallman 1960:259]." At the expressive level, it has been shown that children in schools having access to good central libraries administered by qualified libraries check out more books, have broader interests, and fewer reading problems (Gaver 1962:121). The prerequisite for this lies in motivational factors particularly where children have "mistaken or unhealthy attitudes towards the library [Berry and Mercer 1957:81]."

Sheldon has pointed out that library use, and the application of techniques learned there, are enhanced when pursued by individuals following their own interests and needs. This leads him to state that: "If there is any place for strict attention to individual needs, it is in the study skills area [Sheldon 1961:10]." This confirms Snoddy's observation that: "The elementary school central library is essential to the teaching of certain of the study skills . . . [Snoddy 1967:116]."

In the second sub-skill area, Bond and Wagner consider that "probably the most useful single reference book is the dictionary [1966:232]," and indicate that Mott and Baisden have listed at least twenty-eight uses for these volumes. A partial reiteration of these uses may be found in the work of Dawson and Bamman (1968:250).

The problems surrounding dictionary use are many-fold. Beginning instruction in dictionary skills is not directly related to grade levels. However:

> . . . formal instruction in the glossary and dictionary should be given to all children by the time they have reached the fourth grade. Planned instruction in the use of the dictionary is far more effective than teaching the skills incidentally . . . [Dawson and Bamman 1963:249].

Planned instruction is possible as Sleeman (1966:136) found when recording positive reactions to three different methods of teaching dictionary skills to thirty-two groups of fourth graders. Stereotyped training is likely to have less purposeful outcomes:

> Simply looking up teacher-made or personal lists of words for their meanings does very little to improve vocabulary. Such words are divorced from their associations in reading. Furthermore the practice limits the child's concepts of the value of a dictionary by failing to help him to realize that it may also be a source for assistance in pronunciation, derivation, spelling and usage [Spache 1964:339].

Kinder's five-day survey among eighth graders of above-average intelligence in keeping records of dictionary usage adds a further dimension. Almost half of the students failed to use a dictionary at all (1965:96-98).

The diversity of research study skills concerned with reference skills has been pointed out in a long extract by Dawson and Bamman (1962:61) previously noted. By way of re-emphasis, they include tables of contents, indexes, and key words associated with the use of an

encyclopedia. Chall has explored the contributions of encyclopedic materials, and found that: "The paucity of empirically based information on how to use an educational instrument of the potential of an encyclopedia suggests that some of the finesse of the tool may be going to waste [1961:416-17]."

The use of graphic and tabular representations to communicate significant amounts of information has continued to increase. DeBoer and Dallman (1960:125) suggests that "special instruction in the interpretation of these useful symbols is often necessary." Bond and Wagner (1966:233) say that they "constitute a difficult learning that needs to be taught."

The plausibility of systematic instruction in the interpretation of graphs in grades one through four was shown by Thomas (1933) and Strickland (1948). Eighth grade students also responded well to instruction in map interpretation as reported by Bamberger (1942:60), and Weintraub (1967:345-49). These studies have reinforced the idea that the ability to understand graphs follows teaching of the necessary skills. Unfortunately, it has been noted that:

> Charts and graphs are often taught as a part of the arithmetic curriculum, but no graphic representation is meaningful unless it is related to a particular problem [Dawson and Bamman 1963:270].

Map reading skills also lend themselves to systematic instruction. Rushdoony found this to be the case

in successfully teaching third graders map reading skills normally taught to fourth graders in a fifteen-week instructional period. The following extract from the work of Michaelis offers a comprehensive guide to additional major considerations in this sub-skill:

> Because maps are symbolic representations, attention must be given to the gradual development of map language. First of all, simple maps with very little detail should be selected for use. The map reading skills require specific instruction in the symbols, colors, scale, and network of lines used to represent specific information. Such instruction should be related to specific needs for the use of maps so that children can make immediate application of what they learn. It should never be assumed that children can read maps simply because maps are in their books and on the walls of their classrooms [1972:511].

Evaluation of Research Study Skills

The expansive nature of basic study skills has made the diagnosis of student needs a difficult task. Informal and standardized testing are recommended in differing researches and writings. The need to provide suitable work to meet the needs of individual students is of paramount importance. These questions are equally pertinent to the research study skills where diagnosis and remediation have been a continual concern.

Spache (1963:347) suggests that informal testing and exercises provide for better evaluations and opportunities for applications of study skills than standardized tests. Eclectic approaches are suggested by Tinker

and McCullough and Cleary. The former recommend observation and informal testing at the primary levels and in the upper levels:

> Fairly continuous evaluation of growth in study skills through use of informal observation and tests as well as periodic evaluation . . . by means of standardized tests, where the latter are available [Tinker and McCullough 1968:351].

Cleary indicates that the following five ideas were useful in providing information, evidence of application, and evaluation:

1. The use of such standardized tests as the S.R.A. Work Study Skills Test and Iowa Test of Basic Skills.
2. Observations of students using the skills.
3. Observation of students written work.
4. Self evaluation by students.
5. The interest and enthusiasm of students in approaching tasks [Cleary 1957:205-7].

Diagnostic testing to determine needs prior to instruction is also documented by Carroll (1964:352).

The major writers in the area of research study skills have concentrated on determining those skills to be taught, using diagnostic procedures for gathering information, providing practice exercises to develop skills, and using post-test data as a guideline to the mastery of skills. They meet the criteria developed by Bond and Tinker to account for individual differences:

> One plan recommended for correcting individual differences in basic study skills is to find exactly the study skill in which the child is ineffective and teach the child the skill and give him enough practice to make it part of his permanent reading equipment [Bond and Tinker 1967:392].

Stinson (1970) recommended the development of research study skills programs based on pre-test scores and incumbent on practice exercises to meet individual differences in student achievement. Snoddy (1967) also found diagnostic testing and systematic instruction in research study skills developed through practice exercises led to improved performances among his experimental group of sixth graders. Nold indicated that "greater individualization using pretest data for diagnosis is necessary [1971:123]."

The failure of teachers to make use of diagnostic test information was shown by Austin and Morrison (1963: 145). However, as the specialized research study skills are now readily approached through the Shores and Newland Research Study Skills Test (which may be completed in forty-five minutes) a useful diagnostic tool is available. Nold found in working with fifth graders that:

> The use of the short diagnostic test in this study demonstrated the feasibility of this technique. It greatly reduces the time and effort to collect pretest data necessary for making instructional decisions [Nold 1971:123].

From accurate diagnosis of abilities, practice exercises or treatments may be developed to meet individual needs. This enables the following accurate observation of McCallister to be manipulated successfully:

> Some individuals may master a study skill on first introduction to it; others may require several teachings and much individual help [McCallister 1957:154].

Evaluation of the research study skills for this study took the following form:

1. The use of the Research Study Skills Test by J. Harlan Shores and Mary C. Newland as a measure of standardized achievement in pre-test and post-test situations.
2. The implementation of practice exercises developed by Snoddy (1967) and Stinson (1970) and found useful by Nold (1971) to meet individual needs.
3. The use of a 2x2x2 design in two team-teaching situations at the sixth grade level.

CHAPTER III

DESCRIPTION OF THE STUDY

Research Community

East Lansing, Michigan, is located in the central lower part of the state. It is adjacent to the City of Lansing and is approximately eighty-six miles northwest of Detroit. It was incorporated as a city in 1907, and the Bureau of the Census returns for 1970 indicated a population of 47,540 (U.S. Department of Commerce 1972:1).

The median family income was reported at $11,630 in 1973 (Tri-County Planning Commission 1973). Of the population over the age of twenty-five, 92.8 percent had completed high school education, and the median number of school years completed was given as 16.4 years (U.S. Department of Commerce 1972:11). The labor force characteristics illustrated that the major occupations were dominated by professional, technical and kindred workers and substantial number of managerial and sales personnel. These facts suggest a community with middle or upper-middle class socio-economic status.

The existence of Michigan State University in the City of East Lansing had a strong impact on the foregoing statistical information. The total number of students enrolled at the university in the fall quarter of 1972 was given as 41,378; 33,414 of these students were undergraduates and 7,964 were graduate students. The vast majority of students were attending the university on a full-time basis, of whom 30,208 were undergraduates and 4,797, graduate students.

There are nine elementary schools in the East Lansing School System for children from kindergarten through fifth grade. The elementary school population was approximately 2,243. Two middle schools serving grades six through eight had an approximate enrollment of 1,122. The high school population was 1,425. Per-pupil expenditure for 1972-1973 was given at $1400.00.

Population of the Middle School

The John Hannah Middle School was chosen for this study. A primary reason for this choice was the potential for the implementation of a research study skills program in a team-teaching situation at a sixth grade equivalency level in which the students were also grouped vertically with seventh graders.

Of a total school population of 547, 155 were sixth graders, 193 were seventh graders and 191 were eighth

graders. In a unique teaching situation, parents of sixth grade children were given opportunities to register their children in horizontal or vertically grouped teams. The following totals emerged:

Team One - 53 sixth graders with two teachers

Team Two - 77 sixth and seventh graders with three teachers

Team Three - 109 sixth and seventh graders with four teachers

Team Four - 109 seventh graders with four teachers

Team Five - 90 eighth graders with three teachers

Team Six - 109 eighth graders with four teachers

The children in this study were selected from the sixth grade members of the second and third teams. Each of these teams provided enough students to constitute an experimental and control group from within their numbers.

School Personnel and Facilities

Administration and leadership were provided by a principal and an assistant principal. The full-time teachers were designated as follows: twenty team teachers, two art teachers, two physical education teachers and individual specialists in band, Spanish, reading, library science, counseling and industrial arts. Teachers were also employed on a part-time basis to supplement teaching in physical education, counseling and industrial arts. Other part-time teachers dealt with media, French,

homemaking, "strings" and choral music. The equivalency of full-time teachers amounted to 34.3 people.

The classrooms, special areas and laboratories were comprised of: fifteen classrooms, three science laboratories, two art rooms, three choral music areas, two rooms for instrumental music, a language laboratory, a gymnasium, cafeteria, auditorium, homemaking room, central library and an industrial arts workshop.

An extensive central library was very important to this study. The volume count at this middle school was estimated to exceed nine thousand volumes. Their approximate classification based on the Dewey Decimal System was:

000-099 General Works	-	250 individual volumes plus eight sets of general encyclopedia, two sets of science-related encyclopedia and three historically-related encyclopedia
100-199 Philosophy	-	approximately 100 volumes
200-299 Religion	-	approximately 100 volumes
300-399 Social Science	-	approximately 850 volumes
400-499 Languages	-	approximately 100 volumes
500-599 Pure Science	-	approximately 950 volumes
600-699 Applied Science	-	approximately 700 volumes

700-799 - approximately 600 volumes
Arts and Recreation

800-899 - approximately 400 volumes
Literature

900-999 - approximately 2,150 volumes
History

Books of fiction accounted for an additional 2,700 volumes.

Curriculum of Vertically Grouped Teams

All of the sixth grade students involved in this study were required to take courses in communication arts, social studies, mathematics, science, physical education and music. Elective courses were offered in art, French and Spanish.

Each team met for approximately four hours each day to deal with required courses in communication arts, social studies, mathematics and science. During this period of time, students were scheduled by teachers into instructional groups dependent in size upon the instructional needs of the student for the day.

Approaches to curriculum in the school are further reflected in the following statement:

> The notion that the curriculum consists of prescribed subject matter areas to be covered by all students in a particular grade cannot exist in a school system philosophically committed to the individualization of instruction. The vertically graded philosophy realizes that, since each student is a unique human being, he can profit best from an educational program specifically designed for him. It further

> recognizes that different students must be allowed to complete courses of study in a manner and pace consistent with their own strengths and weaknesses [circular to parents 4/25/72].

Examples of weekly program outlines which illustrate methods of weekly planning to accommodate individual and group needs are noted in Appendix C.

In the areas of communication arts, social studies, mathematics and science, guidelines for curriculum content were made in curriculum guides or through departmental conferences. Teachers were not committed to follow the guidelines stringently and a diversity of activities, approaches and techniques was evident between the curriculum content and organization of teams. These observations of teaching practice were consistent with the commitment to individualized instruction previously noted.

Description of the Teachers

Team Two (Class One) was comprised of three teachers. Each teacher was involved in teaching two of the required courses. The English-Mathematics teacher was thirty years old, had taught for three years and had accumulated twenty-five hours of credit towards a master's degree. All of her teaching experience had been in team-teaching situations. The Social Studies-Mathematics teacher was thirty-three years old, had spent his four years of teaching in team settings and had accrued forty credit hours towards a master's degree. These two teachers

took primary responsibility for the administration of the study skills materials in their team. The third member of the team taught Science-Mathematics. He was in his first year of teaching and had seven hours of credit towards a master's degree.

Team Three (Class Two) was made up of four teachers. The responsibility for implementing the study skills practice exercises fell to the Social Studies and English teachers. The Social Studies teacher was twenty-four years old and experiencing her first year of teaching. Her colleague was twenty-five years old, had taught for three years in teams and had nine credit hours towards a master's degree. The Science teacher was twenty-two years of age and in his first year of teaching. Mathematics was taught by a woman with twenty-three years teaching experience who had acquired her master's degree.

Team teachers' schedules permitted an hour each day for planning and organizing daily or weekly programs as a team. This was a prerequisite to the placement of groups of students in assigned classrooms or laboratories for particular types of instruction. In addition, each teacher was given time for individual planning on three days each week. Examples of schedules are noted in Appendix A.

The teachers who accepted primary responsibility for the teaching of the research study skills materials

imposed minimum limitations of fifteen minutes per day as a requirement on each student in the experimental groups. Students who wished to devote additional time to the practice exercises were not dissuaded from doing so.

Assessment of Students Prior to Testing

The researcher obtained information concerning the background of the sixth grade students in research study skills through discussion with teachers and by reference to curriculum guides. Details are given below according to separate sub-skill divisions:

Library skills and reference skills. All sixth grade students were provided with an orientation session related to the use of the central library in the fall of 1972. The librarian gave talks on the layout and organization of the facility, make particular note of the value of the card catalogue, and provided a "reference hunt" activity. This final strategy was intended to encourage students to locate books and information for themselves.

Subsequent conversations with the librarian indicated that students still preferred to ask her, or her aides, where books were to be found. She looked forward to having future opportunities to expand orientation activities, and to encourage teacher-librarian cooperation on extended library use.

Dictionary skills. The communicative arts courses curriculum guide for 1969-1970 was in use, at least as a reference source, during this study. While the use of dictionaries was inferred to be implicit in the work which is described, no explicit reference to dictionary skills is made. The communication arts teacher in Team Two expressed concern that dictionary skills were receiving insufficient attention at the sixth grade level during the academic year.

Reading graphs and tables skills. Mathematic teachers from both teams used in this study were confident that the materials used in the Reading Graphs and Tables section of the Research Study Skills Test had been covered in their courses. There was some indication that most of the sixth grade students had achieved considerable mastery of the skills and concepts inherent in this work.

Reading maps skills. The social studies curriculum guide had apparently not been updated from the 1969-1970 version. Therefore, the document did not adequately reflect the variety of newly implemented work. That particular document places map and chart activities at the seventh grade level. The researcher was left with the impression that an introduction to maps was now made at the sixth grade level but that making inferences from maps and problem solving using maps were unlikely to be part of the course.

Design

The design for this study may be described as a 2x2x2 factorial design. Factorial designs are discussed in a number of sources including Campbell and Stanley (1967:27-31), Borg and Gall (1971:401-405) and Sax (1968:371-76).

This procedure is appropriate to testing hypotheses in which there are three bases for classification. In this study these classifications are represented by the two classes, the pre-test and post-test, and the existence of experimental and control groups. It is further illustrated by the following diagram:

	EXPERIMENTAL GROUP		CONTROL GROUP	
	PRE-TEST	POST-TEST	PRE-TEST	POST-TEST
CLASS ONE				
CLASS TWO				

An analysis of variance based on this design which will be noted in the Analysis of Data section of this chapter shows a number of sources of variance. The advantages of this approach are reiterated by Sax:

a. Factorial designs allow for the analysis of interaction effects. If interaction is significant, we are in a position to better understand the role of the main effects; if it is not, we have additional knowledge concerning the limitations

of the variables. In either case, we have more information than we could obtain by running separate experiments.

b. . . . more than one variable can be manipulated at the same time. Extraneous variables can be deliberately entered into the design to evaluate their effects. In this way we can gather more information without taking time to equate groups.

c. Factorial designs are efficient and economical [1968:374-75].

Procedures

The two classes selected for participation in this study were chosen because they represented instructional and organizational groupings which were quite distinct from any used in previous research in this area. Self-contained classrooms had been used in earlier studies (Snoddy 1967; Nold 1971). This study was concerned with sixth grade students who were taught in a team teaching situation in a middle school setting. The sixth graders were also vertically grouped with seventh graders.

Students from each class were assigned to experimental and control groups within that class by the use of random numbers. In Class One (Team Two) seventeen students were included in the control group and seventeen in the experimental group. Class Two (Team Three) provided twenty children for the control group and an equal number for the experimental group. These seventy-four students did not constitute all of the sixth grade members of both teams. Additional information was available concerning the

selected students and it was originally planned to use that information. Subsequently, the study was limited to its present form, the selected students retained, and the remaining sixth grade students omitted from consideration.

All of the students involved in the study took a pre-test on February 28, 1973 (Shores-Newland Research Study Skills Test, Form 1). Following an analysis of this information as diagnosed by this measuring instrument it was possible to determine those questions which each student had answered incorrectly.

An individual profile was then developed on each student in the experimental groups. This made it possible to implement those practice exercises designed by Snoddy (1967), and Stinson (1970) and which were used by Nold (1971). Accordingly, it was possible to meet the individual needs of students in those areas where problems were noted. Students were not required to complete practice exercises in areas where they had illustrated competence in the form of correct answers on the diagnostic test.

The first treatments were given in the first week of March, and continued until the post-test (Shores-Newland Research Study Skills Test, Form 2) was administered on May 29. There were two major breaks in the administration of practice exercises which were determined by an Easter vacation, and a one week sojourn at "camp" for each class.

Each student was presented with a file of activities to be completed. These were examined by the researcher on a regular basis. When students completed work in one area satisfactorily they were given new assignments to meet other needs noted in the diagnosis of difficulties. Practice exercises were eliminated when proficiency in problem areas appeared to have been overcome. Proficiency was determined by accurate student responses to practice exercises associated with each topic. Examples of these exercises may be seen in Appendix D.

Those teachers who undertook major responsibility for overseeing the treatments, and for teaching the children on an individual basis, were given a file in which copies of all the practice exercises could be found. These were intended to facilitate speedy reference to the diversity of practice materials under review.

Problems in the Implementation of Practice Exercises

A number of particular difficulties were found in the implementation of the practice exercises in the experimental groups. The observer noted that these were associated primarily with students and classroom organization, but were also influenced by the teachers who took responsibility for instructional matters.

At the beginning of the experiment the students assigned to the experimental groups exhibited a great deal

of excitement about their involvement. As the work progressed the enthusiasm of many children diminished. This may be partially attributed to the fact that the school year was drawing to a close, and the preparations for annual journeys to camp detracted from their interest in the practice exercises. Attitudes towards the practice exercises also changed among those children who had exhibited considerable deficiencies in the five sub-skill areas of the pre-test and were required to complete more work than those who had scored highly. Resentment towards some of the exercises was expressed when students decided that they were not "fun" to do. Work associated with dictionary skills and library skills came into this category most frequently.

As noted earlier in this chapter students were expected to devote fifteen minutes each day to the completion of required work. However, with the large number of children in each team and the wide range of activities available to them, it was not possible to check this time factor carefully. The materials were designed to meet the needs of individual children and to permit them to complete work at their own pace. Conversations with teachers, observations of students at work, and continuous review of completed work suggested that total commitment to the time schedule was not realized by all the students.

The teachers were thoroughly accommodating throughout the experiment. They gave up a great deal of time in discussing the activities, offering insights into student behavior and response, and in trying to ensure that the work was done. Nevertheless they faced several important problems. As specialists in one or two curricular areas within a team, they were occasionally dealing with materials which were either outside their fields of expertise and interest or which barely impinged upon them. This necessitated constant review of all the practice exercises which were in their possession. As the research study skills program was completely new to them, and as the instruction was individualized, they were placed under considerable strain to keep in touch with the progress of each student. Due to the diversity of on-going activities in each team, and the fact that one teacher or the other might be involved in special projects, communication between teachers about individual responses to the exercises was difficult. The complexity of classroom management made it unrealistic for one teacher in each team to accept total responsibility for the program.

Measuring Instrument

Forms 1 and 2 of the Research Study Skills Test were used in this study. Form 1 was administered as a pre-test and Form 2 as a post-test. Both forms were

developed from earlier research by Shores and his colleagues and include a number of revisions which have increased their reliability. The preceding work included an unpublished Research Study Skills Test (J. H. Shores, Rodgers and Newland 1966) and an unpublished Research Study Skills Test, Form A (Shores and Newland 1969). During the process of development of the Research Study Skills Test the reliability of a short form, as determined by the Kuder Richardson 21 formula was .77. A longer revision used by Nold (1971:43-44) had a reliability coefficient of .80 as determined by the split-half reliability coefficient and Spearman Brown Prophecy formula. Nold also used the Research Study Skills Test, Form A which was in the pilot stage of development, and had been validated by content analysis (1971:44).

Results of further revisions of Form A were reported by Shores in 1970. Form A became the Form 1 of the more refined diagnostic instrument used in this study and a new Form 2 was similarly incorporated. The reliability of the present forms of the Research Study Skills Test, Form 1 and Form 2 was given at .863 as determined by the Kuder-Richardson 21 formula. The summary statistics for the test are illustrated in Appendix E.

Analysis of Data

The hypotheses posed by this study were limited to differences between weighted sub-skill and individual

sub-skill scores of all the students in experimental and control groups, and differences between experimental and control groups within each class. This information was to be obtained by making an analysis of variance of the post-test scores obtained on the Research Study Skills Test, Form 2.

The sources of variation examined in the first hypothesis are noted in Table 1. The hypothesis is vested in the second source of variation [Between Treatments (T)].

Table 1

Analysis of Variance With Treatments Crossed With Classrooms

Source of Variation	Degrees of Freedom
1. Between classes (C)	1
2. Between treatments (T)	1
3. Interaction: C x T	1
4. Between measures (M)	1
5. Interaction: C x M	1
6. Interaction: T x M	1
7. Interaction: C x T x M	1

To ensure greater numbers of degrees of freedom it was decided to seek information concerning the second and third hypotheses by revising the sources of variation,

and analyzing the data again. The second hypothesis is vested in the second source of variation [Between treatments (Class One)], and third hypothesis in the third source of variation [Between treatments (Class Two)], both of which are noted in Table 2.

Table 2

Analysis of Variance With Treatments Nested in Classrooms

Source of Variation	Degrees of Freedom
1. Between classes (C)	1
2. Between treatments (Class One)	1
3. Between treatments (Class Two)	1
4. Between measures (M)	1
5. Interaction: C x M	1
6. T x M (Class One)	1
7. T x M (Class Two)	1

The 2x2x2 design also permitted the accumulation of considerable additional information. These data were based on other sources of variation which were used, as necessary, to provide a more precise analysis of the results. These are discussed in Chapter V. A further advantage of the additional sources of variation was to reduce the error variance in the data to be considered.

A number of individual students were selected for further comment. The basis of this selection was either outstanding improvement in post-test scores or a considerable decline in scores on the post-test. An attempt was then made to account for these results based on observations of the students at work, a review of their responses to the practice materials, and discussions with students and teachers.

CHAPTER IV

FINDINGS

Introduction

This chapter is designed to report the statistical analysis of the data. The hypotheses noted in Chapter I are tested and discussed. To accomplish this end an analysis of variance was carried out on the post-test scores of the Research Study Skill Test, Form 2, and used as a primary source of information.

Initial differences between students in the experimental and control groups of Class One and Class Two were accommodated by the random assignment of students to one group or the other within classes. There were seventeen children in the experimental group of Class One and a similar number in the control group. Twenty children were assigned to the experimental group of Class Two, and the same number to the control group. Two teachers in Class One and two other teachers in Class Two took the responsibility for overseeing the program and providing instruction as necessary. As each teacher was technically accountable for both the experimental and control group

within a class, the probability of one teacher having undue impact on a particular experimental group was diminished.

To provide additional information it was also decided to examine the hypotheses in the light of gain scores where this was appropriate. The analysis of the final four sources of variation noted in Table 1 generated the data from which this information was extrapolated. There was no reason to believe that the pre-test and post-test scores would be wieghted differently as the Research Study Skills Test, Form 2 is an alternative form of the Research Study Skills Test, Form 1. However, the analysis of variance on gain scores provided additional statistical information which could be considered in a broader discussion of the results.

The progress and regression of a number of students could be partially accounted for by the researcher. Details are listed later in these findings.

Results

The first null hypothesis to be tested was that:

Hypothesis 0

There is no significant difference in the mean scores of the experimental and control groups on the weighted sub-skills and on individual sub-skill sections of the Research Study Skills Test, Form 2.

In consideration of this hypothesis it is necessary to refer to Table 3 for preliminary information.

Table 3

Analysis of Variance Including Treatments Crossed With Classrooms

Source of Variation	Degrees of Freedom	Multivariate F	p-value
1. Between classes (C)	1	1.3681	.2477
2. Between treatments (T)	1	1.5932	.1743
3. Interactions: CxT	1	1.1198	.3586
4. Between measures (M)	1	2.7628	.0252
5. Interaction: CxM	1	1.2097	.3145
6. Interaction: TxM	1	1.4575	.2158
7. Interaction: CxTxM	1	1.2689	.2879

This table is drawn to illustrate the broad findings of the first complete program which was analyzed. Partial testing of the first hypotheses is inherent in the second source of variation [Between treatments (T)] shown in Table 3. The p-value of .1743 indicates that there was no significant difference in the weighted sub-skill scores of the Research Study Skills Test, Form 2, at the .05 level. Table 3 also provides collateral information which shows that there were no significant differences between the classes or unexpected differences in the interactions between classes and treatments. The only significant 'p' value is listed under item four where the source of variation is represented by the measures on gain scores

between pre-testing and post-testing. There is a significant difference in the means of the gain scores below the .05 level of probability. This indicated that children on both the experimental and control groups improved their scores on the post-test.

A closer examination of the individual sub-skill sections denoted by Table 4 indicated that there were no significant differences anywhere. These figures are again based on an analysis of variance using post-test information.

Table 4

Individual Sub-Skill Sections: Comparing All Students in Experimental Groups With All Students in Control Groups

Variable	Mean Square	Univariate F	p less than
Library Skills	2.2838	.6752	.4141
Dictionary Skills	3.9054	1.4217	.2372
Reference Skills	3.9054	.7928	.3763
Reading Graphs and Tables Skills	1.6351	.4413	.5087
Map Reading Skills	.3378	.0655	.7988

Note: F-ratio for multivariate test of equality of mean vectors = 1.5932.

The data expressed in Table 3 and Table 4 provide sufficient evidence to make it impossible to reject the first hypothesis.

The second null hypothesis to be tested was that:

Hypothesis 1

There is no significant difference in the mean scores of the experimental group and mean scores of the control group of Class One, on the weighted sub-skills and individual sub-skill sections of the Research Study Skills Test, Form 2.

The broad findings related to the second hypothesis are shown in Table 5. The first, fourth and fifth sources of variation remain the same in this analysis as they are in Table 3. As noted earlier, this analysis is a modified version of the previous program. In this instance the weighted sub-skill scores are addressed by the second source of variation [Between treatments (Class One)].

Table 5

Analysis of Variance With Treatments Nested in Classrooms

Source of Variation	Degrees of Freedom	Multi-variate F	p-value
1. Between classes (C)	1	1.3681	.2477
2. Between treatments (Class One)	1	.2764	.9246
3. Between treatments (Class Two)	1	2.4366	.0436
4. Between measures (M)	1	2.7628	.0252
5. Interaction: CxM	1	1.2097	.3145
6. TxM (Class One)	1	.0369	.9993
7. TxM (Class Two)	1	2.6894	.0285

The second line of Table 5 indicates that there is no significant difference ($p<.9246$) in the means of the weighted sub-skill sections of the experimental and control groups of Class One.

Table 6 illustrates the mean scores of the individual sub-skill sections when comparing the experimental and control groups of Class One. The analysis of variance on post-test scores does not reflect any significant differences at the .05 level between these groups in any individual sub-skill section.

Table 6

Individual Sub-Skill Sections: Comparing the Experimental and Control Groups of Class One

Variable	Mean Square	Univariate F	p less than
Library Skills	.4706	.1391	.7103
Dictionary Skills	.2647	.0964	.7572
Reference Skills	1.8824	.3821	.5385
Reading Graphs and Tables Skills	1.0588	.2858	.5947
Map Reading Skills	.0294	.0057	.9401

Note: F-ratio for multivariate test of equality of mean vectors = .2764.

The evidence provided by the statistical analysis of the data suggests that the second null hypothesis should not be rejected.

The third null hypothesis to be tested was that:

Hypothesis 2

There is no significant difference in the mean scores of the experimental group of Class Two on the weighted sub-skills and on individual sub-skill sections of the Research Study Skills Test, Form 2.

Reference should be made to Table 5 in consideration of the first part of this hypothesis. The means of the weighted sub-skill scores are noted in the third source of variation [Between treatments (Class Two)]. This shows that there is a significant difference ($p<.0436$) at the .05 level on these weighted sub-skill scores. This suggests that either the experimental group of control group of Class Two would also have made significant gains in one or more of the individual sub-skill sections. However, Table 7 which is concerned with this information and has a direct bearing on the second part of the hypothesis fails to reveal such details.

None of the individual sub-skill sections show significant differences at the .05 level between the experimental and control groups of Class Two.

Closer examination of the statistical data is shown in Table 8 which is an extension of Table 7. This shows differing p-values based on the conditional mean distribution of means rather than the marginal mean distribution for each variable. The marginal mean distribution is most commonly used to determine significant

differences and the conditional mean is typically of less importance. However, the conditional mean provides useful information in this case.

Table 7

Individual Sub-Skill Sections: Comparing the Experimental and Control Groups of Class Two

Variable	Mean Square	Univariate F	p less than
Library Skills	7.1362	2.1362	.1484
Dictionary Skills	4.9000	1.7837	.1861
Reference Skills	2.0250	.4111	.5236
Reading Graphs and Tables Skills	.6250	.1687	.6826
Map Reading Skills	.9000	.1744	.6775

Note: F-ratio for multivariate test of equality of mean vectors = 2.4366.

Table 8

Additional Data

Variable	Step down F	p less than
Library Skills	2.1362	.1484
Dictionary Skills	6.0651	.0163
Reference Skills	.5342	.4675
Reading Graphs and Tables Skills	.8491	.3602
Map Reading Skills	2.3285	.1319

The significant differences between the groups is in dictionary skills ($p<.0163$). An examination of further data based on the analysis of variance on the post-test, reveals that the control group of Class Two made greater improvement than the experimental group in dictionary skills. The observed cell means are 5.4000 for the control group and 4.7000 for the experimental group. This information, and the relevant details from Table 5 and Table 7, were regarded as insufficient to reject the third hypothesis.

Individual Profiles

This section is based on observation and provides supplementary information to the statistical analysis. The researcher came to know all the students in the experimental groups quite well. Observations of these students at work, inferences drawn from their responses to the practice exercises, and numerous discussions with them were extremely useful in illustrating their views and attitudes towards the research study skills. Similar characterizations of students in the control groups were not possible as they were less well known to the researcher.

Although the statistical data did not indicate significant gain in the mean scores of the experimental and control groups when an analysis of variance was

carried out, a number of students made significant gains on raw scores. These may be seen in their totality in Appendix F.

In Class One a number of students expressed their interest in the practice exercises, stated that they enjoyed doing them, and applied themselves to the required work quite vigorously. These students may be identified by their designated student numbers in the raw score tables. In Class One there are two particularly good examples of students who made excellent progress which is reflected in their post-test scores. One boy, identified by the number "02," increased his scores in every sub-skill except reading graphs and tables where he maintained his pre-test score. An equally good example is found by reference to the girl identified by the number "07." Her post-test scores show improvement in every sub-skill section except map reading skills. There are a number of other students who made quite satisfactory advances in several sub-skills and enjoyed marginally higher post-test results. These are best represented by students with the numbers "05," "06," "11," and "14" in Appendix F. By way of contrast, one girl (number "08" in the tables), was disdainful of the whole program. She expressed her feelings by refusing to discuss the program, writing negative comments on her post-test score sheet, and producing significantly lower marks in several sub-skill sections.

Class Two provides a comparable number of positive illustrations. The boy denoted by the number "47" in the raw score tables was among the most enthusiastic participants in the program. He made substantial gains in all sub-skill sections except reading graphs and tables in which he maintained the same high scores from pre-test to post-test. A second student who displayed particular interest in the research study skills was a girl (number "38" in the tables) who increased her performance in every sub-skill section on the post-test. There were a substantial number of students who made gains in several sub-skill areas. These are best exemplified by reference to students with the numbers "41," "46," "48" and "49 in the tables. There are no examples in Class Two which match the solitary case of extreme regression mentioned with regard to a Class One Student.

On a speculative level there appeared to be a relationship between the values expressed by students and their responses to the practice exercises. For example, students with real concerns about reporting and grading systems were relieved that their work in research study skills would not be reported to parents. This had a negative effect, and resulted in work being produced which did not characterize their best efforts. On the other hand, students who were highly self-motivated, enthusiastic about the exercises, and intrigued to be part of

the study, generally made good progress. These details are discussed further in Chapter V.

CHAPTER V

SUMMARY, FINDINGS, OBSERVATIONS AND RECOMMENDATIONS

Summary

The purpose of this study was to examine the competencies of two groups of sixth grade students in the research study skills, as determined by Form 1 of the Research Study Skills Test. On the basis of the information obtained from this test, practice exercises were given to selected students to meet their individual needs. The topics included in the program were library skills, dictionary skills, reference skills, reading graphs and tables skills and map reading skills.

The John A. Hannah Middle School of East Lansing, Michigan was chosen for the study. Two classes which included sixth graders were used in this experiment. Both sixth-grade groups were part of a team-teaching arrangement, and were vertically grouped with seventh graders. Within each class students were randomly assigned to experimental and control groups. There were seventeen students in both the experimental and control groups of Class One,

and twenty sixth-grade students in both the experimental group and control group of Class Two. Only the students in experimental groups received practice exercises intended to ensure their increased proficiency in sub-skill areas where the diagnostic instrument illustrated that they had made errors.

The pre-test was administered in late February, 1973 and the alternative form of the test was given in late May, 1973.

Summary of the Results

The data were examined in Chapter IV and the major findings were that:

1. The gains made by the experimental groups of Class One and Class Two were not significantly different from the gains made by the control groups of those classes, when tested by an analysis of variance of their scores. This analysis was concerned with the means of the weighted sub-skill scores and the means of individual sub-skill sections of the Research Study Skills Test Form 2.

2. A comparison between the experimental and control group of Class One was made on the basis of an analysis of variance on post-test scores. No

significant differences were recorded on weighted sub-skills or individual sub-skill sections of the Research Study Skills Test, Form 2.

3. The experimental and control groups of Class Two were also examined for significant differences on weighted sub-skill and individual sub-skill sections of the Research Study Skills Test, Form 2. An analysis of variance carried out on these post-test scores failed to reveal significant differences on individual sub-skill sections of the test. A significant difference was found on the weighted sub-skill sections but a closer examination of the data made it impossible to reject the null hypothesis to which these data were pertinent.

Observations

The observations contained in the following paragraphs have been suggested by the results obtained in this study, conversations with teachers and students, and the personal reflections of the researcher.

1. Organization of the Study:

   The study was rather short in duration and several advantages may have been gained if the study had begun in the fall term of 1972 rather than in the winter term of 1973. Those team

teachers who took primary responsibility for the instructional aspects of the research study skills program may have benefitted from a brief in-service workshop prior to the initiation of the study. This would have enabled them to become more familiar with the concepts and ramifications of the topics, and assisted them in planning for the integration of the work within their weekly teaching schedules. Similarly, a number of students, particularly those who needed additional time to complete the practice exercises, would have had that opportunity.

2. Administrative Comments:

The program was not really regarded as an integral part of the school curriculum by the students in the experimental groups. Their initial excitement in being part of a university study was not maintained by a substantial number of them. The problem was compounded by the fact that the results of their efforts were not to be reported to parents. This had a negative effect on the work generated by some of the participants. The students who were most affected were those who had to complete the most practice exercises. Towards the end of the spring term there were

many exciting events in progress at the school. Where students could not join in these activities because they were required to complete work in research study skills, their resentment became apparent. Problems were also created by the fact that only half of the sixth grade students in each class were required to do the practice exercises.

3. Classroom Organization and Individualized Instruction:

The administrators and teachers at the middle school were totally committed to individualized instruction, and this program seemed to meet this approach quite readily. It provided a diagnostic base from which to proceed, and treatments designed to meet the needs of individual students. The faculty were also concerned with the principle of students learning to discover information for themselves, and found the program to have merit in this respect.

Several points already alluded to deserve reiteration in this section. It was extremely difficult for the teachers to keep abreast of the progress of individual students as they began working in differing sub-skill areas, and completing a wide variety of practice exercises within those sub-skills. The lack of intimate

familiarity of the teachers with these materials mitigated against intensive instructional practices with individual students. Frequent school visits and observation by the researcher, discussions with teachers, and the existence of comprehensive activity files were probably insufficient to meet this difficulty.

The research study skills need to be taught systematically. This was not readily achieved in the times set aside for the research study skills. Many differing activities were likely to occur during these periods. The teachers were, therefore, unable to provide as much individualized instruction as they would have wished.

4. The Practice Exercises:

The practice exercises used in this study had been implemented in earlier research in the area of research study skills, and found to be of considerable value. They were applied with minor alterations to the middle school in this study.

The teachers reacted positively to the practice exercises. A solitary adverse comment was addressed to the map reading skills section. This related to a map which was quite complicated and poorly drawn, and which was quickly removed from the program.

A number of students found difficulty in completing the dictionary skills section. This had nothing to do with the degree of severity of the work but rather with the repetitious nature of some of the practice materials. The idea that the practice exercises were not "fun" to do recurred several times in conversations with students.

5. The Measuring Instruments:

The short diagnostic tests were well received by the teachers and administrators at the school. Each form of the Research Study Skills Test took forty-five minutes to administer and this was regarded as an ideal amount of time. The pre-test provided useful information to the teachers. Standardized tests in use at the city and state levels did not reveal similar information and the faculty were able to make new assessments of individual students based on the results which were obtained.

Recommendations

The following recommendations for further investigation in teaching research study skills have arisen from this study:

1. Further investigation needs to be made into the effect of organizational patterns such as team

teaching on individualized instruction in the research study skills.

2. The nature and form of the practice exercises used in this study need to be reviewed to determine their interest value to sixth grade students.
3. Teachers intent upon using the Research Study Skills Test should be fully aware of its contents and possibilities to ensure that practice exercises are used to their best advantage.
4. A more precise way should be found to determine when practice exercises have increased proficiency in individual sub-skills, prior to post-testing.
5. The effect of systematic instruction in the research study skills over differing periods of time needs further consideration. The diagnostic instrument may be more sensitive to improvements in students scores over longer periods of time than were illustrated in this study.
6. Attempts should be made to ascertain the sensitivity of the Research Study Skills Test to a wide variety of school settings. The high educational level of the East Lansing community, the aspirations of parents for their children and the quality of the school system were reflected in the substantial pre-test scores obtained by many students. It was difficult for these students to

improve significantly on the measures of the diagnostic instrument. In other school systems where the research study skills are not approached in the curriculum, the alternative forms of the test and practice exercises might produce very different results.

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APPENDICES

APPENDIX A

TEAM TEACHERS' SCHEDULES

APPENDIX A

TEAM TEACHERS' SCHEDULES

The following schedules for the academic year 1972-1973 have been slightly modified. The names of the teachers have been omitted and the team numbers altered to conform with those denoted in Chapter III.

Team planning time was used by the three or four teachers in the respective teams to provide for conversations concerning curriculum content, determinations of grouping procedures, the use of designated classroom and laboratory areas, and preparations for extra-curricular activities. In addition, teachers had individual planning periods to make further preparations in their own fields of specialization.

The research study skills practice exercises were incorporated into morning or afternoon sessions where the single word "team" appears.

HANNAH MIDDLE SCHOOL 1972-1973

Team Two--Team Teachers' Schedule

	8:00-8:15	8:15-9:15	9:20-10:15	10:20-11:15	11:20-11:45	11:45-12:15	12:20-12:45	12:45-1:15	1:20-2:15	2:20-3:15	3:15-4:00
Monday	Other service	TEAM	Team Plan	Indiv. Plan	LUNCH	TEAM					Other service
Tues.		TEAM	Indiv. Plan		LUNCH	TEAM				Team Plan	
Wed.		TEAM		Indiv. Plan	LUNCH	TEAM				Team Plan	
Thurs.		TEAM	Indiv. Plan		LUNCH	TEAM				Team Plan	
Friday		TEAM		Indiv. Plan	LUNCH	TEAM				Team Plan	

English-Math Room 204
Science-Math Room 300
Social Studies-Math Room 202

Team Planning Room 204

HANNAH MIDDLE SCHOOL 1972-1973

Team Three--Team Teachers' Schedule

	8:00-8:15	8:15-9:15	9:20-10:15	10:20-11:15	11:20-11:45	11:45-12:15	12:20-12:45	12:45-1:15	1:20-2:15	2:20-3:15	3:15-4:00
Mon.	Other service and Plan	Team Plan	TEAM		Indiv. Plan	LUNCH		TEAM			Other service and Plan
Tues.		Team Plan	TEAM		Indiv. Plan	LUNCH		TEAM			
Wed.		Team Plan	Indiv. Plan	TEAM	Indiv. Plan	LUNCH		TEAM			
Thurs.		Team Plan	TEAM		Indiv. Plan	LUNCH		TEAM			
Fri.		Team Plan	Indiv. Plan	TEAM	Indiv. Plan	LUNCH		TEAM			

English Room 208
Math Room 212
Science Room 300-108
Social Studies Room 207

Team Planning Room 208

APPENDIX B

INDIVIDUAL TEACHER PLANNING

APPENDIX B

INDIVIDUAL TEACHER PLANNING

Two examples from the communication arts teacher's notebook in "Team Three" are illustrated below. They were not intended to provide extensive information, but served as guidelines and represented possible procedures to be adopted with the special groupings assigned by the teacher.

Such plans were generated in the individual planning "periods," other service and planning "times" (noted in Appendix A) or outside school time.

HANNAH MIDDLE SCHOOL 1972-1973

Team Three

	8:15-9:15	9:20-10:15	10:15-11:15	Lunch/Plan	12:45-1:40	1:40-2:15	2:15-3:15	After school/ Evening
Monday	1. Check on Films 2. Sp/Vocab. 3. Check Eng. Off. for Writ. Skil.	Group B 1. Spel/Vocab. 2. Go over test 3. Charades 4. Writ. Skil.	Group D 1. Spel/Vocab. 2. Go over test 3. Charades 4. Writ. Skils		Group A 1. Spel/Vocab. 2. Go over test 3. Charades	Study Period 1. Spel/Vocab. 2. Go over test 3. Charades 4. Writ. Skil.	Group C 1. Spel/Vocab. 2. Go over test 3. Charades 4. Writ. Skil.	7:00-8:00 Drama Club
Tuesday		B 1. Spel/Vocab. 2. Reading	D 1. Spel/Vocab. 2. Reading		A 1. Spel/Vocab. 2. Reading	Study Period 1. Film 2. C.A. Games	C 1. Spelling 2. Reading	3:30 Team Teacher Meet. 7:00-8:00 Drama Club
Wednesday		10:15-10:20 Homeroom	B 1. Direct info. on pantomime 2. Charades		D 1. Direct info. on pantomime 2. Charades Break	A 1. Direct info. on pantomime 2. Charades	C 1. Direct info. on pantomime 2. Charades	7:30 Faculty Recreation
Thursday		B 1. Read 2. Group pantomimes	D 1. Read 2. Group pantomimes		A. 1. Read 2. Group pantomime	Study Period	C 1. Read 2. Pantomimes 3. VTR-In Search of Asto.	
Friday		Homeroom	B 1. Spel/Vocab test 2. Charades		D 1. Spel/Vocab. test 2. Charades Break	A 1. Spel/Vocab. test 2. Charades	C 1. Spel/Vocab. test 2. Charades	

Tuesday - Team Teacher Meeting
Saturday - Visit Camp

HANNAH MIDDLE SCHOOL 1972-1973

Team Three

	8:00-8:15	8:15-9:15	9:20-10:15	10:15-11:15	Lunch/Plan	12:45-1:40	1:40-2:15	2:15-3:15
Monday			Group B 1. Sp/Voc word 2. Quotation Marks 3. Charades 4. Reading	Group D 1. Spel/Voc 2. Quotation Marks 3. Charades 4. Reading		Group A & C 1. Field trip 2. Spel/Voc 3. Go over quotation marks 4. Charades 5. Reading	Option	Mrs. Whitford
Tuesday		-run ditto for quiz -plan sub. on Wed. -Find clipboard	Group B 1. Test quotation marks 2. Reading 3. Charades	Group D 1. Test quotation marks 2. Reading 3. Charades		Group A 1. Spel/Voc for those who were on field trip Monday. 2. Suggestions for Charades and Explanations 3. Test on use of Quotation marks 4. Free Reading	Group C	FLEX PERIOD
Wednesday		-correct test		Homeroom: Group B -Return test -Spel/Voc -Pen. Work Sheet -Charades		Group D 1. Return tests 2. Spel/Voc 3. Pen Wkst. 4. Charades	Break Group A 1. Return tests 2. Spel/Voc 3. Pen Wkst. 4. Charades	Group C 1. Return tests 2. Spel/Voc 3. Pen Wkst. 4. Charades
Thursday			Group B 1. Charades 2. Introduce Pantomime for small group	Group D 1. Charades 2. Introduce Pantomime for small group		Group A 1. Charades 2. Introduce Pantomime for small group	Option --free reading --com. arts. games --Library (10)	Group C 1. Charades 2. Introduce pantomime for small groups
Friday	Collect "Journals" from Indep. group			Group B -Spel/Voc -Free Read. or Charades		Group D 1. Spel/Voc Test 2. Free Read. or Charades	Break Group A 1. Spel/Voc 2. Free Read. or Charades	Group C 1. Spel/Voc test 2. Free Read. or Charades

9:25-9:55 Th. - Vision Testing

1. C.A. meet all day on Wed.
2. Pool Party 6:30-8:00 on Wed.

APPENDIX C

WEEKLY SCHEDULES

APPENDIX C

WEEKLY SCHEDULES

The following weekly schedules indicate the assignment of children to various rooms and groupings. They also reflect how a number of special events and activities were incorporated into weekly programs. While some of the abbreviations and notations are obscure to the outsider, they obviously had meaning to the students. The most important abbreviations related to:

C.A. - Communication Arts

S.S. - Social Studies

Sci. - Science

Flex. - Flexible use of time by students

Lib. - Library

While names of teachers were indicated on each schedule, only the initial letter of each name appears on the material presented here. The numbers which appear indicate the rooms to which students were to go for particular activities. To conform with Chapter III, "Team Two" was used to denote the particular team involved.

You must attend 2 "Color of Man"
Afternoon classes begin at 12:00 and 1:15--You must be in your seat and quiet by these times.

TEAM TWO SCHEDULE

Week of January 22, 1973

	8:20-9:15	9:20-10:15	11:55	3:15
Monday 22nd	S.S. Test 8:30 Math Metric Test* 300 Math	If you are not in Matric go to room 202 during the test.	C.A. Matric Test* S.S.	C.A. Matric Test* S.S.
23rd Tuesday	C.A. Color of Man--Phase I (Ancient Astro.) S.S.		C.A. Color of Man S.S. Phase I	C.A. Phase I Color of Man S.S. (Ancient Astro.)
Wednesday 24th	Math Math Math	C.A. Color of Man--Phase I S.S.	C.A. Phase I Color of Man S.S.	1:20-2:15 All-School Orchestra Assembly (Aud.)
25th Thursday	Math Math Math	Vote on H.M.S. Monogram Selection 8:15	C.A. Color of Man S.S.--Phase I	Catch-up--Sign up for room (Incl. Lib.) Phase I will be assigned.
26th Friday	Math--Phase I Math--Anyone Black in America--Post-test	Math--etc. Phase I Room 202 Indian Reports Due - S.S.	Parent Conferences in Gym--1:00-4:00 (End of Marking Period)	No School-- A.M. Monday starts 1:00

F L E X

"Ancient Astro." will be shown at 1:10.

763 Parent Night

Orchestra Concert--7:30

*Bring Reading Book or Math to Matric Test. Fill out S.S. and C.A. record cards. Hand in math folders.

TEAM TWO SCHEDULE

Week of April 2-6

Name _____

	8:20-9:15	9:20-10:15	11:55			3:15
Monday	NO SCHOOL	A.M.	YOUTH TALENT SHOW			Camp Handout
Tuesday	Stories--204 Math M.F.--300 Identity-Lib. Conference Interacting Group--202		Stories--204 Science Lab Quiet--300 Identity-Lib. Conference Interacting Group--202	Break--1:00-1:15	Stories--204 Open Science 300 Identity-Lib. Conference Interacting Groups--202	F L E X
Wednesday	Stories--204 Nature Walk* 300 Math 202	Stories--204 Math with M.F. 300 S.S. Quiet Study--202	Play-Aud.	Break--15 minutes	Stories--204 Open Science--300 Melanie Reading Group Lib. Conf. S.S. Quiet Study	Bring back Handouts for Camp.
Thursday	Quiet Reading 204 Math 300 1 to 1 Interacting Groups--202		Stories--300 Science Quiet--300 1 to 1 Interacting Groups--202	Break--1:00-1:15	Stories--300 Open Science 300 Melanie--Conf. Room Interacting Groups--202	Bring back camp handouts!
Friday	Math 204 Math 300 Identity--202 Quiet Study Lib.	Stories--204 Quiet Science 300 Identity--202 Interacting Groups Test Evaluation--Aud.	Sweep-stakes	Break--1:00-1:15	Stories--204 Open Science 300 Lib. Conf. S.S. Wrap-up	Camp Handouts Bring Back

*Nature Walk--Only those students who signed up last week (weather permitting).

TEAM TWO SCHEDULE

Week of April 9-13

	8:20-9:15	9:20-10:15	11:55-1:00	1:05-2:00	2:15-3:15
Monday 9th	Math by Groups		C.A.--Quiet Spelling	C.A. Spelling, Etc. Lib. Conf. 1:15 204	
			Open Science 300	Electric Models, etc. 300	
			Identity-Gp. I Lib. Conf.	Identity--Gp. II Lib. Conf.	Break 2:00-2:15 / Identity--Gp. III Lib. Conf.
			Special Gp. 202	Interacting Gps. 202	Inter. Gps. 202
10th Tuesday	Math 204	Strings	C.A. 204	C.A. 204	
	Math 300	Assembly 10:20-11:15	Quiet Science 300	Open Science 300	
	Math 202		Interacting Groups 202	Interacting Groups 202	
Wednesday 11th	Math 204	C.A. 204	C.A. 204	C.A. 204	
	Math 300	Math 300	Quiet Science 300	Open Science 300	
	Quiet Study 202	Quiet Study 202	Quiet Study 202	Lib. Conf. 1:15	
				Quiet Study 202	
12th Thursday	Math 204		C.A. 204	C.A. 204 Lib. Conf.	
	Math 300		Open Science 300	Quiet Science 300	
	Identity-- Group I Lib. Conf.		Identity II Lib. Conf.	Identity III Lib. Conf.	
	Math 202		Interacting Gps. 202	Interacting Gps. 202	
13th Friday	Math 202	Catch-Up	Sweep-stakes / Spelling Test-Aud.	Break 1:15-1:30	Talent Show (Aud) 1:30-3:15
	Math 300	Goal Cards, Spelling, Math, S.S.			
	Math 202				

*Hand in Math Folders on Friday.

ADVANCED WEEKLY SCHEDULES

Where a teacher wished to show progression through a topic, unit or center of interest over a number of weeks, additional schedules were developed.

The example given below was prepared by the social studies teacher in "Team Three." It provided a series of guidelines relative to course content, films to be shown and the times at which guest speakers could be heard.

DRUG USE AND ABUSE SCHEDULE

	Monday	Tuesday	Wednesday	Thursday	Friday
January 29	No School A.M.	A Look at "Over The Counter" Drugs	Research	10:30 Medical Aspect of Drug Use/ Abuse Film--"Speed Scene"	Sweepstakes Self-Evaluation
February 5	Film--"Not Me" Research	Film--"Darkness, Darkness" Research	Research	9:30 Legal Aspect of Drug Use/ Abuse	Sweepstakes Self-Evaluation
February 12	Film-- "Marijuana" Research	Research	Research	Folders Due Mastery Test	Sweepstakes Self-Evaluation
February 19	No School	Decision-Making Activities			Sweepstakes Self-Evaluation

APPENDIX D

PRACTICE EXERCISES

APPENDIX D

PRACTICE EXERCISES

An example of a practice exercise for each aspect of each sub-skill is included in this appendix. The total number of exercises represented here constitute less than a third of the total number of practice exercises available for use in the study.

LIBRARY SKILLS--CARD CATALOG

The diagram shown below represents the front of the trays of a card catalog. Notice that they are arranged in alphabetical order. All of the cards that fall alphabetically between the letters shown on the front of the tray are found in that tray. Write the number of the tray that probably contains cards on each of the subjects and titles given below.

1 A - B	3 E - H	5 L - M	7 Z - R	9 U - W
2 C - D	4 I - K	6 N - P	8 S - T	10 X - Z

1. Transportation_____
2. Fiji Islands_____
3. A Boy of Indiana_____
4. The Spy_____
5. Harvard_____
6. Edgar Lee Masters_____
7. Australia_____
8. Armistice Day_____
9. Baseball_____
10. Chemical bonds_____

LIBRARY SKILLS--SOURCES OF INFORMATION

There are two columns below. The column on the left is made up of different sources of information and the column on the right is made up of things you might want to find out about in your school work. Place in the blank the number of the source on the left that might contain the information on the right. The items in the left column may be used more than once, and you may want to place more than one number in each blank.

1. Encyclopedia
2. Newspaper
3. Local Health Department
4. Atlas
5. Dictionary
6. Geography book
7. World Almanac
8. History book
9. Weekly magazine
10. Road map
11. Telephone directory
12. Local Chamber of Commerce

_____ 1. The phone number of a friend

_____ 2. The weather for tomorrow

_____ 3. The distance from Park Ridge, Ill. to Quincy, Ill.

_____ 4. The places where the word "behavior" can be hyphenated

_____ 5. The population of the ten largest cities of the world

_____ 6. A short article with pictures about the election

_____ 7. Some materials about the prevention of tuberculosis

_____ 8. Information concerning the parks in your city

_____ 9. A map showing the Appalachian Mountains

_____10. A brief article concerning space travel

_____11. The address of a department store

_____12. An article about Henry Ford

_____13. A discussion of Greek culture

_____14. A brief summary of the past week's events in Asia

_____15. The winners of the 1932 Olympic games

_____16. The type of highway that connects St. Louis and Chicago

_____17. The number of cases of diptheria reported in your city last year

_____18. A list of all of the automobile dealers in your city

_____19. The meanings of a word

_____20. The number of automobiles produced by each European country

LIBRARY SKILLS--SHELF LOCATION

Arrange the following fiction books as you would find them on the library shelf. Place a number 1 before the one that would come first, a 2 before the one that would come second, etc.

_____	John C. Curtis	The House on Arrow Lane
_____	Raymond Olsen	Boy of Norway
_____	Eric Clayton Jones	The Cats of London
_____	Norma Brown Jonshon	The Secret Place
_____	B. A. Nelson	Big Bertha

Arrange the following non-fiction books as you would find them on the library shelf. Use the Dewey Decimal Classification System. Place a number 1 before the one that would come first, a 2 before the one that would come second, etc.

_____	Peter C. Andrews	Principles of Accounting
_____	Nancy B. Baker	Poems About the City
_____	Alden Anderson	Elementary Economics
_____	Pat Summers	Photography Made Easy
_____	Jon Bean & Mary White	A Children's Dictionary

PARTS OF A BOOK--PREFACE

The preface or introduction is that part of the book that introduces the book to the reader. If a book has a preface, it is usually found on the page following the title page. The preface may include such information as the reasons the author wrote the book, what the book is generally about, the kinds of persons for whom the book was written, the names of the persons the author wishes to thank for their assistance and suggestions for using the book.

Using the information above, answer the following questions. The preface (or introduction) of your arithmetic textbook may be helpful in some cases.

1. Which part of a book, the preface or the table of contents, gives you more information about the titles of the chapters of the book? _____

2. If you want to find out the page numbers of the book that contains information on a certain topic, would you look in the preface or the index? _____

3. If you want to know why the author wrote the book, where would you look, the preface, the title page, or the glossary? _____

4. If the author believes the book is most useful if used in a certain way, would he tell you this in the glossary or the preface? _____

5. If someone other than the author drew the illustration for the book, would you find this information most easily on the title page or in the preface? _____

SKILLS--PARTS OF A BOOK--TITLE

Listed below are the titles of several books as the titles would appear on the front cover. Use this list of books to answer the questions. Place the number of the title in the blank in front of the question.

1. Exploring the Mississippi River
2. One Hundred Science Experiments
3. Silky, the Circus Pony
4. Midwestern America
5. A Collection of Mysteries

_____ 1. If you were interested in reading about the kinds of fish found in a midwestern river, which book would you choose?

_____ 2. If you wanted to read something that included some information about the Indians of Illinois, which book or books would you choose?

_____ 3. If you liked animal stories, which book would you choose?

_____ 4. If you wanted to read something that would tell you how to make water evaporate, in which book would you first look?

_____ 5. If you liked stories that were full of suspense, which book would you choose?

REFERENCE SKILLS--PARTS OF A BOOK--COPYRIGHT DATE

The copyright date of a book is usually found on the back of the title page, but occasionally it is included on the title page. The copyright date is the date the book was published or if more than one date appears, the most recent date is usually the date of the latest publication of the book. Sometimes the date of publication is important. For example, if you want to know the present population of the state of California, a reference source such as the World Almanac and Book of Facts with a 1966 or 1967 copyright date would have a more recent population figure than would a reference source with a 1950 copyright date.

For each of the topics below, draw a circle around the copyright dates of reference sources that would be apt to contain accurate, up-to-date information about the topic. The first has been done for you.

1. The dropping of the atom bomb on Hiroshima in 1945.

   1910 1941 1946 1951

2. The life of William Shakespeare.

   1916 1948 1965

3. How Alaska became a state.

   1835 1915 1964 1966

4. The number of children presently attending the public schools of Georgia.

   1625 1811 1966 1956

5. The effects of solar radiation on astronauts.

   1910 1920 1941 1965

USE OF INFORMATIONAL BOOKS

1. The third edition of a book is advertised as a "revised and enlarged edition." In what part of the book would you be most likely to find a statement of the differences between this new edition and preceding editions?

   A. The appendix
   B. The bibliography
   C. The preface
   D. The first chapter

2. How can you find out most easily whether a general science textbook gives a description of how the telephone works?

   A. Read the table of contents
   B. Leaf through the book quickly
   C. Look at the list of illustrations
   D. Look in the index

3. In which part of a mathematics textbook would you be most likely to find such materials as a table of logarithms?

   A. The appendix
   B. The glossary
   C. The foreword
   D. The bibliography

4.

JAPAN
Industries and resources
Resurgent Japan. Fortune 55:76+ F '57

In the entry from the Readers' Guide to Periodical Literature reproduced above, what is the title of the article?

   A. "Resurgent Japan"
   B. "Japan"
   C. "Industries and Resources of Japan"
   D. "Resurgent Industries and Resources in Japan"

5. In what volume of the magazine does the article appear?

   A. Volume 55
   B. Volume 76
   C. Volume 57
   D. The volume is not indicated

6. What does the plus sign (+) following the figure 76 mean?

   A. Article contains statistical tables, in addition to the text
   B. Article contains illustrations, in addition to the text
   C. Continued on additional pages
   D. Printed serially in several issues

7. What method is generally used in an atlas index to help you find a given town on a state map?

   A. The name of the county is given
   B. The latitude and longitude, in degrees, are given
   C. The code tells which small area of the map to examine
   D. The quarter of the map is given, e.g., "northeast"

8. Which of the following would be most help to you in planning a more extensive study of a certain topic that is treated rather briefly in your textbook?

   A. The index
   B. The footnotes
   C. The appendix
   D. The bibliography

9. A footnote in a textbook reads "Ibid., p. 237." What does Ibid. mean?

   A. In the chapter beginning on the indicated page?
   B. See the diagram on the indicated page
   C. In the book mentioned in the preceding footnote
   D. On the indicated page of this textbook

10. In an index the topic under Norway which would most likely refer to a famous Norwegian explorer would be

    A. Map
    B. History
    C. Climate
    D. Commerce

11. In an index the topic under lumbering, discussing the process would be

    A. North America
    B. Exports
    C. Distribution
    D. Methods of

12. The most direct reference to the Inca Indians of Peru, South America, would be found in an index under

    A. Inca Indians
    B. South America
    C. Peru
    D. Indians

13. In an encyclopedia the best description of steelmaking would be found under

    A. Bessemer process
    B. Carnegie
    C. Industrial Revolution
    D. Steel

14. In an encyclopedia the best account of the life of Lincoln would be found under

    A. Slavery
    B. Civil War
    C. Lincoln
    D. Lincoln Memorial

15. In the index of a science book under planets, the topic telling why planets do not wander away would be

    A. Distance from the sun
    B. Courses of
    C. Distance from earth
    D. Life on the

THE DEWEY DECIMAL CLASSIFICATION

Non-fiction books are arranged on the shelves in numerical order according to the Dewey Decimal Classification system which divides all books among ten main divisions with numbers as follows:

000-099 GENERAL WORKS (general encyclopedias, periodicals, newspapers, bibliographies, etc.)

100-199 PHILOSOPHY (psychology, logic, ethics, Oriental and ancient philosophy, modern philosophy)

200-299 RELIGION (Christian and non-Christian beliefs, mythology, Bible)

300-399 SOCIAL SCIENCES (Government, economics, education, banking, commerce, civics, vocations, law, folk-lore, etc.)

400-499 LANGUAGE (grammars, dictionaries, readers, etc. in all languages)

500-599 PURE SCIENCE (mathematics, astronomy, physics, geology, chemistry, biology, botany, zoology, etc.)

600-699 APPLIED SCIENCE (i.e., USEFUL ARTS) (medicine, engineering, business accounting, salesmanship, agriculture, home economics, radio, television, aviation, building, etc.)

700-799 FINE ARTS (architecture, painting, photography, music, sculpture, drawing, recreation)

800-899 LITERATURE (poetry, drama, debates, essays, etc. in all languages)

900-999 HISTORY, GEOGRAPHY, TRAVEL, AND BIOGRAPHY (books on history including all countries and all ages; books on traeel in all countries; biography of an individual is arranged alphabetically by the name of the person written about)

FICTION Fiction books are arranged on the shelves alphabetically by the authors' last names

LIBRARY SKILLS--DEWEY DECIMAL SYSTEM

The Dewey Decimal System is a method of classifying books by number so that they can be arranged on the shelves of a library. This makes it easier to locate books on a certain topic or to find a book when we know its title.

Write the numbers in the blanks that apply to each of the books listed below. The first one has been done for you.

500-599 1. Astronomy for Fun

_____ 2. Photography Made Easy

_____ 3. The New York Times

_____ 4. How to Invest Money Wisely

_____ 5. Battles of the Civil War

_____ 6. Cities of Europe

_____ 7. Skin Diving for Recreation

_____ 8. Chemistry for Elementary Schools

_____ 9. A Dictionary for Boys and Girls

_____ 10. The Life of George Washington

DICTIONARY SKILLS--ALPHABETICAL ORDER

A. Write the following words in alphabetical order.

clothing	1. _____
shoes	2. _____
mattress	3. _____
bed	4. _____
apron	5. _____
ladle	6. _____
knit	7. _____
dance	8. _____

B. Circle the word which would come first if you looked them up in the dictionary.

1. coward, ballet
2. banana, left
3. money, cowcatcher
4. satellite, date
5. energy, zero
6. water, fruit
7. painful, honey
8. swamp, fudge
9. yellow, color
10. pencil, package

C. Fill in the letters which are missing so that the letters will be in alphabetical order.

B __ D, H I __, P __ R, U V __, X __ Z,

R S __, E F G, A __ __, D E __.

DICTIONARY SKILLS--GUIDE WORDS

The two words printed at the top of each page of the dictionary are the first and last words on that page and are called guide words. If the word you are looking for falls in alphabetical order between these two words, it will be found on that page. In the following exercise, place before each word the number of the page on which that word would be found according to the sample guide words.

SAMPLE

Page	Guide Words
401	sedate -- segregate
402	seigneur -- selfless
403	self-made -- Seminole
404	semi-precious -- sensual

_____ 1.	selfish	_____11.	seminary
_____ 2.	sedition	_____12.	senate
_____ 3.	self-satisfied	_____13.	seed
_____ 4.	seizure	_____14.	self-government
_____ 5.	segment	_____15.	sensible
_____ 6.	seine	_____16.	sedge
_____ 7.	sensitive	_____17.	semester
_____ 8.	sell	_____18.	sense
_____ 9.	seer	_____19.	semicolon
_____10.	senior	_____20.	seldom

DICTIONARY SKILLS--SPELLING

Some words seem to be more difficult to spell than others. Usually these are words that are not often used in our everyday writing. Words of this type are listed below with some of their letters missing. Use your dictionary to help you fill in the missing letters.

	Word	Meaning
1.	curr _ c _ lum	A course of study
2.	conv _ n _ nce	Personal comfort
3.	fin _ _ ce	Funds, money on hand
4.	crit _ c _ _ m	A careful judgment or review
5.	col _ _ el	A military officer
6.	char _ ta _ _ e	Liberal with money
7.	hom _ g _ n _ ous	Made up of parts that are the same
8.	nerv _ _ s ness	Weakness of the nerves
9.	surv _ _ l _ nce	Close watch
10.	vac _ _ nation	Inoculation

DICTIONARY SKILLS--PRONUNCIATION

You probably already know how to pronounce most of the words in the two columns below. The words are divided into syllables in both columns but the accent mark is placed before a different syllable in each column. Say each word both ways, each time saying the accented syllable with extra force. Place an X in the blank in front of the word that is accented correctly. Use your dictionary for any word you do not know.

List I		List II	
1.	_____ 'ar my	_____	ar 'my
2.	_____ chart 'er	_____	'chart er
3.	_____ 'wash ing	_____	wash 'ing
4.	_____ par 'tic u lar	_____	par tic u 'lar
5.	_____ 'op po nent	_____	op 'po nent
6.	_____ ob 'serve	_____	'ob serve
7.	_____ 'li on	_____	li 'on
8.	_____ 'grad u a tion	_____	grad u 'a tion
9.	_____ cre 'den tials	_____	'cre den tials
10.	_____ bo 'nan za	_____	bo nan 'za
11.	_____ 'met ro pol i tan	_____	met ro 'pol i tan
12.	_____ 'lin e ar	_____	lin e 'ar
13.	_____ 'in vest	_____	in 'vest
14.	_____ 'gar den	_____	gar 'den
15.	_____ dra ma 'tic	_____	dra 'ma tic

DICTIONARY SKILLS--MEANINGS

As you know, many words have more than one meaning. The meaning depends partly upon how the word is used in the sentence. Use your dictionary to find correct meanings for each of the underlined words in the sentences below. Write the number of the correct meaning in the blank in front of the sentence. All of the words underlined are used as verbs so be sure that a small v. follows the word in the dictionary.

_____ 1. Bill told us he could apprehend danger.

_____ 2. We are about to toast some bread for breakfast.

_____ 3. The minute the referee gave the signal, the small boy tried to throw his large opponent.

_____ 4. Come over to my house after school and we will play basketball.

_____ 5. Germs multiply very quickly.

_____ 6. I will jump as many of your checkers as I can.

_____ 7. Do you think this dust will irritate your skin?

_____ 8. "Invest your money wisely," said his father.

_____ 9. Plants usually flourish in the sunshine.

_____10. Coffee is a product that we import into this country.

DICTIONARY SKILLS--SYLLABLES

As you know, words with more than one syllable can be divided by syllables to help pronounce them. It is also useful to know syllables when you need to divide a word with a hyphen at the end of a line. Your dictionary has words divided by syllables. Use it to divide the words listed below by syllables. Rewrite the word showing the breaks in the word as shown in the sample in the first word

1. mackintosh — mack in tosh
2. veterinarian
3. rotary
4. lingual
5. flexible
6. firmament
7. dignity
8. deputize
9. deponent
10. bothersome

Write the number of syllables of each word listed below on the line following the word.

1. boss_____
2. emperor_____
3. foster_____
4. jumble_____
5. maneuver____
6. ornament_____
7. ownership_____
8. parsonage_____
9. quiz_____
10. rub_____

REFERENCE SKILLS--TABLE OF CONTENTS

A table of contents from a book entitled Fishing for Boys is shown below. Use this table to answer the questions.

TABLE OF CONTENTS

_____1. Which chapter will probably tell what kinds of fish are in the waters of your state?

_____2. Which chapter will give information about how early man caught fish?

_____3. Does this table of contents tell you the exact page that tells about dry fly fishing?

_____4. Does this table of contents tell you how many different kinds of fishing are discussed?

_____5. Even though the exact page number of information about the various kinds of trout is not given, in which chapter would you expect this information be contained?

_____6. If you wanted to know what Pete Anderson, a famous fishing guide in Canada, has to say about fishing for northern pike, on what page would you begin looking?

From this exercise we can begin to see how the table of contents can help us in locating information. List three different kinds of information that are provided by this table of contents.

1. _____
2. _____
3. _____

REFERENCE SKILLS--INDEX

The index of a book can be very useful in showing where to look in the book for certain topics. The index is located at the back of the book. It is a detailed listing of the contents of the book arranged by topics in alphabetical order. Also included are the page numbers on which information about the topic is found in the book. Part of an index from a social studies book is shown below. Use it to answer the questions. In this index, map pages are shown in parentheses.

_____1. On what page would you look for reading material about the Merced River?

_____2. On what page would you find the Merced River on a map?

_____3. On what page would you look for information on Detroit, a city in Michigan?

_____4. Where would you look for information on skiing in Michigan?

_____5. If you wanted to find out if Memphis was located on a river, where would you look?

_____6. What two places could you look at to find out if Michigan had a climate suitable for raising apples?

_____

_____7. This index gives you a hint as to how people in Michigan earn a living. List four ways suggested by the index.

_____, _____, _____, _____.

_____8. Think back to the exercises you did on the uses of the table of contents. List two different kinds of information that can be obtained from an index that are not available in a table of contents.

A._____

B._____

REFERENCE SKILLS--KEY WORDS

Information about a topic can often be found in an encyclopedia by using different key words. For example, information about knighthood might be found under knighthood, feudalism, middle ages, chivalry, squire, or page. For the topics listed below, list three or four key words that you might use to find information for each topic. Put a check beside the one you think is the best place to look.

1. Coal mining

_____

_____

_____

_____

2. Energy

_____

_____

_____

_____

3. Honey

_____

_____

_____

_____

4. Sioux Indians

_____

_____

_____

_____

5. Mars (the planet)

_____

_____

_____

_____

6. Agriculture

_____

_____

_____

_____

REFERENCE SKILLS--ENCYCLOPEDIA LOCATION SKILLS

Illustrated below is a set of encyclopedias. Notice that there are letters in the alphabet. Can you see why? It is because some volumes contain the words which start with two or more different letters. Why do you suppose the people who made these encyclopedias combined certain letters?

A	B	C	D	E	F	G	H	O	J-K	L	M	N	O	P	Q-R	S	T	U-V	W-X	Y-Z
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	

In which volume of this set of encyclopedias would you expect to find information on the following topics? Write the number of the volume in the blank space.

Homonyms_____ Kenya_____

Life_____ Francisco France_____

Volcanoes_____ Elizabeth Barrett Browning___

Quakers_____ Turtles_____

NATO_____ Zionism_____

Automobiles_____ Allan Pinkerton_____

Clare Booth Luce_____ Civil War_____

Education_____ Observations_____

SEATO_____ United Nations_____

Jewelry_____ Health_____

George Simon Ohm_____ Water_____

Folklore_____ Dallas_____

Muslims_____ Yellowstone National Park____

Gibraltar_____ Metals and Metallurgy_____

X-Rays_____ Reptiles_____

GRAPHS AND TABLES--LOCATING INFORMATION

A bar graph is a picture that uses bars to represent various amounts. This makes the amounts easy to compare. The bars can be either vertical or horizontal. Use Graph A which is a bar graph with vertical bars to answer the following questions.

1. How many feet are represented by one space on the graph?_____
2. Which mountain is highest?_____
3. Which mountain is lowest?_____
4. What is the highest mountain in the U.S.A.?_____
5. How many mountains are represented on this graph?_____
6. What is the name of the mountain in France?_____
7. How high is the mountain in France?_____
8. Which mountain is second highest on this graph?_____
9. How high is Stalin Peak?_____
10. Name a mountain in Switzerland._____
11. How high is the highest mountain?_____
12. What is the height of the lowest mountain?_____
13. What is the height of the highest mountain in the U.S.A.?_____
14. In what country is Mount Godwin?_____
15. What mountain is in two countries?_____

Round the following to the nearest 50 feet and make a bar graph with vertical bars. Give your graph a title and name the columns and rows.

STRUCTURE	HEIGHT
Eiffel Tower	984
Empire State Building	1,250
Great Pyramid	451
Washington Monument	555
Hoover Dam	726

GRAPHS AND TABLES--MAKING COMPARISONS

Graphs can be used to help us compare one thing to another. By looking at a graph we can decide how much larger one amount is than another or how many times larger one amount is than another. Use Graph A to make the following comparisons.

1. How much taller is the highest mountain than the second highest mountain?_____

2. Four mountains have the same height. They are all located in what country?_____

3. Mount Godwin is how many times taller than Pike's Peak?_____

4. How much taller is the mountain in Russia than the mountain in Japan?_____

5. What mountain is the same height as Mount McKinley?

_____

6. What mountain is three-fourths as high as Mount Blanc?_____

7. The Matterhorn is how much shorter than Kilimanjaro?

_____

8. Kilimanjaro is how many times as tall as Mont Blanc?

_____

Use Graph B to make the following comparisons:

9. How much longer is the Congo River than the Saint Lawrence River?_____

10. The Amazon River is how many times longer than the Yukon River?_____

11. The Hwang River is how much shorter than the Yangtze River?_____

12. What fraction would state the length of the Arkansas River as compared to that of the Yukon River?_____

13. How muchllonger is the longest river than the shortest river on this graph?_____

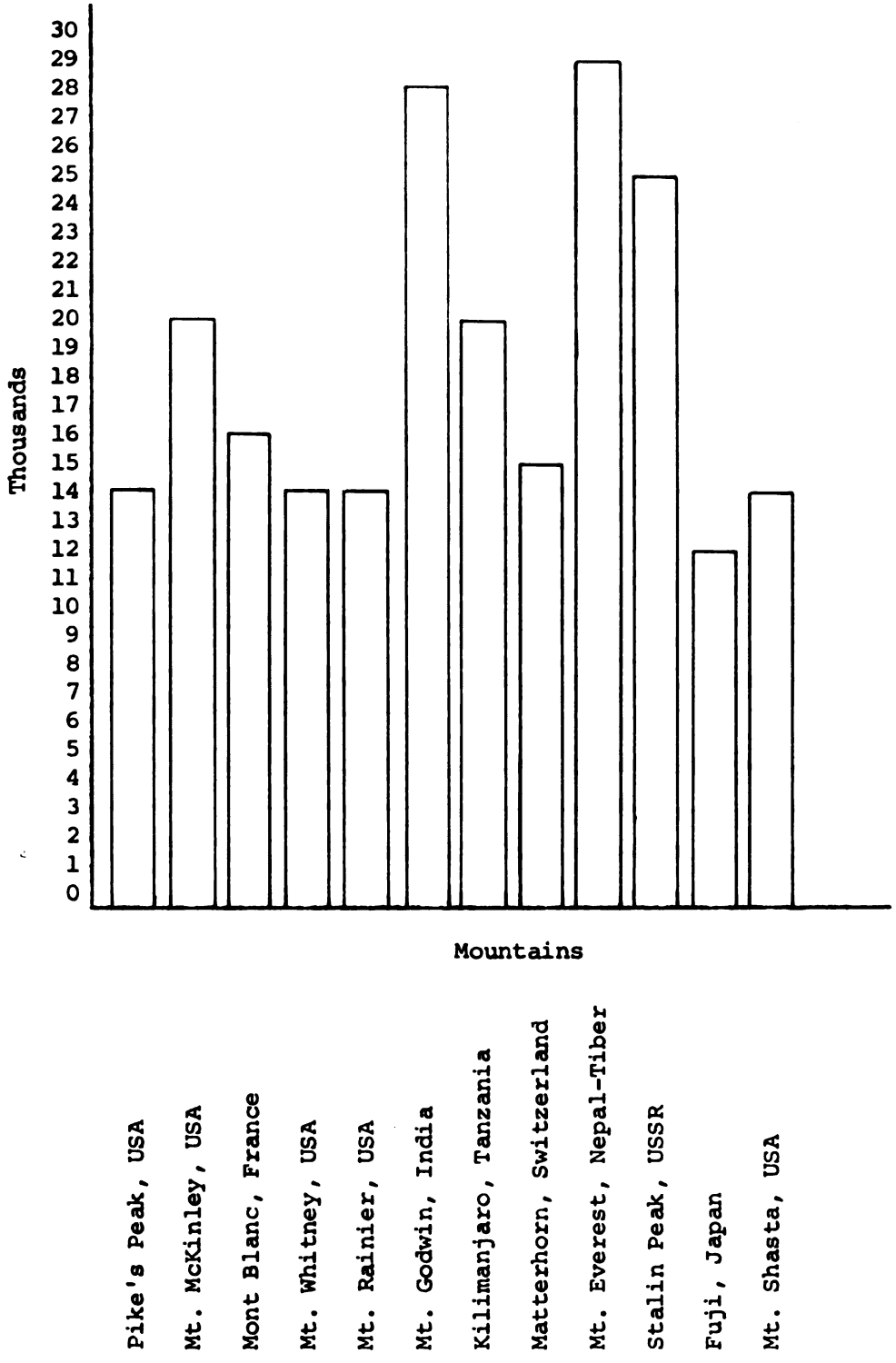
14. The Rio Grand River is how many times longer than the Arkansas River? _____

15. The longest river is how much longer than the second longest river?_____

GRAPH A

Heights of Some of the World's Tallest Mountains

(All heights have been rounded to the nearest 1,000 feet)



GRAPHS AND TABLES--TRENDS AND INFERENCES

Use Graphs C, D, E and F to answer the following questions:

1. Is the population of the U.S. increasing or decreasing?_____

2. What is happening to the farm population in the U.S.?

_____

3. Are the number of cattle in the U.S. increasing or decreasing?_____

4. What could you say about the number of horses?_____

Suppose the 1970 figures were added to each graph. Decide whether you think each bar would go up or down or stay the same, then circle U if you think it would go up, D for down, or S for same.

5. Total population U D S
6. Farm population U D S
7. Number of cattle U D S
8. Number of horses U D S

These graphs say nothing about cities. See if you can answer these questions:

9. Did the population of the cities increase or decrease?

_____

10. Did the size of the cities increase or decrease?_____

Many graphs help us make predictions about the future.

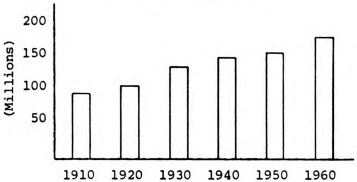
11. Can you see how a graph can indicate a trend?_____

12. Does every bar have to be larger than the one before it in order to show a trend?_____

A new bakery has come to town. They sold five pies the first week they were in business, ten pies the second week, fifteen pies the third week, and twenty pies the fourth week. Make a bar graph showing the number of pies you think they sold the first six weeks they were in business.

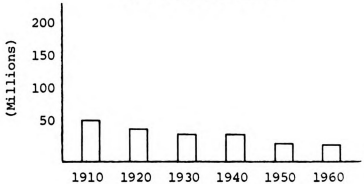
GRAPH C

Total Population Change
in the United States



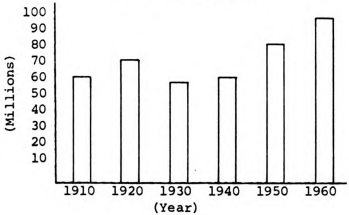
GRAPH D

Farm Population Change
in the United States



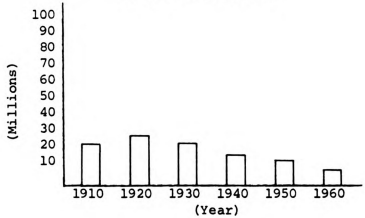
GRAPH E

Number of Cattle
in the United States



GRAPH F

Number of Horses
in the United States



GRAPHS AND TABLES--MAKING COMPARISONS

Use graphs H through M to answer the following questions:

1. How many more policies did Mr. Brown sell the 6th week than he sold the 5th week?_____

2. How many less policies did Mr. Glen sell the 5th week than he had sold the 4th week?_____

3. During what weeks did Mr. Smith sell the same number of policies?_____

4. Mr. Brown's sales were how many times greater the 4th week than the 2nd week?_____

5. During what week were Mr. Glen's sales one-third as great as they were the next week?_____

6. The number of policies Mr. Glen sold the 1st week is what fraction of what he sold the 2nd week?_____

7. How many more policies did Mr. Brown sell during the week when he sold the most than he did during the week when he sold the least?_____

8. How many more policies did Mr. Miller sell the 5th week than he sold the 2nd week?_____

9. How many less policies did Mr. Jones sell the 6th week than he had sold the 2nd week?_____

10. During what weeks did Mr. Glen sell the same number of policies?_____

11. Mr. Miller's sales were how many times greater the 5th week than the 2nd week?_____

12. During what week were Mr. Miller's sales one-third as great as they were the 5th week?_____

13. The number of policies Mr. Miller sold the 2nd week is what fraction of what he sold the 3rd week?_____

14. How many more policies did Mr. Miller sell during the week when he sold the most than he did during the week when he sold the least?_____

15. How many more policies did Mr. Glen sell the 4th week than he sold the 1st week?_____

GRAPHS AND TABLES--TRENDS AND INFERENCES

Study Graphs H through M and see if there are any trends. Look at each man's record and decide if his sales are increasing, decreasing, or staying about the same. Circle I if you think they are increasing, D if you think they are decreasing, and S if you think they are staying about the same.

1.	Mr. Brown	I	D	S	4.	Mr. Miller	I	D	S
2.	Mr. Smith	I	D	S	5.	Mr. Glen	I	D	S
3.	Mr. Jones	I	D	S	6.	Mr. Payne	I	D	S

About how many policies do you think the following men sold during their seventh week?

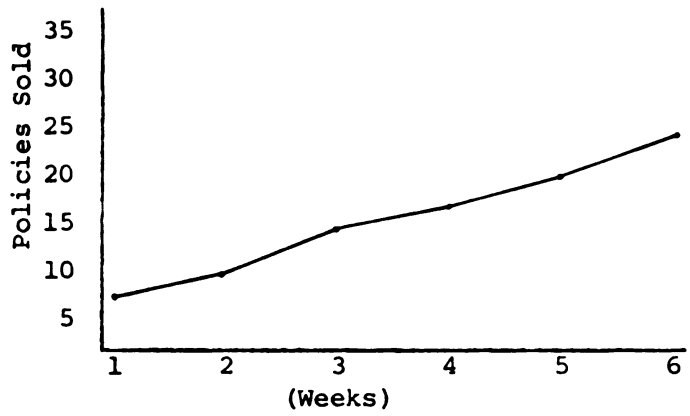
7. Mr. Brown_____
8. Mr. Jones_____
9. Mr. Glen_____
10. Mr. Payne_____

Pretend that you are the president of this company and answer the following questions:

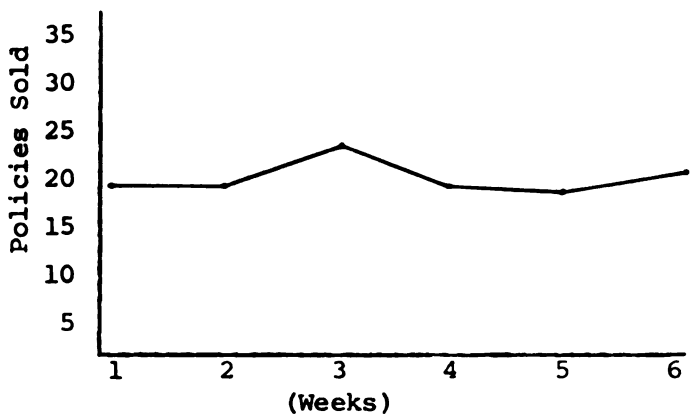
11. Which of your salesmen is the most dependable?_____
12. Which man would you fire if you had to let one of them go?_____
13. Who would be the second man you would fire if you only wanted to keep 4 salesmen?_____
14. What two men are showing the most progress?_____
15. Overall, do you feel your business has increased or decreased during the last 6 weeks?_____

NUMBER OF POLICIES SOLD BY SALESMEN OF THE ACME LIFE INSURANCE COMPANY OVER A SIX-WEEK PERIOD

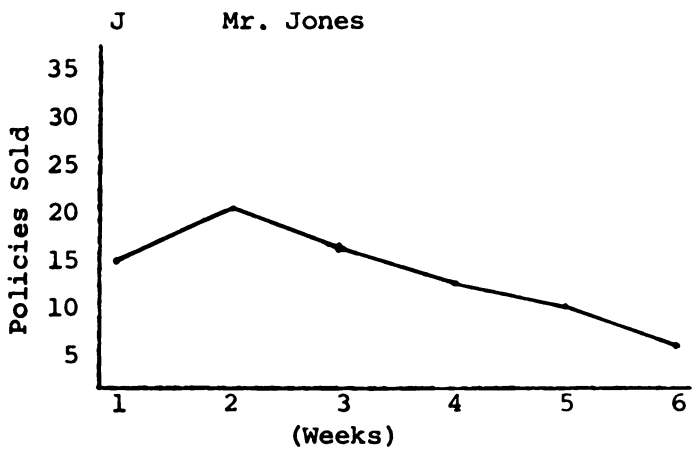
H Mr. Brown



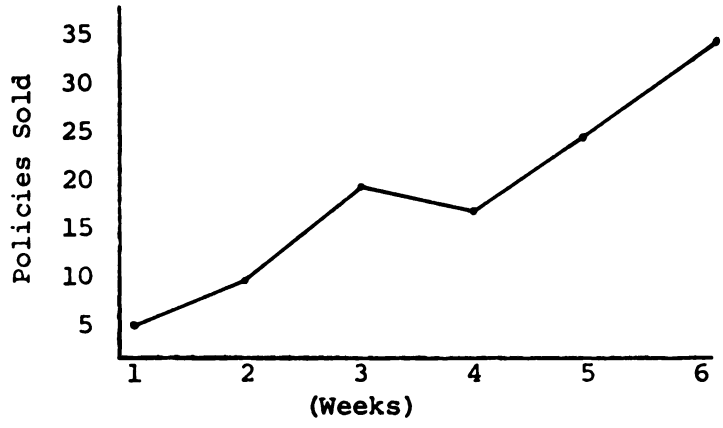
I Mr. Smith



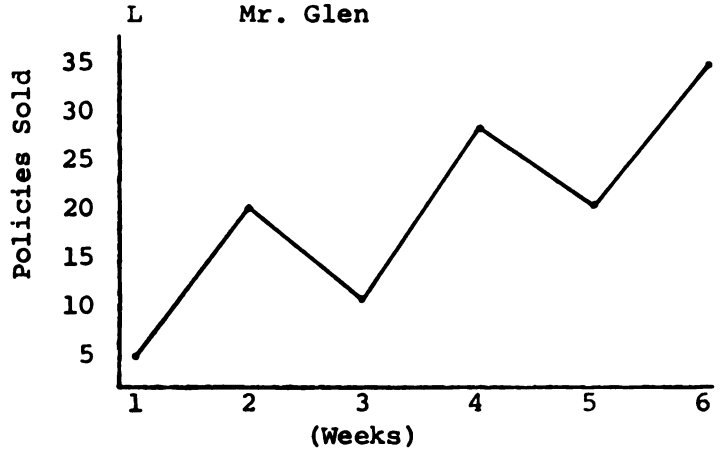
J Mr. Jones



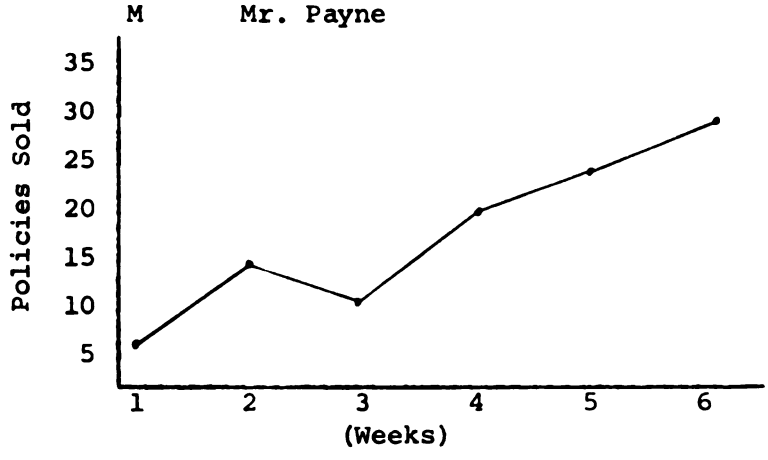
K Mr. Miller



L Mr. Glen



M Mr. Payne



GRAPHS AND TABLES--MAKING GENERALIZATIONS

Using Graphs N through S, complete the following generalizations:

1. Jim earns _____ every month.
2. Jim saves _____.
3. Jim's church offering is always _____.
4. Entertainment always costs Jim _____.
5. Jim buys school supplies _____.

Circle T if the following statements are true and F if they are false.

Use Graphs N through S in deciding on each statement.

6. Business expenses are very small. T F
7. Other things always cost over a dollar. T F
8. Jim never saves over half of his earnings. T F
9. Entertainment never costs more than $1.00 T F
10. Jim buys school supplies every month. T F

GRAPHS AND TABLES--PROBLEM SOLVING

Use Graphs N through S and answer the following questions:

1. How much would Jim have saved in September if he had saved the money he spent on entertainment?_____

2. How much more money did Jim save in January than in September?_____

3. How much money has Jim saved in 6 months?_____

4. How many movies did Jim see in November if all his entertainment money was spent on movies and it costs .50 to get in each time?_____

5. How much more was spent on other things during November than during December?_____

6. How much money was given to the church during these 6 months?_____

7. How much has Jim spent for gifts during these 6 months?_____

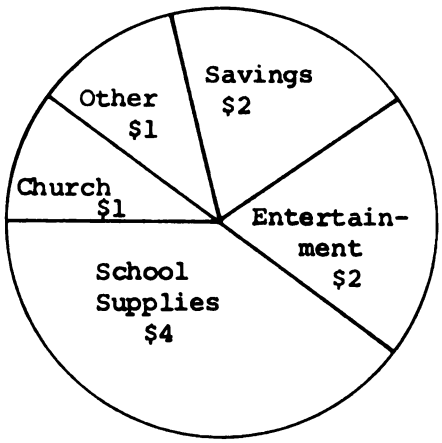
8. How much has been spent for school supplies during these 6 months?_____

9. If Jim had saved half of the money he spent on entertainment and half of the money he spent on other things during October, how much could he have saved altogether?_____

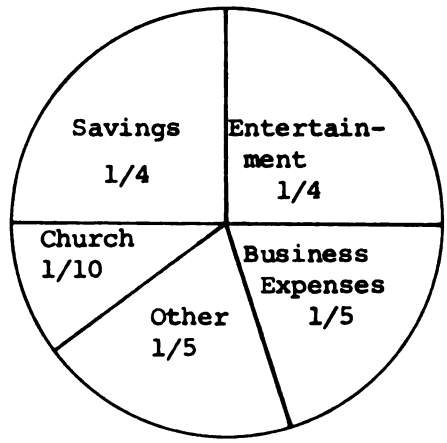
10. There are 5 people besides Jim in his family. He spent an equal amount for each Christmas gift. If he had increased the amount spent on each gift by .50 and taken it from his savings, how much savings would he have had for the month?_____

Jim earns $10.00 a month delivering newspapers. This is what he did with his money for 6 months:

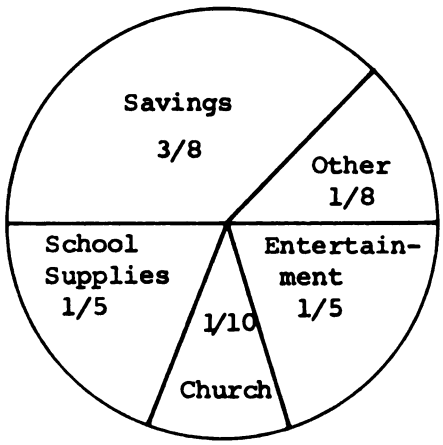
N September



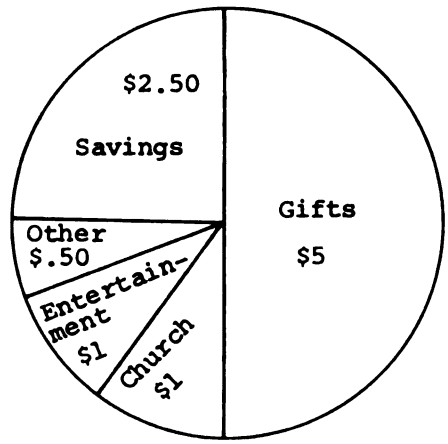
O October



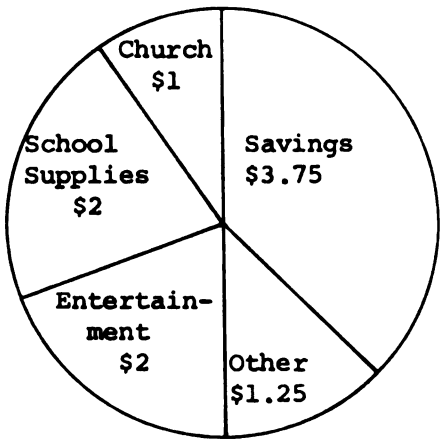
P November



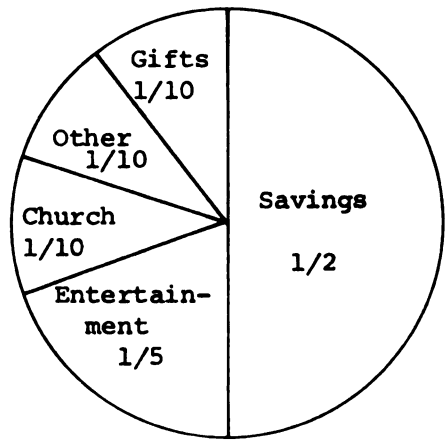
Q December



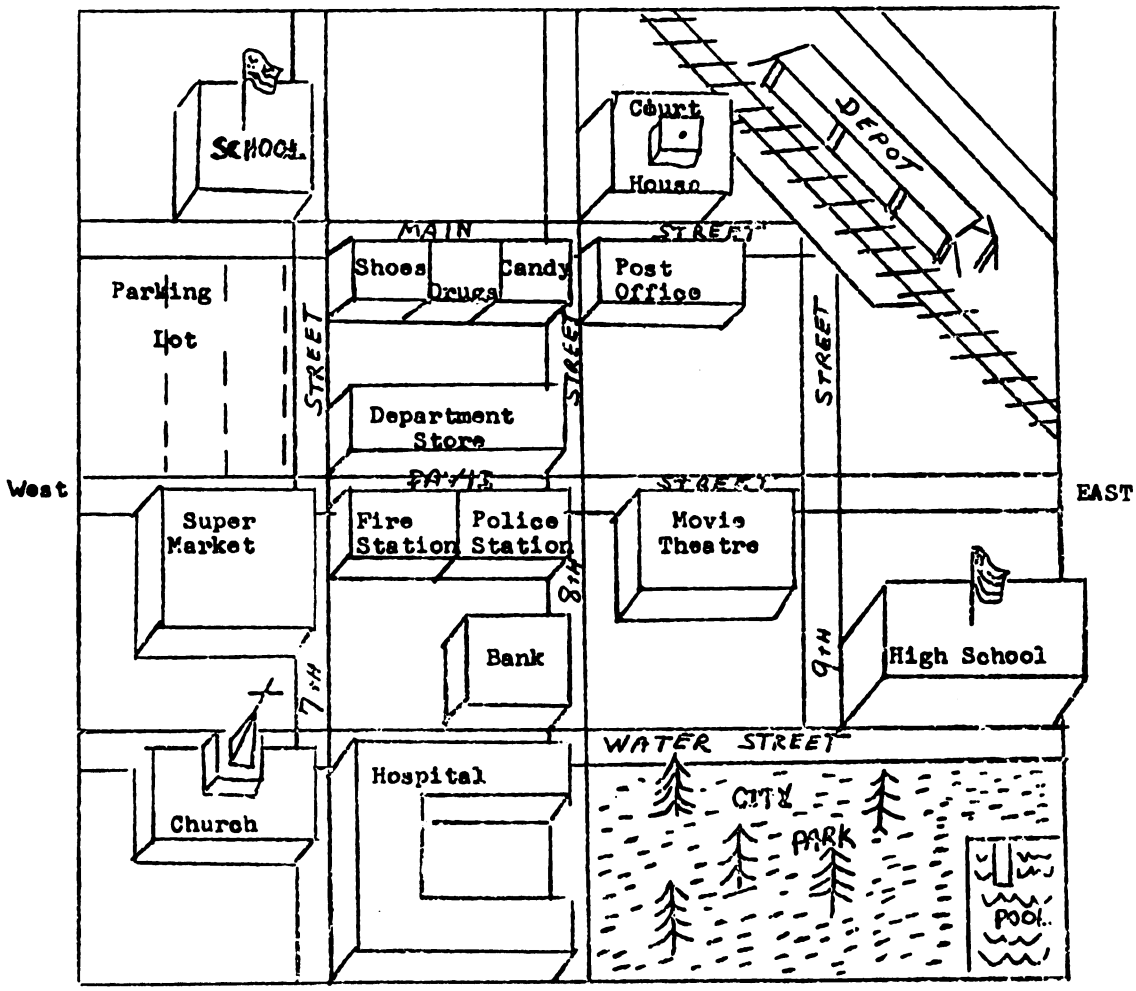
R January



S February



NORTH



SOUTH

MAP A

This is a make-believe picture map of part of a city

MAP READING--LOCATING INFORMATION

Using Map A, answer the following questions.

1. Which building is closest to the church?_____

_____

2. Which building is located on the corner of Water Street and 9th Street?_____

3. From which two streets could one enter the court house?_____

4. Which is the shortest street on this map?_____

5. Which building is located on Davis Street between 8th Street and 9th Street?_____

6. What street would you walk down to get from the court house to the bank?_____

7. From which two streets could one enter the supermarket?

_____

8. How far is it from the bank to the high school?_____

9. How far is it from the park to the depot?_____

10. How far is it from the school to the high school?

_____

MAP READING--MAKING INFERENCES AND PROBLEM SOLVING

Use Map A to answer the following questions. Circle the number of the answer you select.

1. On which street would you expect to see this sign?

QUIET ZONE

a. Main Street
b. Davis Street
c. Water Street
d. 9th Street

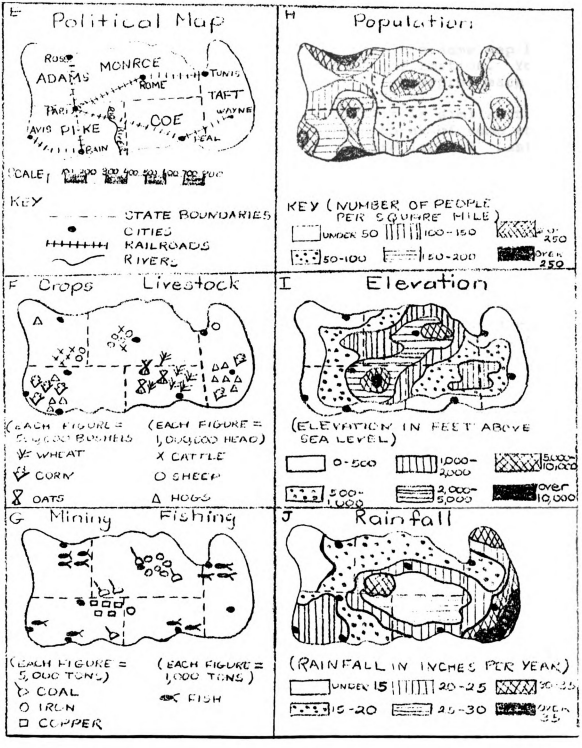
2. On which street would you expect to see this sign?

SCHOOL ZONE

a. Davis Street
b. 8th Street
c. West Street
d. Main Street

3. If you live on the corner of 9th Street and Water Street, how far would you have to walk to the candy store?

a. One block
b. Two blocks
c. Three blocks
d. Four blocks


E Political Map
ROSE
MONROE
ADAMS
ROME
TUNIS
TAFT
WAYNE
PIKE
COE
DAVIS
PAIN
TEAL
SCALE: 100 200 300 400 500 600 700 800
KEY
STATE BOUNDARIES
CITIES
RAILROADS
RIVERS
H Population
KEY (NUMBER OF PEOPLE PER SQUARE MILE)
UNDER 50
50-100
100-150
150-200
200-250
OVER 250
F Crops Livestock
(EACH FIGURE = 5,000,000 BUSHELS)
WHEAT
CORN
OATS
(EACH FIGURE = 1,000,000 HEAD)
X CATTLE
O SHEEP
Δ HOGS
I Elevation
(ELEVATION IN FEET ABOVE SEA LEVEL)
0-500
500-1,000
1,000-2,000
2,000-5,000
5,000-10,000
over 10,000
G Mining Fishing
(EACH FIGURE = 5,000 TONS)
COAL
IRON
COPPER
(EACH FIGURE = 1,000 TONS)
FISH
J Rainfall
(RAINFALL IN INCHES PER YEAR)
UNDER 15
15-20
20-25
25-30
OVER 35

MAP READING

The same outline map can be used for many purposes. Study Maps E through J and you will see that the same map has been used to give different kinds of information. You will see that it is very important to interpret each map.

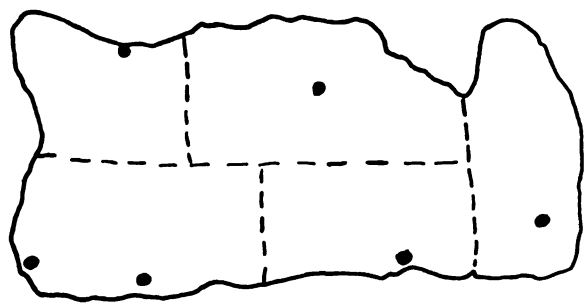
Look at Map E. You will notice that it is similar to the maps we have been studying. Can you think of some things which this map might contain if it were larger? List them:

1. _____
2. _____
3. _____
4. _____
5. _____

Look at Maps F and G. Both of these maps use symbols to represent various crops, minerals, etc. Do you have some ideas about some similar kinds of things that could be represented on this type of map? Name them and draw the symbols you would use to represent them.

1._____ _____
2._____ _____
3._____ _____
4._____ _____
5._____ _____
6._____ _____
7._____ _____
8._____ _____
9._____ _____
10._____ _____

Look at Maps H, I and J. Can you think of something else that could be represented in the same way? Use the map below to show your ideas.



MAP READING--DIRECTIONS--USING A SCALE--USING A KEY

Use maps E through J to answer the following questions. You will have to select the right map to answer each question. You may have to look at more than one map to answer a question.

1. What direction would you travel to get from Paris to Ross?_____
2. What direction would you travel to get from Pike to Coe?_____
3. What direction would you travel to get from the copper mines to the iron mines?_____
4. What direction does the Rio River flow?_____
5. What direction would you travel to get from the place of greatest rainfall to the plact of least rainfall?

_____

6. What is the length of this country?_____
7. How far is it from Paris to Peal?_____
8. How far is it from Peal to Wayne?_____
9. How long is the Rio River?_____
10. How far is it from one mountain to the other?_____
11. Which state has the largest population?_____
12. Which city is probably considered the railroad center of the country?_____
13. Which state has the greatest overall elevation?

_____

14. Which state has the most rainfall?_____
15. Which state has the least rainfall?_____

In each of the following, name the state which produces the most:

16. Wheat_____

17. Corn_____

18. Cattle_____

19. Sheep_____

20. Copper_____

APPENDIX E

SUMMARY STATISTICS

APPENDIX E

SUMMARY STATISTICS

The summary statistics for both forms of the Research Study Skills Test follow. They are taken directly from the final report prepared by J. Harlan Shores for the U.S. Department of Health, Education and Welfare which is noted in the Bibliography.

APPENDIX E--ITEM 8

SUMMARY STATISTICS FOR DIAGNOSTIC TESTS
Forms 1 and 2

		Form 1				Form 2			
Skill	Grade	No.	M	S.D.	Rel.*	No.	M	S.D.	Rel.*
Library	4	101	4.66	2.01	.424	108	4.40	1.50	
Dictionary	4	101	3.36	1.81	.466	108	4.23	1.72	.370
Reference	4	101	4.06	2.17	.541	108	4.92	2.30	.586
Graphs & Tables	4	101	4.50	2.66	.723	108	5.25	2.77	.749
Map Reading	4	101	3.90	2.32	.619	108	3.69	2.47	.686
Total	4	101	20.49	8.31	.848	108	22.49	8.08	.834
Library	5	103	5.65	1.87	.327	103	5.35	1.89	.340
Dictionary	5	103	4.15	1.75	.399	103	4.36	1.61	.272
Reference	5	103	5.63	2.10	.489	103	5.75	2.55	.692
Graphs & Tables	5	103	6.46	2.21	.592	103	6.33	2.61	.733
Map Reading	5	103	5.24	2.27	.575	103	5.12	2.33	.599
Total	5	103	27.13	7.47	.806	103	26.90	8.42	.851
Library	6	93	5.81	1.87	.335	100	5.84	1.99	.428
Dictionary	6	93	4.76	1.75	.426	100	4.87	1.69	.377
Reference	6	93	5.84	2.02	.448	100	7.00	2.05	.556
Graphs & Tables	6	93	7.10	2.39	.709	100	7.58	2.03	.615
Map Reading	6	93	6.03	2.32	.617	100	5.83	2.17	.535
Total	6	93	29.54	7.84	.833	100	31.12	7.50	.823
Library	4,5,6	297	5.36	1.98	.403	311	5.18	1.89	.336
Dictionary	4,5,6	297	4.07	1.86	.481	311	4.48	1.69	.354
Reference	4,5,6	297	5.16	2.24	.556	311	5.86	2.46	.665
Graphs & Tables	4,5,6	297	5.99	2.66	.734	311	6.36	2.67	.749
Map Reading	4,5,6	297	5.03	2.46	.651	311	4.85	2.49	.662
Total	4,5,6	297	25.62	8.74	.861	311	26.73	8.74	.863

*Reliability (KR-21)

APPENDIX F

RAW SCORES--RESEARCH STUDY SKILLS TEST, FORM 1 AND FORM 2

APPENDIX F

Appendix F includes the raw scores of all students included in this study. They were assigned to groups as follows:

Class One (Team Three) Numbers 1 through 17
--experimental group

Class One (Team Three) Numbers 18 through 34
--control group

Class Two (Team Four) Numbers 35 through 54
--experimental group

Class Two (Team Four) Numbers 55 through 74
--experimental group

Raw scores for pre-test sub-skill scores immediately precede post-test scores in each category. Total scores constitute the final two columns.

Student No.	Library Skills		Dictionaries		Reference Skills	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
	(10)*		(8)*		(10)*	
01	9	9	5	6	9	4
02	6	8	2	3	2	5
03	10	8	7	7	10	8
04	10	8	4	4	8	8
05	6	7	7	6	7	8
06	7	7	6	7	5	9
07	3	4	2	4	3	5
08	9	7	7	7	9	1
09	5	7	4	4	7	6
10	5	5	4	3	5	10
11	5	7	4	4	7	9
12	7	6	5	3	9	5
13	9	9	5	7	8	7
14	6	8	6	8	8	10
15	9	9	7	4	8	7
16	8	7	3	5	9	7
17	7	10	6	5	8	9
18	10	10	6	8	10	9
19	6	8	5	7	6	7
20	5	5	2	5	7	9
21	7	5	7	6	8	6
22	9	9	4	6	7	9
23	9	9	4	6	8	7
24	8	8	4	4	6	4
25	8	9	4	6	9	6
26	6	7	6	4	10	7
27	9	3	5	3	4	7
28	7	8	4	4	2	7
29	7	8	5	4	8	7
30	7	10	7	5	10	9
31	7	10	5	8	10	9
32	6	8	6	6	9	10
33	4	4	2	1	5	3
34	9	9	8	7	10	10
35	4	8	7	5	8	5
36	10	9	7	7	9	9
37	6	6	3	5	8	6
38	2	6	1	3	5	9
39	2	7	6	4	4	7
40	9	8	6	5	10	9
41	6	8	6	7	9	8

*Possible scores.

Student No.	Library Skills		Dictionaries		Reference Skills	
	Pre-test (10)*	Post-test (10)*	Pre-test (8)*	Post-test (8)*	Pre-test (10)*	Post-test (10)*
42	7	9	4	6	7	7
43	8	9	6	6	10	9
44	5	7	5	4	8	10
45	3	6	3	4	6	8
46	2	6	2	4	2	1
47	2	6	0	1	6	8
48	3	5	1	4	6	6
49	7	7	4	5	6	9
50	4	5	5	5	8	5
51	6	9	5	4	8	6
52	6	6	5	6	7	8
53	3	6	5	4	0	3
54	6	6	2	5	7	6
55	2	6	4	4	4	5
56	5	5	5	6	8	5
57	8	9	7	6	9	10
58	8	10	6	8	10	9
59	6	9	3	4	7	10
60	7	5	3	7	8	10
61	6	5	7	7	6	9
62	9	9	6	7	8	8
63	9	8	7	5	8	8
64	6	4	7	6	8	8
65	4	4	4	5	7	6
66	5	4	6	5	7	10
67	8	9	7	8	10	8
68	9	7	6	7	7	6
69	6	5	4	3	8	8
70	7	3	5	2	3	6
71	6	6	6	6	8	7
72	5	6	5	6	8	9
73	3	5	4	3	7	4
74	3	3	2	3	5	2

*Possible scores.

Student No.	Reading and Graphs and Tables Skills		Map Reading Skills		Total	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
	(10)*		(10)*		(48)*	
01	8	9	8	9	39	37
02	8	8	5	7	23	31
03	10	10	7	9	44	42
04	8	10	10	7	40	37
05	7	8	3	8	30	37
06	10	10	7	7	35	40
07	5	10	3	3	16	26
08	9	5	0	1	34	21
09	10	8	8	7	34	32
10	4	6	6	5	24	29
11	10	8	0	4	26	32
12	4	10	7	8	32	32
13	10	10	5	7	37	40
14	10	10	9	8	39	44
15	10	10	10	9	44	39
16	10	9	8	7	38	35
17	9	10	9	9	39	43
18	9	8	9	9	44	44
19	9	10	8	9	34	41
20	3	9	1	3	18	31
21	7	9	8	5	37	31
22	10	10	9	9	39	43
23	10	9	2	8	33	39
24	10	2	4	1	32	19
25	9	10	9	8	39	39
26	10	9	7	8	39	35
27	7	10	5	4	30	27
28	0	7	0	3	13	29
29	10	9	6	9	36	37
30	10	10	5	7	39	41
31	10	10	7	9	39	46
32	9	9	9	8	39	41
33	4	4	2	4	17	16
34	10	10	10	10	47	46
35	8	10	6	7	33	35
36	10	10	10	9	46	44
37	7	6	10	6	34	29
38	2	9	5	7	15	34
39	8	10	7	4	27	32
40	10	10	6	6	41	38
41	9	10	6	8	36	41

*Possible scores.

Student No.	Reading and Graphs and Tables Skills		Map Reading Skills		Total	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
	(10)*		(10)*		(48)*	
42	9	8	6	6	33	36
43	4	5	8	9	36	38
44	9	10	10	8	37	39
45	8	9	5	6	25	33
46	4	7	5	4	15	22
47	9	9	2	6	19	30
48	6	7	3	3	19	25
49	8	10	7	6	32	37
50	9	9	6	7	32	31
51	9	10	7	8	35	37
52	10	9	7	7	35	36
53	8	8	4	2	20	23
54	8	7	6	3	29	27
55	3	2	2	3	15	20
56	10	7	5	4	33	27
57	10	9	10	7	44	41
58	9	10	10	9	43	46
59	10	9	7	8	33	40
60	9	8	9	6	36	36
61	9	9	7	7	35	37
62	9	10	7	7	39	41
63	10	9	8	10	42	40
64	10	10	7	7	38	35
65	8	10	8	4	31	29
66	10	10	8	5	36	34
67	10	10	10	9	45	44
68	9	10	6	8	37	38
69	10	8	5	9	33	33
70	8	10	1	6	24	27
71	7	8	7	3	34	30
72	8	8	8	6	34	35
73	8	8	2	5	24	25
74	7	3	6	5	23	16

*Possible scores.