An Outdoor Education Field Study Guidebook for the Intermediate Grades

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AN OUTDOOR EDUCATION FIELD STUDY GUIDEBOOK
FOR THE INTERMEDIATE GRADES

A Thesis
Presented to
The Graduate Faculty
Central Washington State College

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

by
James Arthur Asmussen
August, 1970
APPROVED FOR THE GRADUATE FACULTY

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CHAPTER I

INTRODUCTION

One of the deficiencies of the outdoor education program has been the fact that students involved in this program usually have no student field study guidebook of readings and activities designed to give this program continuity and over-all meaningfulness. In many situations, the student without a guidebook is not aware of what is expected of him in terms of the objectives and goals of the program. This may hinder his developing the desired learning and attitudes of the outdoor education program. The student's understanding of the objectives and goals should increase after they are reinforced by the readings and activities in the guidebook.

The teacher is expected to guide and direct his students in acquiring an adequate background in preparation for attending the outdoor school. On many occasions, however, the teacher is not qualified or interested in preparing students for the outdoor school experience and has no follow-up program when the children return.

A number of school districts already involved in outdoor education programs have taken steps to alleviate this perplexity by developing an outdoor education student field study guidebook. Such a guidebook is designed to
give students a definite direction in guiding their learning, so that they may attain the greatest possible value of such a program.

Those school districts that have a student field study guidebook for outdoor education have centered it around their own objectives, outdoor camp facilities, personal philosophy of outdoor education and perhaps on the personal needs of the community in which the school district exists. It is quite possible that there are no two school districts that have the same student guidebook. This requires each school district to construct their own field study guidebook.

Many school districts that participate in an outdoor education program do not have the finances, time, or the qualified personnel to construct such a guidebook. Such school districts that lack a student guidebook may greatly impair the objectives and the desired results that they are seeking to achieve through their outdoor education program.

I. STATEMENT OF THE PROBLEM

Due to the fact that so many school districts use different criteria to select appropriate learning activities through the use of surveys and researching student field study guidebooks already developed, it becomes necessary to employ similar surveying and researching techniques in order to develop and construct an intermediate student field study guidebook for the Tacoma School District.
II. PURPOSE OF THE STUDY

The purposes of this study will be:

a. To evaluate student field study guidebooks from the coastal regions of Washington and Oregon.

b. To list and determine what topics should be used in developing a student guidebook for the Tacoma School District.

c. To include information and activities in a student field study guidebook that pertain to the geographical location of Tacoma's outdoor camps. Such information would include a study of soil, water, plants, animal life, field-study information, and perhaps other pertinent information needed in such a guidebook for this location (19).

d. To determine a list of priority topics in constructing a field study guidebook based on an evaluation of those guidebooks received from the school districts in Washington and Oregon.

e. To develop a student field study guidebook for the intermediate grades will help guide and prepare them prior to, during, and following the outdoor education experience.

III. DEFINITIONS

Outdoor Education. All learning experiences that occur in the outdoors, including social as well as academic
experiences, are considered outdoor education (1:4).

**Resident Outdoor School Site.** This term shall be used to refer to the geographical location or site at which the outdoor education program functions (1:4).

**Field Study Guidebook.** The purpose of a field study guidebook is to familiarize children with the academic aspects of the outdoors through readings and activities in the outdoors and to emphasize their relationship to the outdoors.

**Resource Person.** A resource person is an individual who, because of his education, background or experience, is a specialist in an area of knowledge that is pertinent to outdoor education or conservation education (1:4).

**IV. LIMITATIONS OF STUDY**

The data for this study will be restricted to the coastal regions of Washington and Oregon. The school districts involved in this study must have an established outdoor education program. These school districts must also possess a field study guidebook for the intermediate grades.

**V. PROCEDURES, DATA, AND TREATMENT OF DATA**

The procedures for this study will be based on surveying and researching other school districts by letter that have an established outdoor education program. A list of the school districts located on the coastal regions of Washington and Oregon participating in outdoor education
will be requested from the State Department of Education of these states. A letter will then be distributed to these districts requesting a copy of their student field study guidebook if one is available. The student guidebooks received will be evaluated to extract their major topics in order to develop a survey sheet based on these major topics (19).

The survey sheet will consist of a five point scale located beside each topic. One will represent the least importance and five will represent the most importance. All numbers between one and five will represent degrees of importance or unimportance of the topic.

The survey sheet will be forwarded to the teachers and administrators involved in the outdoor education program for the Tacoma Public School District. The teachers and administrators of the Tacoma Public School District will be asked to mark each topic on the survey sheet in terms of it's usefulness and importance in a student field study guidebook.

The survey sheets will be evaluated to determine the topics felt to be of the greatest use and importance. These topics will then serve as a basis for the construction of a student field study guidebook for the Tacoma School District.

In completing the goals of these procedures, Tacoma administrators will be asked to give some assistance in securing needed information from other school districts and considering the completed student field study guidebook.
CHAPTER II

REVIEW OF THE RELATED LITERATURE

The purpose of this chapter is to review the literature that is pertinent to the background, the values, the advantages, and the implementation of a resident outdoor education program.

I. BACKGROUND OF OUTDOOR EDUCATION

Outdoor education is not a modern innovation to the educational scene. The roots of outdoor education, beginning with the Greek Philosopher Socrates (465-399 B.C.), drive deeply into the human history of the world (11:150). Since that time many noted individuals such as Aristotle, Jesus Christ, John Comenius, Jean Jacques Rousseau, Friedrich Froebel, John Dewey and others have espoused that education does not require a formal school setting for the acquisition of learning (11:Ch. IV). Some of these men taught in the market place, at banquets, and in the outdoors. The world was considered their classroom. They felt learning was acquired by direct experience with one's environment.

Today there is an increase in the number of school districts involved in outdoor education programs because of the desire to re-acquaint children with their environment and the interdependence that exists between them and their
environment (11:385). S. D. Shankland states that "The time is opportune to initiate forward-looking programs of educational activities outside the walls of school buildings through which boys and girls may find a new vision of America--clearer, truer, more satisfying and in the freedom and reality of God's outdoors." (11:385).

II. VALUES OF AN OUTDOOR EDUCATION PROGRAM

For an outdoor education program to be of lasting value, it must have a definite relationship to the "indoor" curriculum and be accepted as part of the curriculum (22:19). It is not extra-curricular. It is a vital and worthwhile technique of education which can be used in conjunction with every subject matter area (11:240).

Donald R. Hammerman and William M. Hammerman define outdoor education to be "The effective utilization of the outdoors to facilitate and enrich learning related to the school curriculum (13:8). They continue to broaden their definition of outdoor education by stating that "Outdoor education in the schools is an integral part of the curriculum which involves an extension of the classroom to an outdoor laboratory; a series of direct experiences in any or all phases of the curriculum involving natural materials and living situations which increase awareness of environment and life; a program that involves pupils, teachers, and outdoor education resource people planning and working to-
gether to develop an optimum teaching-learning climate (13:8-9).

The following diagram illustrates the close relationship between outdoor education and the school curriculum (13:8).

The objectives of outdoor education provide a rationale for its possibilities to enhance the learning situation (15:29). A list of camp objectives, regardless of program emphasis, includes the following factors:

1. To allow children to live together in a democratic situation (15:138).

2. To develop an appreciation of natural resources and to practice the fundamentals of conservation (15:138).

3. To broaden a child's interest, to open new fields
of interest, and to provide opportunities for creative, self-directed study (15:138).

4. To help attain a feeling of independence, emotional maturity and the interdependence of man and nature (15:138).

5. To stimulate an awareness of the beauty of nature (15:138).

6. To teach such elements of formal education as science, language arts, social studies, mathematics, and other subjects that can best be taught in a camping situation (15:138).

Usually three to seven days of resident outdoor education are suggested to accomplish the above objectives (15:138). However, the most common resident outdoor education camping program continues for five days--Monday through Friday (1:63).

III. ADVANTAGES OF A RESIDENT OUTDOOR EDUCATION PROGRAM

Early Greek philosophers suggested that children leave their books to learn from nature (11:231). Socrates advocated a vacation for school children in order that they "might acquire some education" (11:231).

The philosophy of a more recent educator, John Dewey, was that education is life and education is experience. This philosophy helped to bring education into a
closer relationship to the changing culture of the day (11:232). Alfred North Whitehead, in his book, *The Aims of Education*, regarded books as sources of information to be used for practical application to real life situations (11:233). These men contend that something in addition to book learning is needed in the schools of today to make each child more aware of things real and more able to live with them (11:233). An outdoor school camp can provide children with this type of an education.

In the total-living situation of the outdoor school setting there are numerous student gains, many of which cannot be measured in terms of tangible results (13:11). The desire of the outdoor school is to help the child become a more complete person—not only educationally, but also spiritually and socially.

The changes that occur in a child are noticeable while he is at the outdoor school camp. Such changes may be evidenced by a student becoming more friendly, more interested in learning, and willing to accomplish his work.

Another important gain derived from the outdoor school is the improved relationship that normally develops between the teacher and his students (13:11). The teacher, in addition to directing the learning activities, eats three meals a day with his students, relaxes with them, and helps put them to bed (13:11). The total-living situation enables the classroom teacher to observe his pupils under a variety
of conditions that he would not ordinarily see (13:11). Some of the positive outcomes from this experience are a deeper understanding and a mutual appreciation between the student and the teacher (13:11).

The resident outdoor education school also encourages the learning devise of problem-solving (13:12). The learner, rather than the teacher, establishes a goal and then devises a plan for achieving this goal (13:12). In this process, the learner becomes involved in purposeful planning.

Two very important aspects to the problem-solving approach are observation and investigation. Observation is an integral part of the outdoor education program (11:96). It is through observation that children sense such things as hearing, smelling, feeling, seeing, and touching. If children are not taught how to fully develop their senses, their capacity to learn will be incomplete (11:97).

After children have observed and discovered something new to them in nature, the teacher encourages them to find more information about this new discovery through investigation (11:105). Investigation in outdoor education, however, is more likely to take the form of self-directed action motivated by interest and curiosity (11:105). This process of investigation not only stresses the use of many books, but also many different sources of information which should be included in an effective camping program (11:105).
Cooperation among children at camp is another value achieved from the resident outdoor school. Cooperation and democracy are closely related at camp; individuals and groups have to give and take and sacrifice personal gains for the gains of the group (11:107). A democratic camp will emphasize and provide opportunity for children to develop cooperation among themselves and the camp staff (12:88). Experience in living together in the outdoors tends to give every member of the group a share in planning activities and participating in them (11:107).

IV. IMPLEMENTATION OF A RESIDENT OUTDOOR EDUCATION SCHOOL

Outdoor education programs and activities should begin in kindergarten and progress through the sixth grade or may be continued through high school. The outdoor study activity may last from a few minutes to an hour, or from a half day to a week or longer. However, it is the systematic use of the outdoors by the teacher that is most important and that offers an opportunity to realize the objective of this method of teaching (15:33).

The development of school camping usually includes some typical experiences of outdoor education which can be classified in four different phases. (1) The first phase involves children's exploration of the school grounds for such things as different types of soils, animals, and
plants (15:31). This type of study may or may not have a systematic and well planned approach. (2) The next phase involves day trips to visit points of interest (13:9). A day trip may include a visit to a conservation refuge area, a city park, a fish hatchery, a state park, or a tree farm. (3) The third phase followed by many schools is to take a weekend overnight trip with various interest groups from school (15:33). This is usually not a class experience but a collection of students from many classes interested in such things as fishing, camping, or visiting a bird sanctuary in another part of the state. (4) The final phase in the development of an outdoor education program is the resident camping experience in which a teacher and his students leave the schoolroom to live in an outdoor setting while continuing a program of learning activities related to the school curriculum (15:33). This fourth phase of development is usually reserved for sixth graders. However, some school districts involve the fourth and fifth grades in the resident school experience.

The organizational pattern of a school camp is the final result of the thinking and planning of several groups: pupils, teacher, parents, administrators, and resource people (13:62). If the most meaningful program of study is to be designed and the maximum achievement of educational goals are to be obtained, two planning points to keep in mind are: (1) Each class should develop its own program
of learning activities so that the experiences at the outdoor school compliment the curriculum in the "indoor" school (13:62). (2) Each classroom teacher should coordinate the entire sequence of outdoor education whether or not a professional outdoor education or resident staff is available. This coordination will include the organization, implementation and evaluation of the program for his class (13:62).

The most important contribution of the teacher to camp is a positive attitude toward the experience (15:135). The teacher must assume the responsibilities for camp in a confident manner (15:135). The work of organizing a camp is demanding. Permission forms must be sent out and collected; camp projects must be integrated with class activities; student committees must be formed; and, when necessary, parents must be reassured that their children will be well supervised at camp (15:135). It is definitely above and beyond the call of duty for a teacher. For many teachers, a day at camp requires more energy and stamina than a day at school.

In school districts that provide an annual camp experience for a particular grade, teachers are required to participate according to the provisions of their teaching contract (15:156). This is to insure that the teacher is aware of his responsibilities to camp. It is the district's responsibility to provide a camp orientation program in such forms as in-service workshops, institutes, and confer-
ences for a new teacher who will be teaching a grade which will attend camp (15:156).

Very early in the planning stages, preferably before actual preparation is started with the children, an orientation meeting for parents should be held (13:63). At such a session, the parents should become acquainted with the purposes and scope of the resident outdoor school (13:63). The general nature of study activities should be outlined. Plans should be discussed concerning the health, safety, and welfare of the children. The financial share of the parents, if any, should be explained, as well as the over-all cost of the program (13:64). No child should be required to attend camp, although, it is desirable for the entire class to participate. If some children cannot participate in the camp program because of a lack of family finances, the administrator or school principal should secure camp funds. Funds may be available through the Parent Teacher Association or another source to insure that every youngster who is physically able and willing has the opportunity to participate in the camp program.

Leadership is an important key to a successful school camp, therefore, a great deal of care should be taken to obtain counselors that possess a genuine interest in children and in the outdoor education program (23:18). Camp counselors may be secured from the community high school, college, or university. The Ann Arbor School System sug-
gests a student ratio of one counselor to fifteen students (23:18). However, the Tacoma Public School System suggests that a student ratio of one counselor to ten students is more desirable (20:11).

In special instances, the writer suggests, it may be desirable to have fewer students per counselor. Children who have some type of physical or emotional handicap necessitate more attention.

Many school districts incorporating a camping program as a part of their curriculum, purchase a camp facility (15:137). Then a permanent resident camp staff operates the camp and coordinates their efforts with the classroom teacher. In other situations where a school district does not own a camp but does have a director in charge of the camping experience, the director also coordinates his efforts with the classroom teacher (15:137).

The camp staff of a permanent facility manages many of the administrative functions such as hiring a cooking staff, providing adequate bedding, developing trails, and other facilities on the site (15:137). The camp staff are experts in the outdoors and act as resource personnel for the groups attending camp.

Resident outdoor education occurs under a variety of conditions and various outdoor, or camp-like settings. The majority of school camps are rented or leased from private or state authorities (15:153). Other school districts
rent state park facilities that will serve their purposes for a few days or a week's time (15:138).

It is not essential to have a permanent site or camp staff before embarking on school camping (15:137). If a camp program is begun on a limited basis and is successful, the school board should assume the responsibility for the next step to establish a permanent facility and a trained staff to operate the camp to the best advantage (15:137). The writer suggests that any school district who successfully operates a resident outdoor education program should work towards owning its own camp and having a permanent camp staff. This is a convenient and beneficial arrangement.
CHAPTER III

REPORTING THE RESULTS OF THE SURVEY

The following chapter consists of the procedures used to collect data from various school districts in Washington and Oregon, and the analysis and interpretation of that data to be utilized in the construction and development of a student field study guidebook.

I. PROCEDURES USED TO COLLECT THE DATA

To ascertain the data to be included in a field study guidebook, the writer sent out three types of letters seeking information. The following will describe the content, the purpose, and the results of each letter.

The first letter, as indicated in Appendix A, was sent to the Office of Environmental Education in Olympia, Washington and Salem, Oregon. The content of this letter described the project that the writer was attempting to accomplish. It also requested a list of the school districts that offered an outdoor education program for the intermediate grades. The offices of both states replied by sending the names and addresses of school districts involved in an outdoor education program. The names and addresses of six school districts were received from Washington's Office of Environmental Education. The names and
addresses of fifteen school districts were received from Oregon's Office of Environmental Education. A second letter, as indicated in Appendix B, was constructed and sent on the recommendation of the Office of Environmental Education to those school districts in Washington and Oregon that were engaged in an outdoor education program. The letter described the project of the writer. Secondly, the letter requested that a copy of each district's outdoor education field study guidebook be sent to the writer, if one were available. The information gained from these various guidebooks would be utilized while compiling a student field study guidebook for an outdoor education program. Four school districts in Washington and eight school districts in Oregon responded by sending either a copy of their student field study guidebook or related materials to a student field study guidebook. The writer evaluated each of the student field study guidebooks to select and list their major topics of significance relative to the study of the outdoors.

The last letter, as shown in Appendix C, was distributed to thirty-four teachers and administrators involved in an outdoor education program in Tacoma, Washington. Basically, this letter listed the topics which had been selected and screened from the outdoor education student field study guidebooks developed by other school districts in Washington and Oregon. This letter briefly explained
that the writer was conducting a survey among the sixth grade teachers and administrators of Tacoma and that the results of this survey could possibly be a direct benefit to them in their outdoor education program. These people were asked to rate the survey topics in terms of importance for their particular area. They were also asked to circle a desired number between one and five on a five-point scale with number one meaning least desirable topic and number five meaning most desirable topic to be included in a student field study guidebook. Twenty-seven of the teachers and administrators contacted responded by sending back the desired information. Appendix D contains a table of the survey results.

II. ANALYSIS AND INTERPRETATION OF DATA

The technique used to evaluate this survey was to identify which curriculum content items were considered to be most significant by the respondents as they responded to the survey. It was determined that items which scored highest in columns four and five were considered to be high priority items and to be included in a student field study guidebook. Those items that scored highest in columns one and two were considered to be of lowest priority and were not included in the student guidebook. Items in column three were considered to be of average value; however, if these items received the largest response and, along with the items in columns four and five, made a majority response,
then these topics would be included in the student guidebook. Correspondingly, if the response in columns three, two, and one consisted of a majority response, the item was given a low priority ranking.

The items which rated high in priority were tree and plant life, survival training, forestry study, ornithology study, soil study, study of geology, marine life study, fresh water study, map and compass training, and a page of suggested or special interest projects for the students at the end of each major section. It is interesting to note that most of these topics are not a regular part of the school curriculum, nor could they adequately be studied in the classroom. This apparently indicated that many educators, perhaps because of social and political pressures or a desire to make the curriculum more relevant to children, are beginning to put greater emphasis on the environment and how man can better live in and understand his environment.

Another indication seems apparent. Educators appear increasingly interested in giving students direct experiences in the curriculum by their studying natural materials and observing living situations in their natural environment. Perhaps the greatest indication is that these topics should become a definite part of the elementary school curriculum.

The low priority items consisted of wildlife, insect study, creative writing, study of the weather, and a daily log of each day's activities. It was interesting to discover that the topics of wildlife and a study of insects
did not receive as high a priority rating as the topics in columns four and five. This may indicate that the teachers and administrators surveyed in this study were not as familiar with these topics as some of those topics of highest priority. Perhaps they felt these topics were of less importance because they could conduct a more adequate study of them in the classroom. This may also have indicated that those surveyed felt that their camping facilities were not adequate to teach such topics as wildlife or the study of insects. Another factor may have been lack of time to implement these topics and the topics of highest priority in an outdoor curriculum and do an adequate teaching job. It is also interesting to observe that the topics of weather and maintaining a daily log of each day's activities have been an established part of the regular classroom curriculum and can better be taught in the classroom rather than the outdoors.

The results from this survey would seem to indicate a sense of direction that the author could follow in developing an outdoor education field study guidebook for the intermediate grades, to follow in Chapter IV.
CHAPTER IV

DEVELOPMENT OF STUDENT FIELD STUDY GUIDEBOOK

This chapter will consist of an outdoor education student field study guidebook for the intermediate grades, based on the literature of outdoor education, the need for an outdoor education student field study guidebook in the Tacoma School District for the intermediate grades, and the results of the survey discussed in Chapter III of this study.

I. LITERATURE OF OUTDOOR EDUCATION

The student field study guidebook is designed to help develop in the intermediate students, by their active participation in learning process, the following objectives of outdoor education: (1) To develop an appreciation of natural resources and to practice the fundamentals of conservation; (2) To broaden a student's interest, to open new fields of interest, and to provide opportunities for creative, self-directed study; (3) To make classroom learnings more meaningful through the application of knowledge to practical outdoor situations; (4) To stimulate an awareness of the beauty of nature (15:138).

Julian Smith, an authority on outdoor education, believes that students should go directly to the outdoors
and study plants, animals, and other living things or study such phenomena in the physical world as air, soil, and water (22:37). They should not be studied as abstract facts in the classroom.

The student field study guidebook was planned to strengthen and facilitate the student's use of observation, which is an important learning technique. It is through observation that the student learns to develop his senses. Studies in nature and in real life situations require greater skills in observation than reading from the printed page or listening to lectures (15:97). Another valuable contribution that occurs through the observation technique is that the observer has the opportunity to become an active part of the situation or experience he is studying (11:104).

This guidebook is also designed to supply for the classroom teacher the methods to provide real meaning to abstract verbal learning through direct experience. Real understandings come through doing or experiencing (13:4). Children who have the opportunity to experience first-hand usually learn more rapidly. Furthermore, knowledge which is learned in this fashion is ordinarily retained for a longer time than that which is merely read (13:4).

When the student becomes actively involved in the learning experience there is a natural urge to investigate (11:106). The questions of who, what, where, when, and how become a constant challenge to the student and the teacher
(11:106). As a result of direct experiences and through investigations, a chain reaction is started which involves a desire to discover other things related to the subject. This type of investigation seeks to encourage the use of many books and many different sources of information.

An important guide used in constructing the outdoor education student field study guidebook may be summed up in the words of L. B. Sharp:

"That which can best be learned inside the classroom should be learned there. That which can best be learned in the outdoors through direct experience, dealing with native materials and life situations, should there be learned" (22:21).

II. THE NEED FOR AN OUTDOOR EDUCATION STUDENT FIELD STUDY GUIDEBOOK IN THE TACOMA SCHOOL DISTRICT

(1) In the Tacoma School District there are approximately thirty schools out of forty-two schools which participate in the sixth grade outdoor education program. At this time there is no student field study guidebook. A student field study guidebook would give direction to such a program and also encourage other schools in the Tacoma District to take part in the outdoor education program.

(2) A student field study guidebook will facilitate a better program and offer more similarity of program among the various schools that participate in the outdoor education program.
(3) The student field study guidebook is needed to help students achieve a greater appreciation and understanding of the outdoors.

(4) Tacoma School administrators have expressed the need for an outdoor education field study guidebook for the students (19).

(5) A student field study guidebook would be beneficial to help other school districts develop an outdoor education program or to improve upon their existing program.

III. RESULTS OF THE SURVEY

The content of the student field study guidebook is based on the results of the data obtained through the survey sheet; the analysis and interpretation of the data from the outdoor student field study guidebooks established by other school districts; and the Tacoma School District's teachers Outdoor Education Guide.

For purposes of clarity and convenience of curriculum development, those materials derived from the survey sheet were integrated into a single unit. Plant life, trees, and forestry were developed as one unit of study, with the title of "Plants". Wildlife and ornithology were developed as one unit of study with the title of "Wildlife".
STUDENT FIELD STUDY GUIDEBOOK
Teacher orientation to the Student Field Study Guidebook

The following are suggestions on how to best use the materials in this guidebook.

1. Recognize that this book is a guide and not a textbook.

2. It is suggested that each teacher familiarize himself with the materials in this guide so that the guidebook may be utilized to its best advantage.

3. To achieve the greatest benefit from this guidebook, the teacher should initiate preplanning and follow-up activities related to the materials established in the guidebook.

   It is also suggested that adequate time be taken to familiarize students with the materials in this guidebook before they attend the outdoor school.

4. It is suggested that the teacher may evaluate the student's work in this guidebook to best serve the student.

5. A good reference book to assist the teacher in preparing to teach from this guidebook is the Outdoor Education Guide distributed by the Tacoma Public School District.

6. Teachers may suggest changes to portions of this guidebook so that necessary revisions may be made.

7. Teachers may also wish to incorporate their own ideas to enhance the value of this guidebook.
INFORMATION ON SHORT-TERM SURVIVAL

Many people find few things more enjoyable than spending a week-end or vacation in our forests or the wilderness. Beauty, excitement, fishing, camping, hunting, and hiking are some of the important reasons why people enjoy our forest lands. An enjoyable trip has, on occasion, turned into a frightening experience or a tragedy when members of a family have become lost. This need never happen to anyone if they learn some rules about the forest environment and about how to take care of themselves (16:64).

What is your definition of survival? Webster defines survival "to remain or continue living after some event has passed in one's life." The type of survival discussed in this unit will refer to being lost from civilization where such modern conveniences as the telephone, grocery store, direction signs, warmth or shelter, do not exist (8:1).

Outdoor survival is maintaining a balance of heat in the body and conserving enough energy to continue to produce the heat to continue this normal operating temperature of 99.0 degrees F. (10). Your greatest enemy, as you stand against hostile weather elements, will be anything that takes away this temperature (9:C-4). A few degrees higher or lower in body temperature and you can become incapable of thinking or acting in a normal fashion (9:C-4).

Before going on a hike or a camp-out in the wilder-
ness, it is advisable to take a pocket survival kit with you. The Tacoma Unit of Mountain Rescue provides such a pocket survival kit for short-term survival for a minimum price. This kit contains matches, a candle, salt, sugar, tea, bouillon, a plastic tarp, an instructional brochure, a metal cooking container, wire, and a metal lid. Each of the items in this survival kit may have more than one purpose. You may also wish to personalize your survival kit by putting in such items as a knife, compass, or fishing line and fishing hooks. You may think of other items to include in your kit.

A very important factor to remember at the beginning of your survival situation is to not **PANIC**. This is the urge to hurry or run from the situation. You will only have a limited amount of available energy in your body and this energy must be conserved \(9:D\text{-}3\). It may be large or small, depending on your circumstances before your survival condition developed.

The real challenge to stay alive is to use your brain to help conserve this remaining amount of usable energy by limiting your muscle action, which reduces body heat loss \(9:D\text{-}3\). Your situation and actions must be carefully thought out to determine the immediate and most important needs to improve your chances of living and being rescued \(9:D\text{-}3\).

Mountain experts rely upon the following when ad-
vising what to do in any emergency:

S - Stop
T - Think
O - Observe
P - Plan

S--Stop. The body is designed to do three things: digest food, do work, or think. It does not do any two of these very efficiently all at once. This is the reason for the need to stop and think. By stopping to think, you may avoid the possible errors of hasty decisions (9:D-4).

T--Think. Think about the immediate and future danger to self. Study the weather, the land, and the available energy and resources to continue life (9:D-4).

O--Observe. Look around you, observing the problem for possible solutions. Observe resources, weather potential and best possible course of action (9:D-4).

P--Plan. After thinking and observing all aspects of your emergency, plan a course of action which will best use your limited body energy. Plan your activities, whatever they may be, to take advantage of the natural and ready resources that exist about you (9:D-4).

If you should become lost in the wilderness, you must help yourself to maintain the "necessities of life" (10). The "necessities of life" consist of air, shelter, water, food, and the most important of all--the will to live.

Normally, one can live three days without water and three weeks without food. Food will be of lesser importance for short-term survival (10). Although food is a great
comfort, it is not advised to waste energy searching for berries or edible plants (10).

Survival in this modern age is generally a short-term situation (10). Usually an organized search is begun as soon as you are reported overdue. However, in some cases, it may be necessary to prepare yourself for a longer wait in the wilderness under certain circumstances. For further information on this type of survival you may refer to the Boy Scout Handbook or Food in the Wilderness by G. W. Martin and R. W. Scott.

Sheltering the body and conserving energy is your greatest concern. Adequate shelter is often the key to survival (9:D-3). The shelter must provide protection from the loss of body heat. Your shelter will be your home and the most important part of your survival experience (9:D-3). When you are lost in the wilderness, it is better to build a shelter than wander without any sense of direction and needlessly using up valuable body energy.

The following will describe shelters that can be used in the wilderness.

**Immediate Shelter:** This type of shelter can be obtained from the natural protection of large or small trees; the wind protection of ditches; small buildings or piled rocks (9:VIII-1).

**Wilderness Shelter:** The following describes how a wilderness shelter may be used and built to protect
you from the weather.

(1) Burrowing under an exposed log is easier than building an above-ground shelter (9:VIII-1).

(2) Explore the wooded areas for possible old logs, boughs, burrows, caves, bark or slab wood which can be used for shelter construction. (While exploring, look for pitch wood for fire starting) (9:VIII-1).

(3) Ground insulators are very important. Various ground insulators may consist of wood, limbs, dried grass, leaves, dry bark, cardboard, or anything that is dry and provides an air space between the human body and the ground (9:VIII-2).

Remember, use what you have to construct your shelter such as your hands, rocks, sticks, or whatever else there is available.

**Improvising Shelter from Man-made Materials Available:**
Such materials may consist of cardboard for shelter against the wind, rain, or sun. Also sheet plastic may be used to construct lean-to shelters: A-frame shelter, and wrap-around shelters (9:VIII-2).

Once a shelter has been made, it is advisable to locate a water supply, if one is available. This may be a river, lake, creek, or locating an underground spring through water seepage.

In the wilderness forest, especially when someone is
lost, a fire properly constructed will be of a great help to that person. It will provide heat for warmth, and signals with fire and smoke. It is important that anyone going into the wilderness have an adequate supply of matches in a waterproof container to take along. However, fire can be dangerous to your survival if you do not pay attention to the strict rules of safe fire building. At times, the forest is very dry or the grasslands may be unsuitable for any fire, because of the danger of a spreading fire which could destroy you (9:VIII-2).

**Principles of Fire Building:**

(1) Select an area out of the wind; clean a six foot area of mineral earth (9:VIII-2).

(2) Use dry tinder, or tinder which is easily burnt when wet, such as birch bark, pitch, fire starter, or petroleum products (9:VIII-2).

(3) Have all of the kindling and wood on hand before you strike your first match. Use old, dry, dead wood (9:VIII-4).

(4) Use the match first to light a small shaved stick or sliver of pitch, and then light the fire with this (9:VIII-2).

(5) Start with a small tepee fire and add to it as the flame increases (9:VIII-2).

(6) Blowing lightly on the now-burning wood helps to increase the flame (9:VIII-2).
(7) Fire climbs upward. Always add new fuel from above the flame (9:VIII-2).

Finding Tinder and Fuel for the Fire:

Tinder may be dry grasses, bark of trees, shavings of dry wood, or pitch. Pitch wood is found in the undecayed parts of old stumps. Start building a small pile of match-like slivers of tinder in the shape of a tepee, three or four inches high, with the shortest, thinnest, driest pieces underneath (9:VIII-2). Increase the size of the wood until the pile is about one foot high. Light the fire from the lowest center point of your tinder.

In wet weather, the best fuel is usually the tiny, brittle branches from dead limbs on the trunks of conifer trees (9:VIII-3). If the branches do not snap or crack, they are not suitable for tinder.

Once a person becomes lost in the wilderness, it is very important to help the searchers locate you. The following describe some of the methods of signaling to assist rescue parties.

(1) Ground Signals. These signals are easy to build and will work for you unattended. The larger the signal, the better to be seen from the air. Pile brush to spell out large letters (9:VIII-5).

(2) Smoke by Day, Fire by Night. Put green boughs or grass on a hot fire to produce white smoke; rubber or plastic for thick black smoke (9:VIII-5).
(3) Flares. Flares should be fired straight in the air when the search plane is pointed in your direction (9:VIII-5).

(4) Sounds. Whistles, tom-toms, beating on metal --everything possible should be done to aid ground searchers to your location (9:VIII-5).

(5) Mirror Signals. A flash of reflected light can be seen for many miles and is one of the most effective signals to use when the sun is shining (9:VIII-5).

Perhaps you may be able to think of other signaling methods.

You will be taught how to do the survival techniques discussed in this chapter by your teacher and your counselor.

If you are planning an extended trip to the wilderness, list those things which you think would be important to take with you:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Survival Activities--Your teacher and counselor will help conduct the following activities.

(1) Find an immediate shelter.

(2) Locate a wilderness shelter that may be used for more than one day.

(3) Improve the wilderness shelter you have found by putting up walls, putting in ground insulation and doing whatever else has to be done.

(4) Find materials from the forest to build a fire.

(5) Build a fire using only two matches.

(6) Practice using the methods for signaling to attract searchers.
Date: __________________
Time of Day: ____________
Weather: _______________

SPECIAL PROJECTS
UNIT II

SOIL
RECORDING FIELD STUDY MATERIAL

Things to look for in soil:

1. Color
2. pH
3. Smell
4. Temperature
5. Texture

<table>
<thead>
<tr>
<th>pH SCALE</th>
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<tr>
<td>Most Acid</td>
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<tr>
<td>0</td>
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</tbody>
</table>

Most Plant Life

FOREST AREA

A. Soil Observation

<table>
<thead>
<tr>
<th>COLOR</th>
<th>TEXTURE</th>
<th>SMELL</th>
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</table>

pH ___________  Temperature _________

(14:32).

B. Plants growing in this area (Four most abundant)

<table>
<thead>
<tr>
<th>SKETCH</th>
<th>COLOR</th>
<th>SIZE</th>
<th>NAME</th>
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(14:32).
C. Animals found in topsoil

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<tr>
<th>SKETCH</th>
<th>COLOR</th>
<th>SIZE</th>
<th>NAME</th>
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(14:32).

EXPOSED BANK

A. Soil Observation

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<tr>
<th>COLOR</th>
<th>TEXTURE</th>
<th>SMELL</th>
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</table>

pH __________ Temperature __________ (14:32).

B. Plants growing in this area (Four most abundant)

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<tr>
<th>SKETCH</th>
<th>COLOR</th>
<th>SIZE</th>
<th>NAME</th>
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</table>

(14:32).
C. Animals found in topsoil

<table>
<thead>
<tr>
<th>SKETCH</th>
<th>COLOR</th>
<th>SIZE</th>
<th>NAME</th>
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(14:33).

**UPPER BEACH AREA**

A. Soil Observations

<table>
<thead>
<tr>
<th>COLOR</th>
<th>TEXTURE</th>
<th>SMELL</th>
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</tbody>
</table>

pH __________________ Temperature __________________

(14:34).

B. Plants growing in this area (Four Most Abundant)

<table>
<thead>
<tr>
<th>SKETCH</th>
<th>COLOR</th>
<th>SIZE</th>
<th>NAME</th>
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</table>

(14:34).
C. Animals found in topsoil

<table>
<thead>
<tr>
<th>SKETCH</th>
<th>COLOR</th>
<th>SIZE</th>
<th>NAME</th>
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(14:34).

SOIL EROSION

Soil erosion—Determine the kinds and amount of erosion present in the field study area.

DEFINITIONS:

**Splash erosion** is caused by raindrops hitting bare soil.

**Sheet erosion** is the removal of soil without easy to see channels.

**Rill erosion** leaves many small easy to see channels.

**Gully erosion** leaves ditches that may be too deep and wide for machinery to cross.

**Bank erosion** is caused by streams washing soils from stream banks.

Record information on the chart.

<table>
<thead>
<tr>
<th>KIND OF EROSION</th>
<th>EVIDENCE</th>
<th>AMOUNT OF SOIL LOST (GREAT OR SMALL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPLASH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SHEET</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RILL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GULLY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BANK</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(16:11).
CONCLUSIONS ABOUT SOIL

A. What soil has good water holding capacity? _________
   Why? ____________________________________________

B. How does the texture and structure of the soil affect the movement of the water and air through the soil?
   __________________________________________________

C. Which of your soil areas has good fertility? _________
   How can you tell?
   __________________________________________________

D. Does the temperature change the deeper you go into the soil?
   Why? ____________________________________________
   What affect will the soil temperature have on plant life?
   Why? ____________________________________________

E. How does the pH change as you study different areas?
   How does this affect the plants on your field study area?
   __________________________________________________

F. How does the temperature differ in the open area from the wooded area?
   Which area would be warmer in the winter? _________
   In the summer? ____________________________________
G. How does organic matter affect the water holding capacity of the soil?

H. How do animals living in the soil affect the soil?

I. What did you notice about the different kinds of plants and the soils in which they live in your study area?

Is there a link between what plants grow in what soils?

(14:35).
STUDENT DESCRIPTION OF A SPECIMEN

Area of Study ___________  Student's Name ___________

Specimen ____________________________  (Common Name)  ____________________________  (Scientific Name)

Description of specimen—What does it look like, its size, habits and color. Where found? Other things found with it.

___________________________________________________________________________

___________________________________________________________________________

___________________________________________________________________________

___________________________________________________________________________

___________________________________________________________________________

(6:72).

SKETCHES - (Scale - Other views)
SUGGESTED SPECIAL PROJECTS ABOUT SOIL

1. Do pH on a number of materials from which soil is formed. Such materials may be different types of duff, lichens, moss, or different topsoils. (14:33).

2. Study, observe, and record erosion around such places as camp roads, and trails as a special project (14:12).

3. Determine the pH of the ashes of a campfire. How might you expect the ashes of a forestfire to effect the regrowth of a forest (14:36)?

4. Write a story about how the soil in each of your study areas was formed (14:36).

5. Collect samples of soil from each of your study areas. Glue these onto a card showing a map of the areas you collected the soil. You may also wish to construct a soil profile from your soil samples (14:36).

6. Write a poem about one of the soil study areas (14:36).
Date: 
Time of Day: 
Weather: 

SPECIAL PROJECTS
UNIT III

PLANTS
A. STUDY OF PLANTS LIVING IN A PLANT COMMUNITY

You will note that plants are different heights in the community when they are mature plants. You will find trees in the upper level; shrubs, bushes and small trees in the middle level, and flowers, ferns, mosses, mushrooms, lichens and molds in the lower level (14:12).

1. **Field Study**

Make a collection of several specimens of plants from each level (middle, upper, and lower) in your field study area and identify each.

<table>
<thead>
<tr>
<th>Plant name or kind</th>
<th>amount</th>
<th>where growing</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>few</td>
<td>open sunlight</td>
<td></td>
</tr>
<tr>
<td></td>
<td>many</td>
<td>partly shaded</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>dense shade</td>
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</tr>
<tr>
<td><strong>Upper Level</strong></td>
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<td><strong>above 30 ft.</strong></td>
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<tr>
<td><strong>Middle Level</strong></td>
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<td><strong>3 to 30 ft.</strong></td>
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<td><strong>Lower Level</strong></td>
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<td><strong>0 to 3 ft.</strong></td>
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(14:12)
2. **Conclusions**

Do the plants in the upper level affect the plants in the lower level? ____ How? ____________________

____________________________

____________________________

Do you find many plants growing in dense shade? ____

Why? ____________________________

____________________________

Describe your feeling about being a visitor in the plant community. ____________________________

____________________________

____________________________(14:13).

**B. STUDY OF TREE AGES AND GROWTH PATTERNS**

We need to know how fast trees grow and their age, to determine the best way to manage them. (Numbers 1, 2, and 3 are ways to tell ages of trees.) It takes about five years for a tree to become large enough to grow a ring of wood or add a whorl of branches. Add five years then count the rings (24:22).

1. Count the rings of a stump to tell how old a tree was when it was cut (14:22).

\[ \text{stump rings} + 5 \text{ years} = \text{age} \]

2. Count the rows, or whorls, of branches of a young conifer. (Most conifers grow one whorl of branches a year (16:19).

\[ \text{whorls} + 5 \text{ years} = \text{age} \]
3. Use a tool called an increment borer to take a core out of a tree and count the growth rings on the core (24:22).

4. Use a tape measure to find the diameter of the tree and compare it with age (24:23).

(NOTE: The diameter of a tree in inches is about 1/3 the distance of the circumference in inches. Trees are measured at 4½ feet from the ground, with a diameter measuring tape (24:23).

Measure and record the following data:

<table>
<thead>
<tr>
<th>Species</th>
<th>Circumference at 4½ feet</th>
<th>Diameter in inches</th>
<th>Age</th>
<th>Height</th>
<th>Describe condition of tree</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

(16:22).

5. Data Collecting:

Tree Stumps: No. 1, Age
Probable species

No. 2, Age
Probable species (14:14).

C. STUDY OF FOREST INFLUENCES

There are many things in the forest that affect plants:

Insects--bore into the wood, lay eggs inside the bark and strangle the tree, eat leaves and some seeds.

Disease--causes wood to rot and decay.
Wind-----blows tops out of trees, which allows insects and disease to enter the tree, uproots trees; helps disperse seeds.

Fire-----burns trees and other plants, allows some tree seeds to germinate.

Man-----marks trees with knives and axes, throws garbage in the forest and is careless with fires; protects and manages trees. (17:67).

1. Field Study

Observe and record evidences of forest influences in your area.

<table>
<thead>
<tr>
<th>Influence</th>
<th>Evidence of Influence</th>
<th>Harmful or Beneficial</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

(17:67).

2. Conclusions

What would you do to reduce some of the harmful influences on your field study area? 

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

How are some of the influences beneficial to other plants in your area? 

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

(14:15).
D. STUDY OF A ROTTEN LOG (A rotten stump can also be studied.)

Rotten logs are an important part of a living community. They provide homes and food for animals and a place where certain plants can grow. The log eventually decays into the soil, changing its texture, color, depth, waterholding abilities and richness (4:28).

1. Field Study

Observe and record as many things as you can about a rotten log on your area. Be sure not to tear the log apart. If you lift up the bark to look for living things, put the bark back in place (4:28).

Where is the stump of the tree? ____________________________

How did the tree die? ____________________________

What species of tree was it? (Look at bark, wood, structure.) ____________________________

List the living plants in or on the log.

<table>
<thead>
<tr>
<th>NAME</th>
<th>LOCATION</th>
<th>SEED SOURCE</th>
<th>EFFECTS ON LOG</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

(4:28).

List evidence of animals in or on the log.

<table>
<thead>
<tr>
<th>NAME</th>
<th>EVIDENCE</th>
<th>FOOD EATEN</th>
<th>ENEMIES</th>
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<tbody>
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</table>

(18:117).
2. **Conclusions**

How does this log help new plants to grow in the community?

What affect do the animals have on the log?

What will this log eventually become?

---

E. **WHAT AFFECT DO PLANTS HAVE ON THE FOLLOWING:**

- Soil?

- Water?

- Other Plants?

- Wildlife?

- Man?

(16:28).
STUDENT DESCRIPTION OF A SPECIMEN

Area of Study ___________ Student's Name ___________
Specimen ________________ (Common Name) ________________ (Scientific Name)

Description of specimen—What does it look like, its size, habits and color. Where found? Other things found with it.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

(6:72).

SKETCHES (Scale—Other views)
F. SUGGESTED SPECIAL INTEREST PROJECTS

1. Make a terrarium representative of the different types of plants found in the field study area.

2. Make a collection of plants, wood samples, seed, etc. Mount and label.

3. Make a list of the plants from study area that are important in everyday life.

4. Make a list of edible plants.

5. Take photographs of various plants.

6. Make a study of moist or boggy location and a dry hillside. Compare tree species, soil conditions, and kinds of associated plants growing. Describe and record observations.

7. Use increment borer to make a study of age and growth rate of trees in the area. Mount the cores on cards and identify type and age of tree.

8. Write a poem suggested by someone significant in the plant community.

9. Draw a series of pictures of interesting things in the study area, using charcoal or crayon.

10. Write a story giving the snail's viewpoint or an ant's eyewview of the plant community.

11. Write a story of how plants affect your everyday life.

12. Write a story on why plants are like the human race?

(14:18).
Date: _______________________
Time of Day: _________________
Weather: _____________________

SPECIAL PROJECTS
RECORDING FIELD STUDY MATERIALS

Date: _____ Time of Day: ___
Weather: Clear-Cloudy-Rain
Warm or Cold: Temperature ___ F

A. STUDY OF WILDLIFE

1. Field Study

Observe and record the many types of animals found in this area. If you do not know names, record all other information.

INVERTEBRATE (Animals without Backbones)

VERTEBRATES (Animals with Backbones)

<table>
<thead>
<tr>
<th>SHAPE</th>
<th>COLOR</th>
<th>LOCATION OR SURROUNDING</th>
<th>INTERESTING FEATURES</th>
<th>INVERTEBRATE OR VERTEBRATE</th>
<th>NAME</th>
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</thead>
<tbody>
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</table>

(14:38).
2. **Conclusion**

How many invertebrates on your list? _______
Vertebrates? _______. Why the difference in number? ___________________________

Date: _______ Time of Day _______
Weather: Clear-Cloudy-Rain
Warm or Cold: Temperature ___ F

B. **STUDY OF HABITATS**

1. **Field Study**

Animals live in different types of habitats such as salt water beach, brush, rotten logs, and many others. See how many habitats you can list and the animals that live there.

<table>
<thead>
<tr>
<th>HABITAT</th>
<th>ANIMALS THAT MIGHT LIVE THERE</th>
</tr>
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<tbody>
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</table>

Habitats are sometimes changed by nature, but man has changed the natural habitat more than anything else. List some of these changes by men or nature.

<table>
<thead>
<tr>
<th>CHANGES IN HABITAT</th>
<th>CAUSED BY</th>
<th>HELPFUL OR NOT HELPFUL TO WILDLIFE</th>
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</tbody>
</table>

(17:91).

(14:39).
2. Conclusion

How could you improve the habitat in this area?

Would you consider this area a good or poor habitat for large animals? _____ Why? ________

(14:40).

Date: _____ Time of Day _____
Weather: Clear-Cloudy-Rain
Warm or Cold: Temperature _____°F

C. STUDY OF EVIDENCE OF ANIMALS

1. Field Study

Many times we do not see the animals, but we do see signs or evidence that animals have been in the area. Look for tracks, droppings, dust baths, nests, tunnels, nipped branches, feathers, and gnawed branches (17:90).

<table>
<thead>
<tr>
<th>ANIMAL SIGN</th>
<th>ANIMAL WHICH PROBABLY MADE IT</th>
</tr>
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<tbody>
<tr>
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</table>

(17:90).

2. What kinds of signs were the most evident? _____

Why? ______________________________________

______________________________________________________________________
D. BIRD STUDY

1. Field Study

Birds are identified by their markings, song, flight pattern and their size. See how many you can list.

<table>
<thead>
<tr>
<th>SIZE</th>
<th>SHAPE</th>
<th>COLOR OR MARKINGS</th>
<th>LOCATION OR SURROUNDING</th>
<th>SONG</th>
<th>FLIGHT PATTERN</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Same as Robin</td>
<td>Tufted Head</td>
<td>Black Head Blue Body</td>
<td>In the Woods</td>
<td></td>
<td></td>
<td>Steller Jay</td>
</tr>
<tr>
<td>Smaller than Sparrow</td>
<td>Black Cap White Cheek</td>
<td>Woods Orchards</td>
<td>Chick-A-Dee-Dee Flits Along</td>
<td>Blk.cap Chick-adee</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(14:41).
2. Conclusions

What kinds of birds were most evident? __________

______________________________

______________________________

______________________________

______________________________

______________________________

E. SOME CONCLUSIONS ABOUT ANIMAL LIFE

1. Did you enjoy looking at animals? ____ Why? ____

______________________________

______________________________

______________________________

______________________________

______________________________

2. How do animals affect the plants of this area?

______________________________

______________________________

______________________________

______________________________

______________________________

3. How can we help make sure we always have wild animals in our area? ____________________________

______________________________

______________________________

______________________________

______________________________

______________________________

(17:93).
STUDENTS' DESCRIPTION OF THE SPECIMEN

Area of Study___________ Student's Name___________

Specimen___________ (Common Name)___________ (Scientific Name)___________

Description of specimen—What does it look like, its size, habits and color. Where found? Other things found with it.

SKETCHES (Scale—Other views)
SUGGESTED SPECIAL PROJECTS

1. Make a collection of drawings of animal tracks.

2. Make a charcoal or pencil sketch of three or four habitat areas. (Beach, rotten log, tree, or other areas.)

3. Write a short story about why you would like to be a particular animal living in this area.

4. Write a poem about an animal. Choose anyone you like.

5. Write a story about why it is interesting to watch wild animals running free in the woods.
Date:__________________

Time of Day:______________

Weather:__________________

SPECIAL PROJECTS
UNIT V

FRESH WATER
RECORDING FIELD STUDY MATERIAL

Date: _____ Time of Day:____

Weather: Clear - Cloudy - Rain

Warm or cold: Temperature____ F

A. STREAM STUDY

<table>
<thead>
<tr>
<th>TYPICAL STREAM</th>
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<tbody>
<tr>
<td><strong>SLOPE</strong></td>
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<tr>
<td>HEADWATERS</td>
</tr>
<tr>
<td>MID REGION</td>
</tr>
<tr>
<td>LOWER AREA NEAR MOUTH</td>
</tr>
</tbody>
</table>

1. Sketch of stream study area
   (Locate such things as banks, large boulders, and sand bars)

   (14:5).

   (17:44).
2. Study of stream qualities present
(Use water testing kit for oxygen content and pH

<table>
<thead>
<tr>
<th>SLOPE</th>
<th>ROCKS</th>
<th>TEMPERATURE</th>
<th>OXYGEN CONTENT</th>
<th>pH</th>
<th>PLANT GROWTH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Top of water</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>under water</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First Sample</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Second Sample</td>
<td></td>
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</table>

Conclusions

What part of the stream are you studying? (Upper, middle, lower)

Describe the plant growth in your study area. (Amount and type)

Why are plants able or not able to grow in this area of the stream?

(14:6).
B. PLANT AND ANIMAL SUPPORT STUDY

Effect of pH on water life. Animals that live in the water cannot stand too much acid or alkali in the water. A few animals have adapted to acid or alkali conditions. A swamp is usually acid. A pond would probably be alkaline in summer, during plant growth, and slightly acid in fall during plant decomposition.

Mark your pH on the scale.

Salmon
Frog
Suckers
Catfish
Cappic
Bass
Clams
Snails
Caddis fly
Stonefly
Mayfly
Trout
Bacteria
Water Strider
Water Boatman
Fresh wtr. Shrimp

pH Ranges that support Aquatic Animal and Plant Life (14:6).
What was the pH of your sample?

Conclusion

What type of animals do you expect to find in your sample area?

In what locations did you find most of the animals?

Did you see any fish? Why or why not?

C. STUDY OF ANIMAL LIFE IN FRESH WATER

<table>
<thead>
<tr>
<th>SHAPE</th>
<th>COLOR</th>
<th>LOCATION</th>
<th>INTERESTING FEATURES</th>
<th>INVERTEBRATE OR VERTEBRATE</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>brown &amp; silver</td>
<td>quiet water near edge</td>
<td>seems to swim upside down</td>
<td>invertebrate</td>
<td>Back Swimmer</td>
<td></td>
</tr>
</tbody>
</table>

(24:38).

(14:7).
D. STUDY OF STREAMFLOW

Instructions for measuring streamflow

1. Field Study

Instructions for collecting and recording streamflow measurements

a. Measure and mark with stakes a 100 foot distance along a straight section of your stream.

b. Find how fast the stream is flowing. Throw a stick (2 or 3 inches long) in the water above the upstream marker. Record the number of seconds it takes to float between the markers.

Record below. Number of seconds to float between stakes: _______ seconds. Now divide the 100 foot distance by the total seconds it took the stick to float between the stakes. This will tell you how many feet the stick floated each second.

100 ft. $\div$ _______ = _______ ft. per sec.
(dist.) (total secs.) (number of ft. stick floated each second)

c. Find the average width of the section of the stream. Measure the width of the stream at three places within the 100 foot area. Record the measurements below. Divide the total by three to get the average width of the stream.

First measurement _______ feet
Second measurement _______ feet
Third measurement _______ feet

Total _______ feet $\div$ 3 = _______ ft. (average width)

d. Find the average depth of the section of the stream. Wade across the stream in a straight line. Measure the depth of the stream in three places along the straight line. Record measurements below. Divide the total by three to get the average depth of the stream.
First measurement _____ feet  
Second measurement _____ feet  
Third measurement _____ feet  
Total _______ feet ÷ 3 = _______ ft. (average depth) 

(17:47-49).  
e. Find the cubic feet of water per second. Multiply the average depth and the number of feet the stick floated each second. This will tell you the number of cubic feet of water flowing in the stream every second.  

_____ x _____ x _____ = ___________  
(average (average (no. of ft. (cu. ft. of water width) depth) per sec.) flowing per sec.) 

Note: A cubic foot of water is the water in a container 1 foot wide, 1 foot high, and 1 foot long.  

E. HOW DOES WATER AFFECT: 

Soil ____________________________________________  
________________________________________________________________________  
________________________________________________________________________  
________________________________________________________________________  
Wildlife _________________________________________  
________________________________________________________________________  
________________________________________________________________________  
Plants ___________________________________________  
________________________________________________________________________  
________________________________________________________________________  

(4:41-42).
STUDENT DESCRIPTION OF A SPECIMEN

Area of Study ____________ Student's Name ____________

Specimen ____________________ (Common Name) ____________ (Scientific Name) ____________

Description of specimen—What does it look like, its size, habits, and color. Where found? Other things found with it.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

(6:73).

SKETCHES (Scale—Other views)
1. Write a paragraph about the necessity of clean, clear water.

2. Describe the sound of a small stream or river by writing a poem.

3. Write a paragraph telling how it feels to have rain splash on your face.

4. Find examples of water erosion and tell what might have been done to prevent such destruction.

5. Write what you think it would be like to be a stick floating down a stream. Tell about your adventures along the way.

6. Write a paragraph about how a raindrop falls in the mountains and travels to the sea.

7. Make a collage of materials picked up along the edge of a stream.

(14:10).
Date: ___________________________
Time of Day: ____________________
Weather: ________________________

SPECIAL PROJECTS
UNIT VI

SALT WATER
RECORDING FIELD STUDY MATERIAL

THE BEACH

Date: ____ Time of Day: ____
Weather: Clear-Cloudy-Rain
Warm or Cold: Temperature ____ F

UNDERSTANDING

Materials needed:

1. Tide tables
2. Stakes
3. Tape measure
4. String

Activities:

A. Look at the tide table and determine the present tide position.

Circle one: High Middle Low

1. Try to determine whether the tide is going in or out.

In Out Time: ____________

2. Predict what the tide will be for evening boating. How high or low will it be? Prediction ________

B. Place a stake by the water's edge. Every 15 minutes move the stake so it is at the water's edge again. Measure the distance you have to move the stake each 15 minutes.

Example:

<table>
<thead>
<tr>
<th>Time From</th>
<th>To</th>
<th>Distance Between Stakes</th>
<th>Tide Coming In or Going Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:15</td>
<td>10:30</td>
<td>33 inches</td>
<td>Out</td>
</tr>
<tr>
<td>10:30</td>
<td>10:45</td>
<td>10 inches</td>
<td>Changes from out to in (14:20).</td>
</tr>
</tbody>
</table>
Student Data

Time you begin: _______________ Time you end: _______________

<table>
<thead>
<tr>
<th>Time</th>
<th>Distance Between Stakes</th>
<th>Tide coming in or Going out</th>
</tr>
</thead>
<tbody>
<tr>
<td>From</td>
<td>To</td>
<td></td>
</tr>
</tbody>
</table>

1. After you have gathered all your data, make a graph of the tides movement while you were at the site.

Example:

Began 9:30 9:45 10:00 10:30 10:45 11:00  

Ended 5" 10" 19" 32" 25"  

(14:21).
A. STUDY OF HABITAT

1. Beach Study

Animals of the seashore live in many different places such as under rocks, cling to rocks, in the sand, and in the shells of other animals. See how many habitats you can list.

<table>
<thead>
<tr>
<th>HABITAT</th>
<th>ANIMALS THAT MIGHT LIVE THERE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under the sand</td>
<td>Worm, Ghostshrimp, Clam</td>
</tr>
</tbody>
</table>

(14:22).
Habitats are sometimes changed by nature and by man. However, man has changed the habitat of the seashore animals more than any other thing. List some of these changes by man and nature.

<table>
<thead>
<tr>
<th>CHANGES IN HABITAT</th>
<th>CAUSED BY</th>
<th>HELPFUL OR NOT HELPFUL TO SEASHORE ANIMALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rocks turned over on beach and not replaced</td>
<td>Man</td>
<td>Harmful because it destroys homes of small seashore animals</td>
</tr>
</tbody>
</table>

2. **Conclusion**

How could you improve the habitats of this beach?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Would you consider this beach a good or poor habitat for animals of the seashore? ________________

Why? ____________________________________________________________________

________________________________________________________________________

(14:24).
Date: Time of Day: --- Weather: Clear-Cloudy-Rain
Warm or Cold: Temperature __ F
Tide: In: Out: ---
       Coming in: Going out: ---

B. STUDY OF SEASHORE ANIMALS

1. Beach Study

   Locate and observe as many types of seashore animals as you can find. If you do not know their names, record all other information.

<table>
<thead>
<tr>
<th>SHAPE</th>
<th>COLOR</th>
<th>WHERE FOUND</th>
<th>INTERESTING FEATURES</th>
<th>TYPE OF SKELETON (External Internal)</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gray-Brown Tide Flats Muscular foot External Hinged-Shell</td>
<td>External Clam</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Conclusion

   How many seashore animals on your list have internal skeletons? ____________________________

   How many have external skeletons? ____ How many have neither? ____________________________

(14:23).
C. STUDY OF EDIBLE SEA FOOD

1. Field Study

Many animals of the seashore are good to eat and provide man with much of his food supply. Look for animals or signs of animals of the seashore that would provide food for man.

<table>
<thead>
<tr>
<th>ANIMAL</th>
<th>WHERE FOUND</th>
<th>ABUNDANCE</th>
<th>EDIBILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barnacles</td>
<td>Near shore on rocks and logs</td>
<td>abundant</td>
<td>Poor</td>
</tr>
</tbody>
</table>

2. Conclusions

Where were the most edible animals found? 


What animals were they? 


(14:25)
THE PURPLE SHORE CRAB


2. Move a pencil toward your crab. (Don't hurt him or touch him.) What is his reaction? Do you think he learned this ______________ or was he born with this reaction ______________? Why do you think so?

3. Test your crab's strength by putting a pencil in his claw. Is your crab strong enough to crush a clam's shell? ________ Could your crab crush another crab's shell? ________

4. Put two crabs together. What are their reactions to each other? ______________ Do they want to fight? ________ Do they hurt each other? ________

5. Look at the underside of your crab for mouthparts. How many does he have? ________ How are they like yours? ________ How are they different from yours? ________

(Biologists say that a crab's mouthparts are really legs that have changed and are now used for eating.)

6. Get a piece of clam, oyster, or fish from your teacher. Describe the action of his mouthparts. ________

7. Where on the beach does the purple shore crab live? (Upper _____, middle _____, near the water _____, in the water _____.) Can he stand to live in brackish water (fresh mixed with salt water?) ________

8. Why is it always a good idea to replace any rocks we turn over? ________
Why is it a good idea to fill in any hole we dig on the beach?

9. Why is it not a good idea for people to collect all the pretty animals that they see on the beach and bring them home?

10. Compare your crab with someone else's. Be sure you look at both the tops and undersides. Do you see any difference between male (♂) and female (♀) crabs?

11. Make a drawing that shows a (♂) crab and another that shows a (♀) crab.

12. How does the animal take in oxygen? 
   How do you know? 
   Look at your crab and draw a sketch to show where this happens.

13. How can a crab survive when the tide goes out? 
   Why doesn't he die from lack of oxygen?

14. Test the water to find which area has the best oxygen for your crab to live in.

15. Is there any gas we have to worry about? 
   How would you test for it?

(14:26-27).
BARNACLES

Date:______ Time of Day______
Weather: Clear-Cloudy-Rain
Warm or Cold: Temperature____F

1. Examine a barnacle in its natural environment.
   A. What evidence do you see that the barnacle is alive?

   B. What purpose does the barnacle's shell serve?

   C. How many triangular plates form the barnacle's shell?

   D. Barnacles grow by molting or casting off their old shell. Do you see any evidence of this?

2. Your teacher may remove a barnacle and place it in a tidal pool so that you can observe its feeding habits.
   A. Watch the barnacle closely. What do you see when he opens his shell?

   B. How does the barnacle react when a shadow passes over him?

   C. How does the barnacle react when something touches his feather like arm?

   D. Crush a portion of a clam and very carefully deposit a few drips (use a medicine dropper) of the fluid near a feeding barnacle. Does this increase the action of the arm? Why?
3. Draw diagrams of a resting and feeding barnacle.

4. Your teacher will show you how to make a plankton net and collect some plankton samples.

What is the importance of plankton in the life food chain of a barnacle?

5. Summary questions:

A. Describe the barnacle's habitat.

B. What special adaptations does the barnacle have to its environment?

C. Success of an animal is measured in terms of his numbers and where he is able to live. Do you think this animal is successful? Why?

D. Why does man often consider this animal a pest?

E. In what way is the barnacle useful to life in Puget Sound or the ocean?

F. In what could the barnacle be useful to man?
STUDENT DESCRIPTION OF A SPECIMEN

Area of Study ___________ Student's Name ___________

Specimen (Common Name) (Scientific Name)

Description of specimen—What does it look like, its size, habits and color. Where found? Other things found with it.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

(6:72).

SKETCHES (Scale--Other views)
SUGGESTED SPECIAL PROJECTS

1. Write a myth about how tides might have begun when the world was created.

2. Make a list of the animals you might expect to find in the three beach zones: High beach zone, middle beach zone, and low beach zone.

3. Make a sketch of a beach scene showing animals of the seashore and their habitat.

4. Write a short story about an animal of the seashore.

5. Catch a fish, clean it.

6. Write a story about the adventures of a barnacle.
Date: ____________________
Time of Day: ______________
Weather: _________________

SPECIAL PROJECTS
The purpose of this study was to develop and construct an outdoor education student field study guidebook for the intermediate grades based on the recommendations of the Tacoma School District teachers Outdoor Education Guide; the established student field study guidebooks collected from various school districts in Washington and Oregon; and the survey of the literature pertaining to outdoor education examined in Chapter II.

The purpose in constructing and developing a student field study guidebook was to make the outdoor education program for the Tacoma School District, or possibly other school districts, a more complete and unified program, and a program that would encourage students to achieve the outdoor education objectives.

The method of the study was to send out three different letters requesting various types of information to determine topics that should be included in a student field study guidebook for an outdoor education program. One letter was sent to the State Department of Environmental Education in Olympia, Washington and Salem, Oregon; the
second letter was sent to selected school districts in Washington and Oregon to obtain student field study guidebooks for the intermediate grades; the final letter, which consisted of a survey sheet, was mailed to the teachers and administrators of the Tacoma School District requesting them to recommend the topics that were desirable to include in a student field study guidebook.

The results of this survey indicated a direction that the writer could utilize in compiling an outdoor education student field study guidebook. With this information obtained and summarized, recommendations have been suggested.

II. RECOMMENDATIONS

The conclusion of this study has suggested additional areas that need investigation—the results of which would be an asset to school districts involved in, or embarking upon an outdoor education program. The recommendations for further study are as follows:

1. To conduct a survey of the outdoor education camp directors in Washington to determine a unified job description of qualifications to guide school districts in acquiring camp directors.

2. To develop a program in outdoor education in the form of college courses, school workshops, or ob-
serving and participating in an outdoor education camp for two or more weeks to orientate and train potential teachers preparing to teach in the public school system.

3. To suggest the possibility of formulating a continuous outdoor education curriculum in the form of a guidebook for teachers and students in the intermediate grades.

4. To conduct a survey of the school districts in Western Washington involved in an outdoor education program to determine if there are adequate topics to construct and develop a unified student field study guidebook that can be utilized in all Western Washington school districts.
BIBLIOGRAPHY
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APPENDIX A
APPENDIX A

Letter sent to State Department of Environmental Education
Olympia, Washington and Salem, Oregon

Dear Sir:

I am a sixth grade teacher for the Tacoma Public School District and a graduate student attending Central Washington State College seeking to earn a Master Teacher Degree in Education. I am writing you concerning some very important information that I need to begin my thesis in fulfilling the requirements for the Master Teacher Degree. My thesis topic is entitled "A Field Study Guidebook for Intermediate Grades" which concerns Outdoor Education in the Public School Districts of Washington and Oregon.

Would you please send a list of the school districts and their addresses if possible of the State of Oregon that offer an Outdoor Education Program for the intermediate grades (grades five and six). With this information, I plan to write each of these school districts and request a field study guidebook, if they possess one. The information gained from these various guidebooks will be very valuable in helping me to compile a field study guidebook for the Outdoor Education program in Tacoma, Washington.

If there are any questions you would like to ask me, please feel free to ask. If there is any advise you would like to render, please feel free to do so. Thank you very much for your time and your consideration.

Respectfully yours,

James Asmussen
Puyallup, Washington
APPENDIX B
APPENDIX B

Letter Sent to School Districts Requesting Copies of Their Outdoor Education Field Study Guidebook

Tacoma Public Schools
Administration Building: Tacoma Avenue at So. Eighth
P. O. Box 1357    Tacoma, Washington 98401    Fu. 3-1811

Dear Sir:

We are cooperating with James Asmussen, a graduate student attending Central Washington State College, who is writing a thesis in fulfillment of the Master Teacher's Degree by the summer of 1970. He is a sixth grade teacher for the Tacoma Public School District. On the recommendation of the State Department of Education, we are writing you concerning some very pertinent information needed for his thesis topic, a field study guidebook for outdoor education.

The purpose of the study is to develop and construct an intermediate (fourth, fifth and sixth grades) outdoor education field study guidebook for the Tacoma Public School District based on research from various school districts that are involved in an outdoor education program and have a field study guidebook.

We would appreciate a copy of your outdoor education field study guidebook if your District has one available. The guidebook would greatly help in determining topics to be used in developing a student field study guidebook for the Tacoma School District.

Thank you for your time and consideration. If there is a charge, please indicate. Mr. Asmussen will be happy to send you a copy of his research when it is completed.

Sincerely,

Bertrum O. Myhre
Administrator for Elementary Education

James Asmussen, Teacher
Park Avenue Elementary School
APPENDIX C

Letter and Survey Sheet Sent to Teachers and Administrators in the Tacoma School District

Dear

I am a sixth grade teacher at Park Avenue School. Presently I am working toward completing my Master's Thesis this summer at Central Washington State College. My thesis project consists of developing an outdoor education field study guidebook for one week of resident camping.

In constructing such a field study guidebook, I would greatly appreciate your consideration in helping me to select those topics to place in such a guidebook. The administration at Central have been very helpful in allowing me to make such a survey among the sixth grade teachers and administrators of Tacoma, as the findings may be a direct benefit to them in the outdoor education program.

The following topics have been selected and screened from a number of outdoor education field study guidebooks that were developed by other school districts in Washington and Oregon. Each of the following topics may be judged on the basis of camp facilities available at Camp Timberlake or Camp Calvinweed.

Please rate the following items in terms of their importance for this particular area. Circle the desired number with one (1) meaning least desirable, and five (5) meaning most desirable to include in a field study guidebook.

Respectfully yours,

James Asmussen

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VII. Wildlife Study (Invertebrates and Bertebrates) - - - - - - - - 1 2 3 4 5
VIII. Soil Study - - - - - - - - - - 1 2 3 4 5
IX. Geology (Study of Rocks) - - - - - 1 2 3 4 5
X. Marine Life Study - Salt Water Study - - - - - - - - - 1 2 3 4 5
XI. Stream Study - Fresh Water Study - - 1 2 3 4 5
XII. Map and Compass Training at Camp Site - - - - - - - - - - 1 2 3 4 5
XIII. Insect Study - - - - - - - - - - 1 2 3 4 5
XIV. A Study of the Weather - - - - - - - - 1 2 3 4 5
XV. A Study of Water - - - - - - - - - - 1 2 3 4 5
XVI. Daily Log of Each Days Activities - - 1 2 3 4 5
XVII. Creative Writing Section of Each Day's Activities - - - - - - - - - 1 2 3 4 5
XVIII. Conservation Study - - - - - - - - - - 1 2 3 4 5
XIX. Bog Study - - - - - - - - - - - - - - - - 1 2 3 4 5
APPENDIX D

RESPONSE TO FIELD STUDY GUIDEBOOK TOPICS

Each of the topics below has been selected and screened from a number of outdoor education field study guidebooks that were developed by other school districts in Washington and Oregon. The following items were rated in terms of their importance for this particular study. The desired numbers were circled with number one meaning least desirable and number five meaning most desirable with all numbers between one and five representing degrees of importance.

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