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ABSTRACT

The program planning guide for ornament horticulture was written to assist Applied Biological a Agricultural Occupations (ABAO) teachers in enriching e programs and/or to provide the basis for expansion of o include additional materials for the cluster areas of a floriculture, greenhouse operation and management, land nursery operation and management, and turf management. includes the following components: an introduction (bri of the subject matter); sample job titles and cluster a job titles, D.O.T. numbers, O.E. numbers, and informati salaries, educational requirements, and career advancem opportunities); competencies for cluster areas and for stated as behavioral objectives; a core course outline representative sample of how a curriculum should be con including references); sample teaching plans designed f days in length (comprising cluster areas, unit titles, a brief introduction, student performance objectives, a outline of instructional content, learning activities, materials and equipment, and student references). Also specific and selected references; a brief description o facilities; lists of equipment, supplies, and audiovisu and a partial list of ways to increase teacher competen

MANAGEMENT BY OBJECTIVES

AND

PROGRAM PLANNING AND BUDGETING SYSTEMS:

A Guidebook for Developing

A Model Local Annual Plan

and

A Model Local Five-Year Plan

For Vocational Education

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CONTENTS

PREFACE

This guidebook is intended to acquaint vocational educators with two specific management strategies: Management by Objectives (MBO) and the Program Planning and Budget System (PPBS). The long range goal of this project is the formation of a model local annual plan and a model five year plan for vocational education in local districts and schools throughout the state of Indiana. For this purpose, it will be necessary to examine the theoretical bases for MBO and PPBS as well as to develop detailed, practical steps for implementing the systems on the local level.

Chapter I presents the rationale for the development of the MBO system, and examines its benefits and pitfalls. Chapters II through V detail the theory and practical application of the four phases of Management by Objectives. Chapter VI defines PPBS and discusses its advantages and disadvantages.

It is our hope that, through familiarity with the concepts and skills of MBO and PPBS, school administrators will strengthen their forward-thinking approach to vocational educational planning, and these attitudes and skills will not only promote greater growth on the part of students, but also contribute to the increased personal efficiency and enthusiasm of individual vocational administrators themselves.

CHAPTER I

ORIENTATION TO PLANNING

Since the launching of Sputnik in 1957, our country's leaders have often and emphatically noted the need for more individuals with higher levels of technical skills. The Vocational Education Act of 1963 and the subsequent Ammendments of 1968 have also underscored these manpower needs. Recent mandates for state and local vocational educational evaluations call for ways of determining whether the intentions of this legislation are being met. These phenomena have led to a growing interest in MBO and PPBS as means of developing quality programs to meet increased manpower needs.

In recent years, MBO has captured the imagination and support of many top managers as they attempt to respond to the nation's changing needs. Governmental agencies and school districts are beginning to adopt the system as a means of improving their environments. MBO is also in use in territories as varied as North and South America, Africa and Europe, and in both small family concerns and giant public corporations. In spite of the setbacks experienced in the implementation of such a newly developed system, Management by Objectives has matured steadily in its philosophy and techniques.

MANAGEMENT BY OBJECTIVES DEFINED

Management by Objectives is a strategy of planning and getting results that integrates two processes: (1) achieving the administrative and edu-

cational goals of the institution and (2) fulfilling the needs for job satisfaction and self-development on the part of individual administrators and staff members. MBO is a means of gearing the individual plans and needs of administrators and staff towards the accomplishment of large-scale institutional objectives within a specific period of time. There are four basic characteristics which distinguish the Management by Objectives system:

1) The statement of objectives. These are statements of important results that are planned and expected to happen. Results may be phrased in terms of student or ogranizational performance. Statements of objectives evolve from an assessment of student and community needs and commitments to meet these needs.

2) Creation of Time Strategy. Time strategy is the timetable by which individuals and school administrators are to achieve long and short range results. It is the "when" portion of the objective and sets forth a deliberate coordination of resources within the calendar. Time strategy calls for administrators to propose, initiate and complete activities at designated periods of time.

3) Involvement of total administration and staff. MBO requires a formalized effort to involve each individual administrator and staff member and coordinate his contributions toward a common goal. The system brings together resources (people and equipment) to carry out the school district's functions.

4) Stimulation of Individual Motivation. Individual administrators and staff members participate in the objective setting process. Such involvement helps develop the desire and willingness to achieve the objectives stated.

MBO AS A FOUR PHASE PROCESS

In practice, Management by Objectives consists of four main phases that are carried out in a specific order. Of course, many additional steps may be required, and these are incorporated as necessary during the four main phases, which are:

Phase I. Determining local school district goals and commitments which are summarized in the MISSION AND ROLES STATEMENT (Chapter 2);

Phase II. Setting and validating OBJECTIVES (Chapter 3);

Phase III. Implementing the objectives by means of an ACTION PLAN (Chapter 4);

Phase IV. Evaluating results and reporting the status of objectives by means of a PERFORMANCE APPRAISAL (Chapter 5).

One can readily see that MBO is, in effect, a return to the fundamentals of good general administration; however, it is more than just another planning system or better in-service training. Management by Objectives offers the following special advantages:

a) MBO gives us insight into the relationships and the inter-dependence of existing management methods. For example, a school district

may have both stated objectives and administrative development programs, but the two are often unintegrated.

b) MBO may provide the stimulus for school administrators to challenge their habitual assumptions and practices. Quite frequently school districts and administrators operate within the self-imposed constraint of "we've always done it this way."

c) MBO can enable school administrators to improve their performance by creating a demanding environment and a set of comprehensible, down-to-earth techniques to help achieve their goals.

d) MBO can help draw together, in a practical way, the results orientation of the "quantitative school" and the teamwork and motivational concepts of the behavioral scientists.

e) MBO can foster the development of a vital, forward-looking, and mutually supportive spirit in an organization.

CHARACTERISTICS OF EFFECTIVE MBO PROGRAMS

When an effective system of Management by Objectives is operating in a school district, there is a continuous process of:

1. Critically reviewing and restating the school district's strategic and tactical plans.
2. Clarifying key results and performance standards with each staff member and gaining his contribution and commitment to these.
3. Reaching agreement with each staff member on a job improvement plan which makes a measurable and realistic contribution to the department and school.

4. Providing conditions in which it is possible to achieve the key results and improvement plans.
5. Using systematic performance reviews to measure and discuss progress towards results, and reviews to identify personnel with potential for advancement.
6. Developing administration in-service training plans to help each administrator and staff member overcome his weaknesses, build on his strengths and accept responsibility for self-development.

MBO AND ADMINISTRATIVE CHANGE

MBO should be embarked upon only in a district or organization that demonstrates a total commitment to professional management and therefore to intensive management education. In an age of high technology and rapid change there is little tolerance left for amateurism in any field, especially in the field of education. The "seat-of-the pants," "catch-as-catch-can" approaches to management of the last generation of administrators are no longer acceptable. Because of its proven usefulness in providing professional administrators with an effective system of management, MBO has become the most widely used system today.

Within recent years it has become evident just how revolutionary MBO can be, as educators begin to realize the system's implications for performance, for results, for organization, for planning, for communication, for evaluation, and other aspects of school administration. MBO means replacing the archaic management system inherited from the industrial period

(1800-1950) by a new system now emerging for the post-industrial period (1950-2000). The radical differences between the two systems can be enumerated thus:

	Traditional Management		MBO
1.	Day-to-day managing	1.	Future-focused managing
2.	Amateur, seat-of-the-pants management	2.	Professional management
3.	Authoritarian style	3.	Participative style
4.	Activity-centered style	4.	Goal-directed, results-seeking style characterized by purposefulness and planning
5.	Emphasis on administration of routines	5.	Emphasis on stimulating innovation
6.	Emphasis on <u>how</u> to do it	6.	Emphsis on <u>what</u> to do
7.	Administrative reliance on money, machines and materials	7.	Reliance on men, minds, methods
8.	Emphasis on centralized, technocratic, functional control	8.	Emphasis on decentralized initiative
9.	Reliance on directives and supervision	9.	Reliance on delegation and reporting
10.	Promotion of individualism	10.	Development of team work

MBO AND COMMUNICATION

Few elements of school administration have generated the amount of concern, worry, work or writing as has the area of communications. In view of the complex nature of the demands placed upon a school administrator, this is not surprising. Through years of our sincere efforts to educate

children, we have come to realize the fact that communication is the key factor that can help keep purposeful and relevant activities focused on the child and his needs. Furthermore, it is the key element that can keep the crucial parts of a school organization functioning together.

Throughout the past two decades, considerable attention has been given to the subject of communication by the behavioral scientists. Through their efforts, a large variety of approaches ranging from non-directive counseling to sensitivity training have been developed to facilitate more open and growth-producing forms of communication.

However, while much attention has been given to issues dealing with how to communicate, little focus has been given to what should be communicated. MBO is concerned with the what problem. There are two basic issues that people have to (and want to) communicate about: (1) what they are required to accomplish and (2) whether they have been successful in accomplishing it. Dialogue between the MBO administrator and subordinates is characterized by the following dynamics: (1) high levels of empathy and concentration, (2) increased involvement of both parties, and (3) greater commitment to the subject under discussion. Under the MBO system this "dialoguing" is commonplace from top to bottom of the organization. It is within this setting that one finds an atmosphere charged by a sense of commitment, purpose and direction.

PITFALLS IN MBO

Many articles have been published presenting some of the pitfalls of

introducing MBO into an organization. For example, difficulties frequently arise when Management by Objectives is over-emphasized as being chiefly for administrators, thus preventing its acceptance by others who might also benefit from the system.

Another common distortion of MBO is its use as a means of performance appraisal. In a number of cases, well-intentioned but poorly informed governmental agencies have sold their colleagues on the idea of introducing MBO as a technique of personnel evaluation. It should be emphasized that MBO is primarily a way of managing and only very incidentally a new way of performance appraisal. Perhaps the main cause of this error lies in a lack of understanding of and/or interest in school administration problems.

Authorities on MBO also emphasize the point that this system requires fundamental changes in attitudes and approach and that the price to pay in time and effort is great. Furthermore, it must be acknowledged that unless the top administrative staff manages by objectives, it is difficult for lower echelons to both relate effectively with the top and to apply the MBO concept.

Another aspect of MBO which is sometimes criticized is its stress on delegation. Administrators often object to delegation on the grounds that "it is quicker to do it yourself." This may be true, but only until subordinates have learned how to perform delegated tasks. Then it is quicker to delegate, thus freeing the administrator for his own work of planning, organizing, innovating, etc. However, effective delegation presupposes that

the administrator and the subordinate share the same objectives. This aspect of MBO will be discussed thoroughly in Chapter III.

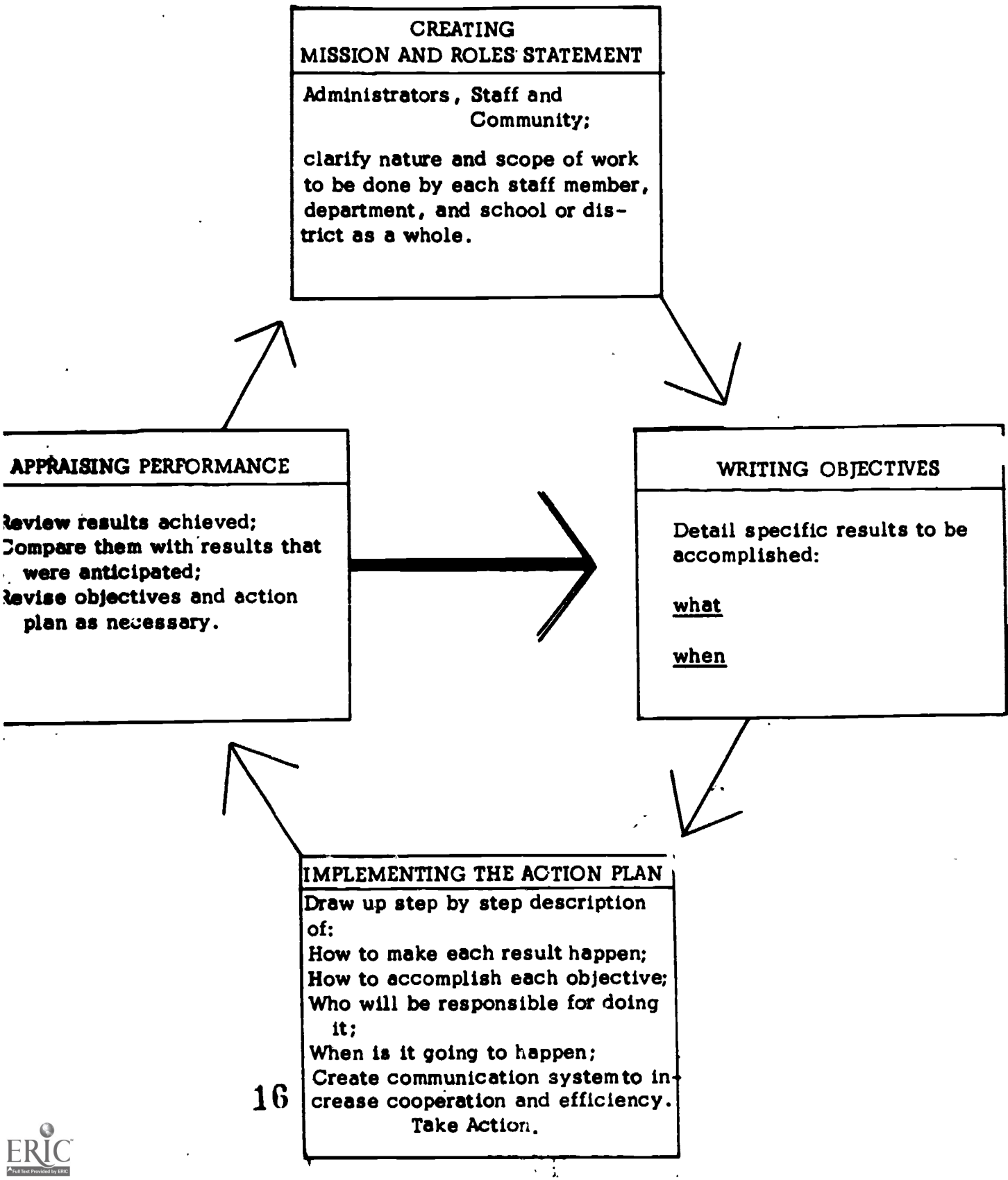
SUMMARY

Management by objectives attempts to integrate the school district's objectives for more student learning and growth with the need for personal satisfaction in the part of its administration and teaching staff. Although the techniques of MBO are continually being improved, they have already demonstrated high levels of effectiveness. New insight is being gained into the interdependence of the techniques viewed as a total management system in the context of a changing educational and world milieu. Above all, it is becoming increasingly evident that the real key to success in education is the more efficient use of human resources. The talent and drive are there; all that is required is the system to release them.

FIGURE #1

SCHOOL MANAGEMENT BY OBJECTIVES

PROCESS CHART



CHAPTER II

ESTABLISHING THE MISSION AND ROLES STATEMENT

Management by Objectives begins with a systematic identification of the basic functions to be performed by a corporation, district, school, department or staff position. This determination of goals and commitments is called the Mission and Roles Statement. It is a statement of the reasons for which the organization exists and of the work for which it is accountable.

The Mission and Roles Statement is the foundation for the specific objectives and action plans that will be established later. It is through the M&RS that the validity of objectives is determined. The M&RS describes both the overall purposes of the organization and those of each department and staff position, thus providing a mechanism for coordinating the total organization and helping to define how each part fits into the total system. On the individual level, the M&RS clarifies the scope of duties and responsibilities of each staff position. It encourages an administrator or staff member to examine his unique contributions to the total process. On the level of the school or district, the M&RS identifies the nature and scope of the work to be done, and distinguishes which services and activities will receive major focus.

Before a school district can write meaningful, measurable objectives, district personnel must arrive at an understanding of the mission and roles to which they are committed. The failure to do so will result in objectives

which are not specific and not responsive to the real needs of the school, department or total district. It is through the establishment of a clear and accepted Mission and Roles Statement,therefore, that the school district creates a solid foundation for the remaining phases of the Management by Objectives system.

EXAMPLES OF MISSION AND ROLES STATEMENTS

A. Mission and Roles for Director of Counseling and Guidance, _____ School District:

To promote the efficient functioning of all the services directed toward the total growth and development of all students of the _____ School through the Counseling and Guidance Department in the following specific areas:

1. Group Counseling: Schedule students for group counseling to assist them in solving problems related to their present and future lives; help students develop greater self-understanding, self-acceptance and self-direction; help each group member understand the mechanisms of the group and ways of gaining acceptance.
2. Individual Counseling: Help the individual student gain more understanding of himself, his values, attitudes and needs, and thus to become more mature and productive.
3. Career and Vocational Guidance: Assist students in utilizing their potential and in selecting meaningful goals by means of field trips, visits to community agencies, conver-

sations with employees, career days, guest speakers and visual aids.

4. Teacher-Counselor-Parent Consultation: Consult with parents; make test interpretations; consult on college placement; advise teachers; inform parents of children's needs; program workshops; direct college and work placement.

5. Testing: Administer college entrance tests; score, interpret, diagnose these and other tests of interests and abilities; conduct vocational analyses and reading tests; make referrals to special services.

6. Scholarship and Financial Aid Information and Placement: Assist students in understanding of procedures for making applications and planning finances in order to further their education, to pursue trade careers, or to acquire part time employment; organize work-study programs; present programs by college placement officers.

7. Follow-up and Referral Work: Help in meeting special needs which require referral to other specialists or community agencies; keep records of graduates; make curriculum evaluations, market analyses, and recommendations based on these.

B. Mission and Roles for _____, Principal of _____ School:

To promote the efficient functioning of services directed toward the total

growth and development of all students of the _____ School.

Major areas of responsibility:

1. Students: Provide guidance and counseling; determine p' ce-ment and promotion; confer with students regarding educational problems; assist students and teachers with new programs; write reports and evaluations; supervise attendance and child welfare.
2. Educational Program: Assist in designing curriculum according to the needs of the students; create optimal learning climate; schedule classes; obtain and allocate materials; initiate and conduct staff meetings; evaluate program effectiveness.
3. Teachers: Create effective climate with staff; help all teachers carry out their teaching responsibilities; confer with teachers regarding personal problems; make evaluations and reports; facilitate communications; support in-service activities.
4. External Relations: Confer with community sources; communicate and consult with parents; work with institutions of higher education.
5. Central Administration: Maintain communications system regarding school activities and programs; obtain approval for new policies and procedures; arrange for personnel, services and materials.

6. Operations: Maintain school accounts; manage custodial staff; check attendance; maintain cafeteria; collect fees; administer extra-curricular activities.

7. Professional and Peer Relationships: Develop involvement in professional associations; participate in research activities; assist with local and state committees and meetings.

ADVANTAGES OF ESTABLISHING MISSION AND ROLES STATEMENTS

There are a number of definite advantages that result when a school district, school, or department establishes a Mission and Roles Statement. The basis of everything that is done in the organization rests with a clear Mission and Roles Statement. Within this framework individual and departmental responsibilities become crystallized, and the contributions of all segments of the school district are examined and, where necessary, revised.

With the establishment of the M&RS, an organization may increase cooperation and communication among staff members, thus facilitating higher levels of learning. The organization becomes better able to clarify the focus of the curriculum, the services to be provided and the relationships and responsibilities that follow.

With the development of a Mission and Roles Statement, duplication of roles, activities, and assignments may be reduced,eliminating much confusion and waste that are common in organizations without such established missions. The mission statement helps meet all important needs within all departments of the school system. Under this arrangement, all

important tasks are identified, assigned and carried out. In addition, a clear M&RS will reduce the possibility of assigning a department or an individual to inappropriate work areas.

SOURCES OF DATA FOR MISSION AND ROLES STATEMENTS

A local school district must develop Mission and Roles Statements that are concerned with two important categories: (1) students and, (2) the system. The students should be given primary importance since they are the fundamental basis for our schools. Focusing on the student and on desired learning outcomes can provide a framework for objective-setting. Chapter III will expand on the process of developing student-centered objectives. Other portions of the Mission and Roles Statements deal more directly with questions such as how the school or district's various departments, offices, and support programs can assist in accomplishing the student-centered objectives. System-centered objectives may be developed for each of the following functions of the school:

1. Philosophy and objectives	2. Curriculum
3. Instructional staff	4. Administration
5. Physical facilities and equipment	6. Instructional materials and supplies
7. Guidance program	8. Student organizations
9. Community involvement	10. Advisory committees
11. Students with special needs	12. Occupational experience

OBTAINING DATA

Each school district has information and data which can be useful in beginning to develop the Mission and Roles Statement. Local school districts as well as departments within the system may obtain previous North Central Association evaluations, as well as statements from other districts. A district's Board of Education may wish to develop a draft of Mission Statements and provide these statements to various individuals and community groups for reactions and suggestions. Another approach might be to organize a series of "open-ended" meetings with various community organizations. These meetings could be organized to determine student and system needs and their priorities.

Since the school's graduates will ultimately become a productive part of their community, it is important that the school district and all departments seek the advice and counsel of various publics and clients of the district (students, parents, lay citizens and employers). Given the diversity of the many school districts throughout the State of Indiana, there is no "one right way" to achieve community involvement in this process. Therefore, a local school district should ask itself the following questions in determining the most appropriate means of setting Mission and Roles Statements:

1. Who are the different clients and publics?
2. What kind of vehicles can we develop that will allow clients and publics a voice in this process?
3. Should we establish different avenues for different groups?

It is essential to provide opportunities for district and community representatives to participate in this M&RS process. Several techniques are presented here as suggestions for community involvement in determining Mission and Roles Statement.

1. Special surveys might be administered to various groups in the district and community.
2. A sample of the community might be interviewed by the district staff.
3. The local school district or school might sponsor a series of special public meetings to solicit community advice.
4. An advisory council for district planning and development might be established.
5. Community representatives might present their ideas of Mission and Roles Statements to the local school board.

RESPONSIBILITY FOR WRITING MISSION AND ROLES STATEMENTS

It would probably be most desirable if the school district as a whole could provide the leadership to deliver a clear and comprehensive outline of the Mission and Roles Statement. This system might then provide the framework for Mission and Roles Statements for all subordinate units in the school district. However, often no district-wide statement exists. Each department and its administrative staff must assume the responsibility for developing its own statement. A draft of the M&RS should then be presented to the school board, staff and community for their review and

reaction. In the event that there are substantial reactions or criticisms, the goals should be modified and again submitted for review.

Each administrator and staff member involved in the process of preparing a M&RS should be forewarned of the substantial time and effort required. They should also be encouraged because, despite the often frustrating, tiresome and time-consuming tasks, the process is an essential and invaluable phase of the Management by Objectives system.

When one is preparing the M&RS it is important to include all the major commitments or responsibilities of each staff position or department. The work for which each one is accountable should be clearly and briefly stated, with an attempt to eliminate inconsistencies or duplication of roles. Finally, the unique contribution of each administrator and staff member should be related as much as possible to the school-wide or system-wide M&RS.

The following sequence of activities is suggested as a workable procedure for developing an M&RS suitable for local conditions:

Step 1: Obtain existing needs analysis information from all the appropriate sources in your community. Some of these sources might include administration and staff surveys, meetings with community groups, recommendations developed as a result of previous North Central evaluations and special advisory councils.

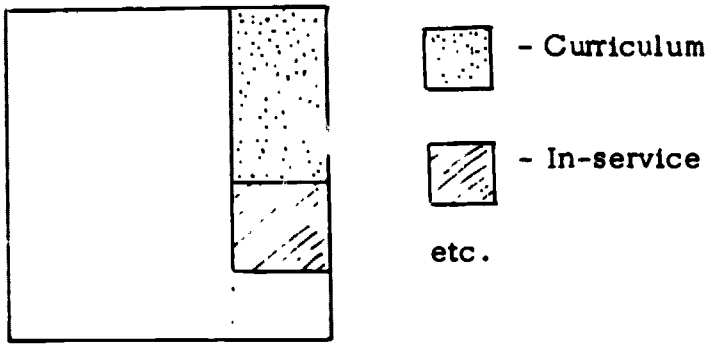
Step 2: Arrange information from Step 1 in appropriate categories, e.g., "Student Needs" and "System Needs."

Step 3: In writing the Statement, start with the phrase: "To promote the efficient functioning of the services directed toward the total growth and development of all students of the _____ School by _____ _____." Here one summarizes in one or two statements the nature or scope of his work as a director, principal or coordinator. For example, a director of vocational education might add: "by directing the vocational services in the following areas." Then he would list the individual work areas or services and what is done in each. If one is not an administrator of a group, but rather an individual contributor concerned with providing direct services, one may simply state, for example, "by performing the following services" and then list the services provided.

Step 4: The next task is to clarify the total scope of each job and its key areas for results. Several important steps must be included in this stage:

A. Divide the overall job into sub-areas as follows:

YOUR JOB



Identify all key areas of the job. These probably range from 6 to 15 key areas in total.

B. It is very important to cover both what these areas are as well as what they should be. If there is a need for another service or key area for results, include it with those already listed.

C. Label each key area as indicated. Usually a noun may be used to label each part of the job. Limit the labeling to one or two words. (Use Worksheet #1, in Appendix A.)

D. Once each key area has been identified, describe it in a few sentences. See the examples provided earlier on pages 12-15. Notice that phrases after each key area describe the work performed and the accountability for each.

E. You are now ready to review and rank the key areas for results. This may be done by placing the most important key areas first, followed by areas that are less important. (Use Worksheet #2, Appendix B.) After this ranking, you may rewrite your M&RS and proceed to Step 5.

Step 5: Present M&RS to other administrators, professional and non-professional staff, and the public for review of priorities, responsibilities and opportunities for improvement. Attempt to reach a consensus on these.

Step 6: Make necessary changes to establish proper priorities of key

areas and responsibilities as a result of information and recommendations in Step 5.

Step 7: Present your reviewed M&RS to your supervisor. The aggregate statements may be presented to the school board for review and adoption.

Step 8: The M&RS may be re-evaluated, modified or improved whenever necessary, and should be reviewed on a regular basis.

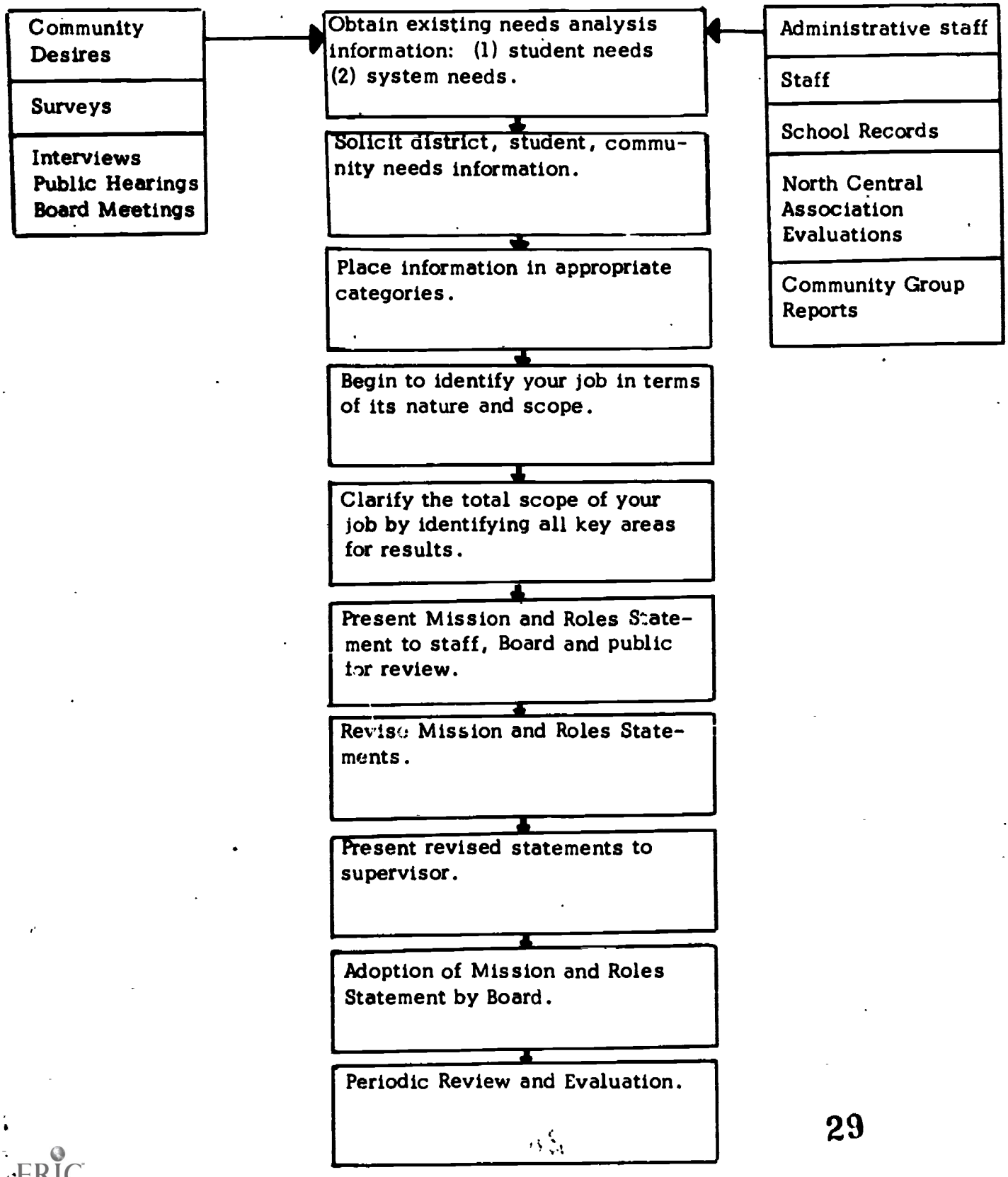
SUMMARY

This first phase of MBO identifies the areas of responsibility that are critical to the long range success of the school district. These are broad areas, including such functions as curriculum development, in-service activities, fiscal policies and learning evaluation. As these key areas for results are defined, it is necessary to specify performance measures for each one. For example, in the Mission and Roles Statement for a Vocational Education Director, curriculum development may be measured by program quality and quantity, and by test scores; student selection may be measured by enrollment data, graduation totals and results of employer questionnaires; and operational liasons with business and industry, by the number of contacts made, services provided and new programs developed. Chapter III will discuss in detail the next phase of MBO, setting objectives that serve as standards against which performance is measured.

FIGURE #2

THE STRATEGY:

NINE STEPS FOR DEVELOPING THE MISSION AND ROLES STATEMENT



CHAPTER III

INTRODUCTION TO SETTING OBJECTIVES

The central process in Management by Objectives is setting objectives, that is, determining the key results to be accomplished within a specified period of time. By drawing up the Mission and Roles Statement, the school administration, staff and community have obtained a picture of where the school should be going and of how well the school is currently performing in relation to its goals. Noting shortcomings in current performance helps to identify existing needs from which objectives are formed. Each department within the school system can then proceed to develop specific statements of who will accomplish what by what date in order to attack the problems and reach the goals implicit in the M&RS.

THE NEED FOR OBJECTIVES

The assumption that every school administrator knows exactly what he is trying to achieve is often incorrect. It is quite common for directions of pursuits to get lost in the shuffle and bustle of the many demanding and anxiety-provoking duties of school administration. Consequently, administrators need to keep clearly in mind both objectives and the steps necessary to achieve them.

To accomplish this, an administrator must first determine his mission within the organization: For what is he really accountable? The answer to this question constitutes the Mission and Roles Statement, which must then be translated into specific, realistic and measurable objectives.

These objectives, in turn, play a role in the accomplishment of the objectives of all other departments and of the school or system as a whole.

PEER OBJECTIVE SETTING

Peer objective setting means that the individuals at a given organizational level, whether it be the top-level administrative staff or peers at considerably lower levels, develop their objectives together. Several major benefits appear to result from such an approach. First, peers (school principals, for example) may be in a position to give a particular manager unbiased viewpoints of those things to which he should be applying a major portion of his time, and they may be able to suggest solutions to recognized problems. Second, individuals in a lateral relationship often develop clearer mutual understanding than do non-peers. Finally, by working out their objectives together administrators in a given organization may reach a better mutual understanding of how their various activities interrelate and how their efforts should be integrated for the good of the over-all school system.

GUIDELINES FOR CAREFUL FORMULATION OF OBJECTIVES

I. Characteristics and content of an objective:

1. An objective is an important result to be achieved.
2. It is written so it can be analyzed and reviewed from time to time.
3. In each objective, only one big result is identified, covering the what that is to be achieved.
4. Objectives may also include who is to be involved, such

as 'students in grades 6-9."

5. Objectives are written forcefully, using such terms as "achieve, completely and replace." The terms suggest performance stretches.

6. Each objective is stated concisely, briefly and in terms of the measurable quantity and quality of the end result.

7. All objectives are written to meet school district requirements for organizational improvements such as curriculum improvements, research, in-service training for personnel, student counseling, and return on investment.

8. Each objective may be assigned a risk factor to indicate the level of confidence about its completion.

9. An objective is written so as to be significant and perhaps even critically important to the individual who is responsible for carrying it out.

10. All objectives are designed as a commitment between the administrator or staff member and his supervisor.

11. Objectives are written with emphasis on opportunity, setting a climate for a leap forward in performance and improved results for the individual and the organization.

12. Objectives should be written in quantifiable terms that are easily measurable and hence easily reportable.

13. Each objective is communicated to superiors as well as subordinates. This is a vital part of the M B O system

and is given major consideration during in-service training.

To write an effective and meaningful statement of objectives appears quite simple. However, without adequate training, people often write only fuzzy collections of commitments that ultimately result in misunderstandings and considerable confusion. While fuzzy statements may comfort those who wish to avoid commitment, they do not provide an adequate description of results to be achieved, nor do they suggest a guide to action.

Robert Mager has drawn up two lists of words contrasting vague, unhelpful language with terminology that is more precise and constructive:

Words Open to Many Interpretations	Words Open to Fewer Interpretations
to know	to write
to understand	to recite
to really understand	to identify
to appreciate	to differentiate
to fully appreciate	to solve
to grasp the significance of	to construct
to enjoy	to list
to believe	to compare
to have faith in	to contrast

Besides being written as concretely as possible, objectives must reflect consideration for the people involved in them: what they think and how they feel. It is important to remember that people of varied backgrounds are involved. Two-way communication is essential in the objective setting process.

METHODS FOR QUANTIFYING OBJECTIVES

Useful objectives are written in specific, concrete terms. Because staff objectives cannot always be completely quantified, it is easy to lapse into vague but expedient generalities. Such relative terms, called "motherhoods," have a tendency to creep into statements of objectives because they sound appropriate, are readily acceptable, and frequently offer a comfortable distance and range. Even though "motherhoods" may be an acceptable part of our day to day language in school administration, they are not acceptable in a statement of objectives. Here are some examples of the kinds of phrases to avoid:

"Achieve greatest educational efficiency. . ."

"Improve administrative effectiveness. . ."

"Attain greatest achievement possible . . ."

"Gain reasonable improvement . . ."

"Render better educational service . . ."

"Improve educational conditions . . ."

"Increase reading levels . . ."

"Accelerate learning rate . . ."

"Decrease drop out rates . . ."

"Maintain morale and attitude . . ."

ELIMINATING GENERAL TERMS IN OBJECTIVES

The following guidelines might be of value in eliminating generalities from statements of objectives:

Avoid: Oversimplifications; opinions subject to change; sensational terms; understated or overstated words; exaggerations; inexactness; terms that can take a range of meanings.

Use: Words that describe how much; terms that can be proven or demonstrated; precise terms identifying actions that can be controlled and measured; terms that lend themselves to clarification by numbers, rates, percentages, averages, index numbers, correlations, and standard deviations.

Objectives must be quantified. Stating the quantity of results -"how much"- is just as important as describing the type or kind of results. Quantified objectives include measurable points built into the written formal statement and specify both the quantity of results expected and the period of time in which they are to be achieved. The more concrete information a school administrator can build into his objective statement, the more likely it is that he will be able to achieve a real meeting of minds among the individuals involved in the project.

ADVANTAGES OF QUANTIFYING OBJECTIVES

1. Quantified objectives define and clarify the elements of expected results better than any verbal description could.
2. Quantified objectives provide a built-in measure of effectiveness. Using a measure to describe a future result also provides a way of measuring the current

activities that will make it happen.

3. Quantified objectives can be enlarged or reduced for progressive performance stretches. This is not possible with vague verbal descriptions.

4. Quantified objectives lower the limits of the unknown. The quantitative feature also helps us see the effects the result will have on other areas. For example, to reduce the drop-out rate from 175 to 25 implies a need for better methods of student supervision and drop-out identification. If training is necessary, the objective should tell how much it will cost, when it can be conducted, and what the program will consist of.

LIMITATIONS OF SETTING QUANTITATIVE OBJECTIVES

1. Numbers can be misleading and suggest a precision that does not exist. Furthermore, numbers may be over-simplified.

2. Mathematics, statistics and other quantifying techniques are not always known by the average person. Those who do not understand these techniques may regard this quantified statement as impractical or too theoretical.

3. It has been suggested that quantification of human judgement is not possible. In this context, critics

of MBO add that the mechanical manipulation of numbers is no substitute for intelligent, mature and experimental decision making.

4. A final limitation is concerned with the difficulty of quantifying certain areas of behavior and leadership. How does one measure qualities such as sincerity, open-mindedness, integrity, impartiality, and tactfulness, which are known to be important elements in achieving results? A response to this problem would be to look upon these qualities as objectives, and to use performance indicators of some type to assess the acquisition of such qualities. For example, a training skill can be measured by before and after examination scores.

While these limitations are significant, they do not outweigh the advantages and benefits offered by quantification. Objective statements must be formulated carefully with built-in means of measuring results.

DETERMINING THE NUMBER OF OBJECTIVES

The number of objectives to pursue during a given period of time varies with different districts, schools and departments. Different community expectations, occupational interests, available resources, and traditions will cause corresponding differences in the number and type of responsibilities which the school superintendent, vocational education director, and school principals must manage within their organizations. The impor-

tance of achieving the same objective may vary with the school district. An inner city school principal may give great importance and devote long-term time strategy to objectives for solving the critical reading problems in his school. On the other hand, a suburban school principal might give a time limit of one year for objectives dealing with reading problems of his students. Most school districts will agree on certain key areas in which objectives should be specified. However, few will agree on the importance to be assigned to each of the key areas within a given period of time. The most suitable number of objectives will be unique to each school district, school and department because each situation differs in the type and number of improvements that must be made within a period of time.

The beginning practioner of Management by Objectives will tend to adopt a great number of objectives, thus diluting his efforts and spreading himself too thin. The number of objectives should be small but significant in terms of results for the enterprise and the individual.

CHARACTERISTICS OF ACCEPTABLE OBJECTIVES

If the Management of Objectives approach is to be effective, objectives must be structured along certain definite lines. In reading the following sample objective statements, ask yourself whether the objectives and results are

1. Significant - having a major effect on educational improvement;
2. Scheduled - stating starting and completion dates;

3. Measurable - considering all possible quantitative and qualitative approaches;
4. Programmed - for the department and the individual;
   a. personnel - considering staff capabilities;
   b. materials - taking into account supply and cost;
   c. coordination - remembering flexibility and timing;
   d. administrative goals - recalling educational needs;
   e. cumulative processes - being consistant with the Mission and Roles Statement;
5. Realistic - attainable, but not so easily attainable that they generate complacency.

This list of poor and better sample objectives covers many crucial areas of a school organization such as personnel, vocational education, curriculum, and pupil personnel services. It is important to remember that objectives must be specific and must be stated in terms of what must be accomplished and when it must be completed. As much as possible, objectives should be quantified, that is, written in terms of test units, units of production, dollar volume, and the like.

1. Overall School District

   Poor - Achieve a substantial increase in reading achievement by January 1, 1974.

   Better - A total school individualized reading program will be developed by January 1, 1974.

   (Specify <u>what</u> is to be accomplished.)

Poor - To make a reduction in plant heating operating costs.

Better - A plan to reduce total plant heating and electrical costs by 20 percent will be developed by March 15, 1974.

(Be more specific and include the <u>when</u>.)

2. Personnel Objectives

Poor - To reduce substantially recruiting costs.

Better - A plan to reduce the cost of recruiting each new teacher from $285 to $210 will be developed by May 1, 1974.

(Be more specific with the <u>what</u> quality and include the date.)

Poor - To reduce the loss of clerical employees.

Better - A plan to decrease the termination rate of clerical employees from 25 to 15 percent will be developed by September 1, 1974.

(State the <u>what</u> more clearly, quantify, and include the date.)

3. Vocational Education Objectives

Poor - To make an effective evaluation of drafting programs.

Better - An evaluation of the drafting curriculum for grades 9-11 will be undertaken by each principal by January 15, 1974.

(Be the what more specifically and include the date.)

Poor - The school policy manual for parents will be revised.

Better - A school policy manual for vocational education will be developed by the area vocational director by March 1, 1974.

(Be more specific with who and what and include the date.)

Poor - A resource center for vocational education materials and an economics department will be established by June 1, 1974.

Better - A resource center for vocational education materials for grades 9-12 will be established by June 1, 1974.

An economics department for grades 9-12 will be established by June 1, 1974.

(State each objective independently.)

Although none of the objectives labeled "better" is perfect, the second version is consistently more vigorous, detailed and precise than the first.

RELATIVE IMPORTANCE OF OBJECTIVES

A school administrator must select the objective or objectives that will give students the greatest return on total investments of time, money and resources. Therefore, it is essential to base objectives upon the problems

and needs that are most severe and that have the greatest potential for improvement. In the face of a wide range of needs and problem areas, one must determine which objectives will yield the greatest gain. One can do this by ranking objectives according to their relative value and weighing them according to the time they will require, thus obtaining a picture of the current situation and of future possibilities.

A form for "Ranking Objectives for School Improvement" in Appendix C may be helpful in arranging objectives beginning with number one (most important), and ending, for example, with number ten (least important.) After ranking objectives according to the importance of their results, the next step is to assign to each objective the amount of time in percentages that will be required for its realization. If one has ten objectives all of equal importance, each would have a value of 10%. Or, the first objective on the list might be weighed much more heavily than less important ones. Note, however, that the most important objective does not necessarily receive the greatest weight in percent of time.

SUMMARY

An objective states the key results to be accomplished within a given period of time. The objective should be written as concretely as possible, in quantifiable terms, and in language that is meaningful to those committed to its implementation. As the second phase of MBO, setting objectives is not a single event but a process which flows naturally into phase three, developing Action Plans, as discussed in Chapter IV.

CHAPTER IV

DEVELOPING ACTION PLANS TO ACHIEVE OBJECTIVES

An Action Plan is a set of activities or steps which must be completed in order to accomplish the desired results stated in an objective. After writing the Mission and Roles Statements and developing objectives, the school district or department is ready to design Action Plans to accomplish each stated objective. An objective states specifically in measurable terms what result is to be achieved and when it is to occur. Each Action Plan that is designed for an objective employs a series of steps that describe how the objective is to be accomplished, by whom and when. The Action Plan may consist of appropriate methods, systems, techniques, courses, or tasks that are carefully established to accomplish each stated objective. In essence, the MBO system requires that there be an Action Plan related to specific objectives and that it be possible to determine whether or not the plan is being carried out.

The development of an Action Plan is a most important part of school administration planning in that it is concerned with not only setting objectives, but developing the strategies to achieve them. A serious and frequent problem encountered by organizations employing MBO is the failure to give adequate attention to the development of Action Plans. Although stating objectives provides the basis for effective planning and for all of the other primary school administration functions, it is formulating step-by-step plans for their achievement that produces the sense of direction and unity of purpose that are essential for long range effectiveness.

FIVE GUIDELINES FOR DEVELOPING ACTION PLANS

There are five basic principles that may be followed in developing effective Action Plans. These guidelines should serve as a reminder that objectives alone do not achieve important results. Unfortunately, many organizations that are unskilled in MBO do not follow through with this important part of the system. Consequently, refined objectives are sometimes not carried out, and the organization loses its effectiveness. These five guidelines for developing an Action Plan can help realize stated objectives:

I. The initial concern of the school administration in developing Action Plans is to <u>divide into steps</u> all of the necessary tasks and activities. This procedure helps the administrator give attention to each phase of the plan, identify the purpose of each step, and state what is required to perform it.

Almost any activity can be arbitrarily divided into smaller steps or units; however, a step should be logical groups of self-contained activities that have a beginning and an end or product. Appendix D may be of help in preparing subsequent action plan steps for your school district.

II. It is important to <u>identify criteria for the completion of each step</u>. In the MBO system it is assumed that there are criteria for each step or task to be performed. Without such criteria it is difficult to know when the step has been completed. For example, an Action Plan may call for hiring three industrial arts teachers. The criterion for the achievement of

this step might be: three industrial arts teachers with full teaching credentials hired. Another action step might include: orientation of total business education staff. The criterion for this step might be: all education staff completed in-service workshop.

The school administrator should indicate the relationships among steps, and carefully attempt to identify any time sequences. Sequential steps tend to lengthen the time required for the completion of the action plan, since often the next step cannot begin until the previous one has been completed. However, scheduling can be improved if steps are overlapped whenever possible.

III. Next it is necessary to identify who is responsible for carrying out each step of the Action Plan. "Who" may be a school principle, a project director, an entire department staff or a single teacher, depending on the size, complexity and duration of the task in question. Administrators must furnish whatever information is needed to the person or persons responsible for a task and encourage communication among all staff members concerned with a given action.

IV. At this stage, the school administrator must analyze what resources will be needed. This analysis will help provide cost information that may be needed in meeting state and federal guidelines and requirements. Furthermore, it is crucial to ascertain who should be contacted for these resources. Having complete knowledge of the required resources will also enable the administrator to determine the completion date for each step.

V. Finally, the administrator must estimate the time required to

perform each step. A specific date is assigned for each action step in order to emphasize the time requirement for achieving each objective as a whole.

OBJECTIVE REVISION AND CONTINGENCY PLANNING

Within an effective MBO system, the school administrator's job is to achieve his objectives, not change them. However, should it become difficult to accomplish a given objective, the administrator may need to develop new Action Plans or to revise existing ones in the light of the encountered difficulties. This approach suggests a change of plans, not of objectives. This should hold true unless conditions have changed so much that achieving an objective becomes impossible or irrelevant.

Contingency planning is the process of anticipating potential problem areas and tentatively deciding what might be done to overcome them. By developing contingency plans, school administrators may force themselves to foresee problems and to prepare in advance for dealing with them should they occur. In this way, school administrators may become more flexible and capable of coping with change.

The MBO system enables administrators to learn not just to anticipate change, but actually to incorporate it into the planning process. This greatly increases their chances of obtaining positive results. The Interim Evaluation Form in Appendix E may be used as a tool to help increase planning efficiency.

SUMMARY

Upon the completion of the first three phases of Management by Objectives -- establishing a Mission and Roles Statement, setting objectives, and developing Action Plans -- the school administrator should have established a solid base for making change. This position of strength may permit him to take advantage of many opportunities that arise in his school organization. With this management tool, he should be able to handle effectively the problems that otherwise might reduce his ability to achieve predetermined objectives.

The development and implementation of the Action Plan is the heart of a successful MBO system. An effective Action Plan demands critical skills on the part of the administrator: awareness of the dynamics of the MBO system; ability to break down objectives into specific, sequential, steps; and skills in human relations that will encourage high performance, personal commitment and growth on the part of all subordinates.

By means of combined MBO and human relations skills an administrator can help subordinates participate in programs not because they are driven to, but because they want to. Such enthusiastic cooperation between administration and teaching staff is one key to higher levels of learning in our schools.

CHAPTER V

DEVELOPING A PERFORMANCE APPRAISAL SYSTEM

INTRODUCTION

The fourth phase of Management by Objectives, the Performance Appraisal, is a joint process of evaluation by which superiors and subordinates determine the extent to which objectives are being accomplished. The tools of appraisal include operations auditing of an entire program and individual performance appraisal interviews, as well as more informal types of self-evaluation, observation, and feedback.

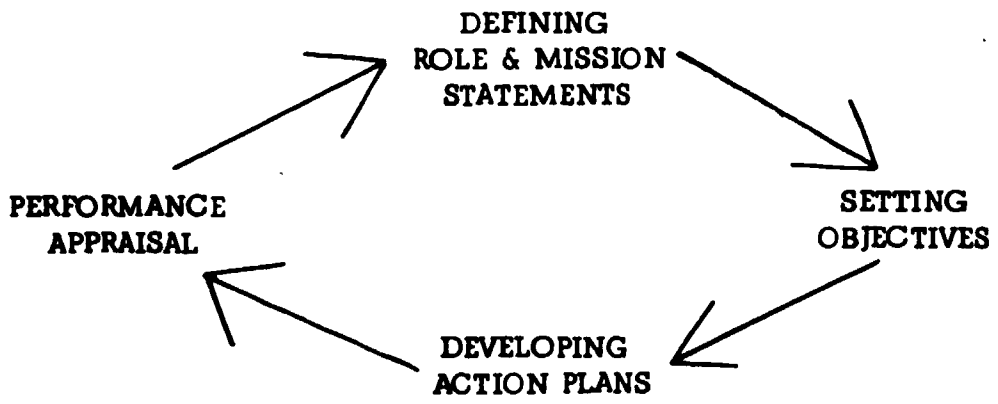
The two basic requirements for effective Performance Appraisal are (1) standards against which to measure performance, and (2) a flow of information keeping personnel aware of progress toward objectives or significant deviations from standards.

In implementing the Management by Objectives system, an organization must arrive at a clear understanding of what constitutes good performance.The statements of objectives provide standards against which the individual can measure his performance. Effective performance may be defined as the individual's ability to get results. The Performance Appraisal is based on progress being made toward completing objectives.

The importance of feedback stems from the principle that "the motivation to achieve results increases as people are informed about matters affecting those results." People in a school organization tend to perform at higher levels when they are aware of the objectives they seek, and how well they are doing in relation to those objectives.

THE ANNUAL PERFORMANCE REVIEW

The annual performance review has a two-fold purpose: to review what has been done, and to begin preparing for the next year. In the following figure, the Performance Appraisal system both completes the M B O cycle and initiates the next:



The annual performance review is concerned with two important factors -- the individual and the results. It is important to note that the annual performance review is not the only established evaluation structure. Periodic reviews are also conducted to keep all levels of the administration completely informed of progress toward objectives. Such periodic reviews must be an integral part of the total information flow in the organization. Reports should be in time for decision-making, correcting and adjusting Action Plans. Record keeping, follow-up reports, and information on status of results should be working tools which help the administrator take the best possible action at the best possible time.

OPERATIONS AUDITING

In the practice of Management by Objectives, it has become apparent that more and more school administrators are operating their programs out of sight of their superiors and other administrators. Hence, an overview of the entire program is difficult to obtain. The larger the school district, the greater its need for administrators to be knowledgeable and effective in areas beyond their direct observation. Operations auditing, a recent management technique, has come into existence because of the need to manage from a distance and out of sight. Operations auditing is particularly important for top administrative personnel who are involved initially in the objective-setting process, but who withdraw during the Action Plan and Performance Appraisal phases. Periodic reviews, which are a form of operations auditing, should give the top administration an overview of progress at a glance. Instruments that provide such a view of progress in a time basis may be developed by school districts or individuals. Reports on results, time, and performance can be very useful in making decisions. An example of a Performance Appraisal instrument is given in Appendix F.

INDIVIDUAL PERFORMANCE APPRAISALS

Developing commitments to objectives during the first three phases of MBO provides a meaningful basis for evaluating performance of a school system or department, and it presents significant advantages for establishing individual Performance Appraisals. Within the Performance Appraisal interview both superior and subordinate may use as a basis for appraisal the data produced in the MBO process. The individual who has established the performance objectives looks forward to participating

in and commiting himself to those challenges in which he is involved. Within this setting, a climate of mutual respect and equality is fostered.

The technique of individual performance appraisal offers specific advantages not found within other appraisal methods. Performance appraisal may increase personal performance as well as job satisfaction when it is done in the following manner:

1. Emphasis in on the results to be achieved. All appraisal reviews focus on work results and job requirements rather than on an individual's personality traits or character. During the appraisal interview, each objective is dealt with specifically and the evaluation is tailored to this unique organizational situation. At no time during this relationship is the individual's worth as a human being to be evaluated and confused with the job performance.
2. Individual appraisals focus on positive and active elements. It is important that the individual performance appraisal be seen as an analytical technique which is designed to improve the school organization, rather than as an administrative club to maintain order and control. The appraisal encounter actively involves two professionals who are mutually attempting to assess job performance. Within this appraisal framework communication improves and commitment is strengthened. Unlike other appraisal systems, MBO calls for no uni-

lateral actions. Only when objectives and goals are established jointly can commitment and results be improved.

3. Individual appraisals are objective and work-centered. Deficiencies in performance should not be cited without presenting accurate and reliable information that relates directly to the job description and stated objectives. A sufficient amount of representative information should be provided, reflecting comprehensive periods of time and work performance. All limitations in obtaining information should be discussed. In all cases, the sources from which information has been obtained should be identified.

4. Individual appraisals are opportunistic. The appraisal interview should always be oriented toward work improvement. In following this principle, the individual has freedom to deviate from past practices and procedures. Innovation and creativity should be encouraged. This approach flows naturally from the future orientation of the entire structure of the Management by Objectives system.

5. Individual appraisals encourage performance stretches. Encouragement is focused on two primary areas: (1) the achievement of the work and its effect on the total

educational organization; (2) the individual job fulfillment, motivation and personal growth and development. Within this relationship there are many opportunities to help increase individual performance and personal fulfillment. The mission of promoting personal satisfaction and job improvement is an essential element of Managing by Objectives.

ETHICAL CONSIDERATIONS OF INDIVIDUAL APPRAISAL

The individual appraisal should be objective, work-centered and focused on the desired work results and the individual's growth. The emphasis should be placed on the work and not on the personality of the person being interviewed. Nor should an appraisal interview be conducted in an autocratic setting. The appraisal data is privileged and should be presented only to those who have a good reason to review it.

THE UTILIZATION OF PERFORMANCE APPRAISALS

There are a variety of ways in which individual school districts may use the results of evaluative techniques discussed above. Performance appraisals may serve any or all of the following functions:

1. Determining annual salary increases. This method of performance appraisal is commonly known as "merit rating." Prior to the adoption of MBO some school organizations attempted to base compensation on so-called "merit" principles. However, merit was a highly

elusive term, and few school districts succeeded in realizing "merit rating" in actual practice. MBO can provide the means of compensation relating to achievement of objectives, allowing payment of staff in proportion to the degree to which objectives have been achieved or exceeded.

2. Identifying personnel for promotion. During this form of Performance Appraisal, the central administration or other administrative team members may evaluate an individual's performance with reference to future positions and opportunities. Focus may also be placed on skills or training necessary in anticipation of prospective promotion or placement.

3. Motivating and coaching for greater professional and personal advancement. The appraisal system can also provide the vehicle for stimulating better performance and coaching individuals to become more effective in their work, thus increasing their personal growth and development.

4. Career planning. The appraisal interview can be an excellent opportunity to counsel the individual with regard to his interests and personal aspirations. In doing so, it may be valuable to observe the individual's present "KASH" position, that is to take stock of his

-- Knowledge and experience

-- Abilities and aptitudes

-- Skills and proficiencies

-- Habits and work relationships

Discussing these factors may help the individual grow in the self-awareness and self-direction that foster optimism and career development. These gains, however, presuppose that the appraiser possess a positive regard and willingness to listen to and accept the individual being guided.

The appraisal system can combine any or all of these functions. Performance appraisals are part and parcel of the school administration process and can be concerned with virtually all elements of administration: Organizational planning, delegation of tasks, evaluation of results, control, communications, development, motivation, and coordination. The performance appraisal technique of MBO provides results-oriented job descriptions and clear cut school district objectives from which accountability and measurability are derived.

STEPS IN DEVELOPING A PERFORMANCE APPRAISAL SYSTEM

Performance Appraisal should be tailored to meet unique requirements of the school, department, or individual. The steps for developing a Performance Appraisal system begin even in the first phase of MBO:

Step 1 The school district or individual work units prepare and refine a Mission and Roles Statement which analyzes the nature and scope of each job and its over-

all contribution to the school district. The M&RS also helps determine each person's accountability for results to be accomplished.

Step II Upon completion of the M&RS, specific objectives are to be established stating the key results to be accomplished. Each objective is linked to the broad goals of the M&RS. These objectives form the basis for discussion and subsequent joint agreement between subordinate and superior.

Step III Upon completion of statements of objectives, Action Plans to accomplish the projected results are prepared. Both superiors and subordinates strive to agree upon methods and activities necessary to reach stated objectives within a specified timeframe. Each individual then applies his skill, ingenuity, effort, time, and energy in getting done what has to be done.

Step IV During the ensuing months there are periodic formal disscussions of the objectives that were set. These meetings are usually designed as quarterly progress reviews. The purpose of these reviews is to keep the administration informed of progress toward projected results. These encounters are characterized by mutual respect, empathy, pro-

gress assessment and problem solving.

The annual performance review is conducted in order to get feedback about results achieved and about progress expected. The administrator prepares in advance the annual review, summarizing achievements and suggesting ways to improve.

SUMMARY

Step IV is based on the principle that progress can only be measured in terms of that towards which one is trying to make progress. This phase of MBO attempts to measure and evaluate all activities according to a schedule in order to report the current ıtus and progress toward completing the objective. The individual reporting and approval techniques attempt to note deviations from expected progress and report these for corrective action. Emphasis is placed on evaluating results rather than on an individual's personality or intrinsic worth. Methods of feedback (evaluating past progress) and feed forward (measuring anticipated progress) give the school administrative team an idea of their present position in relation to where they are going. Thus, the Performance Appraisal provides the basis for renewed commitment to the goals of the school in the ongoing process of Management by Objectives.

CHAPTER VI

THE PROGRAM PLANNING AND BUDGET SYSTEM*

INTRODUCTION

Public schools in Indiana are currently facing an economic crisis of sorts. The State Legislature voted in its last general assembly to freeze local tax levies at the 1973 rate for school purposes and to allocate an additional $36.00 per pupil during fiscal 1974 and $38.00 per pupil additional money in fiscal 1975. This in effect puts very stringent limitations on the amount of money available for new programs, for increased operational costs and for maintenance of present programs. School corporation budgets have sky-rocketed the past few years. Although there seem to be many "good causes" in the field of education for which money could be spent, the legislature was probably accurately reflecting the "will of the people" and the general "tenor of our times" in limiting the amount of money available for public education. This means more than ever that educators must make decisions regarding how to best utilize the dollars available. To accomplish our goals and objectives, the legislature has forced us to recognize that there are many good causes competing for available dollars, and that we as educators must set priorities and choose between several alternatives in getting the most benefit out of the dollar. We are forced to consider alternative methods of accomplishing an objective in light of the cost involved as well as quality of out-put.

The author is indebted to Robert A. Hoffman, Director, Connersville Area Vocational School, for his generous assistance in preparing this chapter.

We in Indiana have been most fortunate in experiencing tremendous growth in vocational education during the past few years. This growth has been one of our goals and it is being accomplished. But while it is being accomplished, federal funds have not increased proportionately. Consequently, during the past year available monies for program reimbursement were approximately 5% less than in the prior year, while vocational enrollments across the state increased nearly 10%. This makes some form of Program Planning and Budget System necessary to obtain maximum benefit per dollar.

DESCRIPTION OF SYSTEM

The system of accounting suggested for use by an area vocational school or district is basically a program-by-program accounting method utilizing the accounting code as prescribed by the Indiana State Board of Accounts for school accounting purposes. Costs are broken down into two main catagories:

1. Indirect Charges Series Control
2. Direct Charges Series Control

The indirect charges are those which are applicable to all programs such as administrative costs, secretarial and bookkeeping costs, care of buildings and grounds, heat, utilities, power, telephone, and other costs associated with plant operation. Also, fixed charges such as maintenance, group insurance, etc., are charged to the indirect catagory. Direct charges are then made for each program of instruction. These are broken down as instructional salaries, audio-visual materials, books, instructional supplies, travel and other expenses, and repair or replacement of furniture and

equipment. Each program has its own control number code in this particular system. The program control code is assigned in alphabetical order. For example: Agri-Mechanics - .01; Appliance Repair - .02; Auto Body - .03; Auto Mechanics - .04; and so on down the line with each separate program having a separate project number.

A monthly management report is available within a week after the last day of the month and gives the original appropriation, expenditures to date, outstanding encumbrances, and the free balances as of the end of the month. Coupled to this information of expenditures is a supplemental monthly report which shows receipts from sale of materials or supplies in each project. This information is needed in order to show the actual cost of a program utilizing tax monies. For instance, in Agri-Mechanics or Auto Mechanics it would not be unusual to spend a $1,000 in a month on materials and supplies. This does not however reflect the true cost of the program because we may take in $1,000 or $1,100 in receipts. Therefore, the monthly report of receipts is important in evaluating the particular cost of a program. It should be pointed out that many times there is time lag between the purchase of saleable materials and the receipts for those materials. For instance, receipts are very light the first two months of the school year and very heavy the last two months of the year (May and June).

The accounting system is basically self explanatory as can be seen by the attached example, pages 68 through 79.

IMPLEMENTATION OF THE SYSTEM

To implement such a system of accounting would be nearly impossible without firm support from top school authorities, whether they be a local school board or a joint vocational board of a given area vocational school. For any school system utilizing a fairly late programable bookkeeping machine, it would be relatively easy to implement such a system. The advantages of an accounting system are considerable, since they give an administrator accurate cost analysis of each program which can help him identify problems and alternative solutions to those problems. A thorough, detailed and accurate accounting system is basic to the process of developing alternatives in education to get more "bang for the buck."

ADVANTAGES AND DISADVANTAGES

Advantages of the system are obvious.

1. The system gives an accurate accounting of the costs in each separate program.
2. The accounting system provides a basis for analyzing costs as they relate to number of students placed in full time employment and number of students in the field for which they were trained, etc.
3. Information gained through accurate cost analysis provides the basis for setting up alternative solutions to meet educational objectives.
4. The accounting systems tells quickly when spending exceed budget allocation.

Disadvantages:

1. Some programs naturally cost more than others. For example, welding takes a considerable expenditure for supplies and has very little return, in comparison to the operation of a drafting program. There is a tendency when looking at the cost to base tuition or per pupil billing on a program cost basis. This may be particularly attractive to superintendents who are sending students outside the school corporation to cheaper programs. An area vocational school does not necessarily transfer tuition costs on a program basis. All costs are figured and divided by total enrollment so that students outside the local corporation all pay the same tuition regardless of the program in which they are enrolled.
2. Basing tuition costs on a program basis could seriously hinder a valid counseling program in that there might be a tendency on the part of administration to encourage participation in low cost programs and discourage participation in expensive programs.
3. The monthly management report, while valuable, does take time to prepare. It probably could not be done economically without the benefit of some type of bookkeeping machine. However, most school corporations in Indiana now have such equipment.

SUMMARY

With the general trend toward more accountability in public schools and with less federal reimbursement on a per pupil basis, some form of Program Planning and Budgeting System is rapidly becoming a necessity. Determining priorities and having a method of cost analysis in education are essential. We need a system to set alternatives for consideration in meeting educational objectives. Basic to this process is an understanding of objectives to be obtained and an accurate accounting method to monitor the cost of such a program. This cannot be attained without the support of top echelon administrative leadership in the local educational agencies. The system has the advantages of accurate cost analysis at any given time and will provide information necessary to correct inadequacies and excess expenditures. However, there is danger in slanting the vocational guidance program toward the lower cost program, thus possibly reducing the breadth of offerings available to students.

CONCLUSIONS

The age of accountability is in full swing in Indiana with the action of the legislature limiting the amount of monies available on a per pupil basis. It is imperative that we implement some type of PPBS in the administration of our vocational programs. We must recognize that there are many good causes competing for the expenditures of funds, and it's up to the educational leadership and the people in a community to determine their priorities and in what way the limited dollars available for education

shall be spent. We must recognize that we as educators cannot be all things to all people, that we cannot solve all problems in society with our educational system, and that we must establish priorities in education and a system by which we can evaluate the attainment of objectives in reaching educational goals.

MODEL PPBS SYSTEM FOR AN AREA VOCATIONAL SCHOOL

Accounting of Projects

Month of April

PROJECT:	RECEIPTS: Services & materials	EXPENDITURES: Supplies	BALANCES:	REPAIR AND REPLACEMENT OF EQUIPMENT:
AGRI-MECHANICS	812.11	1,027.46	- 215.35	-0-
APPLIANCE REPAIR	6.35	45.49	- 39.14	-0-
AUTO BODY	159.48	446.82	- 287.34	-0-
AUTO MECHANICS	833.91	590.99	- 242.92	7.10
BUILDING TRADES	6.50	42.52	- 36.02	-0-
BUSINESS	33.15	410.09	- 376.94	118.44
COSMETOLOGY	165.80	250.00	- 84.20	-0-
DRAFTING	-0-	58.41	- 58.41	-0-
ELECTRONICS	-0-	28.79	- 28.79	-0-
MACHINE SHOP	11.65	150.40	- 138.75	32.50
WELDING	2.30	350.00	- 347.70	85.48
TOTALS FOR: APRIL	2,031.25	3,400.97	- 1,369.72	243.52
PREVIOUS BALANCE	11,583.24	39,050.26	-27,467.02	13,358.19
BALANCES:	13,614.49	42,451.23	-28,836.74	13,601.71

FIGURE #4

JOURNAL OF APPROPRIATIONS, ENCUMBRANCES, DISBURSEMENTS AND BALANCES

AREA VOCATIONAL SCHOOL
APRIL, 1973

DESCRIPTION	ENCUMBRANCE		Appropriations	BALANCES		
	Encumbered	Liquidated		Outstanding Encumbrances	Expenditures To Date	Free
INSTRUCTION-SALARIES-PRINCIPALS & ASSISTANTS SUMMER SCHOOL BOOKKEEPERS & CLERKS MATERIALS & SUPPLIES MILEAGE & CONFERENCES, IN SERVICE VOCATIONAL INSTRUCTION SUBSIDIARY CONTROL						
OPERATION OF PLANT-SALARIES-CARE OF BLDGS & GROUNDS CONTRACTED SERVICES REMOVAL OF REFUSE AND GARBAGE LAUNDRY & DRY CLEANING HEAT FOR BUILDINGS UTILITIES-WATER AND SEWERAGE LIGHT & POWER TELEPHONE MATERIALS & SUPPLIES OPERATION OF PLANT SUBSIDARY CONTROL						
MAINTENANCE OF PLANT-REPLACEMENT OF FURNITURE-NON INST.						

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DESCRIPTION	ENCUMBRANCE		Appropriations	BALANCES		
	Encumbered	Liquidated		Outstanding Encumbrances	Expenditures To Date	Free
MAINTENANCE OF PLANT SUBSIDIARY CONTROL						
FIXED CHARGES-EMPLOYEE RETIREMENT SOCIAL SECURITY PUBLIC EMPLOYEES' RETIREMENT EMPLOYEE GROUP INSURANCE RENT OF EQUIPMENT FIXED CHARGES SUBSIDIARY CONTROL						
INDIRECT CHARGES SERIES CONTROL AGRI-MECHANICS-SALARIES FOR INSTRUCTION AUDIO VISUAL BOOKS ETC. TEACHING MATERIALS & SUPPLIES OTHER EXPENSES OF INSTRUCTION REPLACEMENT OF FURNITURE & EQUIPMENT AGRI MECHANICS PROJECT SUBSIDIARY CONTROL						
APPLIANCE REPAIR PROJECT-SALARIES FOR INSTRUCTION BOOKS, REPAIRS, AUDIO VISUAL & TELEVISION TEACHING MATERIALS & SUPPLIES OTHER EXPENSES OF INSTRUCTION REPLACEMENT OF FURNITURE & EQUIPMENT						

DESCRIPTION	ENCUMBRANCE		Appropriations	BALANCES		
	Encumbered	Liquidated		Outstanding Encumbrances	Expenditures To Date	Free
APPLIANCE REPAIR PROJECT SUBSIDIARY CONTROL						
AUTO BODY PROJECT-SALARIES FOR INSTRUCTION BOOKS, REPAIRS, AUDIO VISUAL & T.V. TEACHING MATERIALS AND SUPPLIES OTHER EXPENSES OF INSTRUCTION REPLACEMENT OF FURNITURE AND EQUIPMENT AUTO BODY PROJECT SUBSIDIARY CONTROL						
AUTO MECHANICS PROJECT-SALARIES FOR INSTRUCTION BOOKS, REPAIRS, AUDIO VISUAL & T.V. TEACHING MATERIALS AND SUPPLIES OTHER EXPENSES REPLACEMENT OF FURNITURE AND EQUIPMENT AUTO MECHANICS PROJECT SUBSIDIARY CONTROL						
BUILDING TRADES PROJECT-SALARIES FOR INSTRUCTION BOOKS, REPAIRS, AUDIO VISUAL & T.V. TEACHING MATERIALS AND SUPPLIES						

DESCRIPTION	ENCUMBRANCE		Appropriations	BALANCES		
	Encumbered	Liquidated		Outstanding Encumbrances	Expenditures To Date	Free
OTHER EXPENSES REPLACEMENT OF FURNITURE & EQUIPMENT BUILDING TRADES PROJECT SUBSIDIARY CONTROL						
BUSINESS PROJECT-SALARIES FOR INSTRUCTION BOOKS, REPAIRS, AUDIO VISUAL & T.V. TEACHING MATERIALS & SUPPLIES OTHER EXPENSES REPLACEMENT OF FURNITURE & EQUIPMENT BUSINESS PROJECT SUBSIDIARY CONTROL						
COSMETOLOGY PROJECT-SALARIES FOR INSTRUCTION BOOKS, REPAIRS, AUDIO VISUAL & T.V. TEACHING MATERIALS & SUPPLIES OTHER EXPENSES REPLACEMENT OF FURNITURE & EQUIPMENT COSMETOLOGY PROJECT CONTROL						
ELECTRONICS PROJECT-SALARIES FOR INSTRUCTION BOOKS, REPAIRS, AUDIO VISUAL & T.V. TEACHING MATERIALS AND SUPPLIES						

DESCRIPTION	ENCUMBRANCE		Appropriations	BALANCES		
	Encumbered	Liquidated		Outstanding Encumbrances	Expenditures To Date	Free
OTHER EXPENSES REPLACEMENT OF FURNITURE & EQUIPMENT ELECTRONICS PROJECT SUBSIDIARY CONTROL						
MACHINE SHOP PROJECT-SALARIES FOR INSTRUCTION BOOKS, REPAIRS, AUDIO VISUAL & T.V. TEACHING MATERIALS & SUPPLIES OTHER EXPENSES REPLACEMENT OF FURNITURE & EQUIPMENT MACHINE SHOP PROJECT SUBSIDIARY CONTROL						
WELDING PROJECT-SALARIES FOR INSTRUCTION BOOKS, REPAIRS, AUDIO VISUAL & T.V. TEACHING MATERIALS AND SUPPLIES OTHER EXPENSES REPLACEMENT OF FURNITURE & EQUIPMENT WELDING PROJECT SUBSIDIARY CONTROL						
STAFF PROFESSIONAL DEVELOPMENT PROJECT-SALARIES FOR INSTRUCTION STAFF PROFESSIONAL DEVELOPMENT PROJECT SUBSIDIARY CONTROL						

DESCRIPTION	ENCUMBRANCE		Appropriations	BALANCES		
	Encumbered	Liquidated		Outstanding Encumbrances	Expenditures To Date	Free
DIRECT CHARGES SERIES CONTROL						
AREA VOCATIONAL OVERALL CONTROL						

APPENDIX A

WORKSHEET #1

DIVIDE YOUR TOTAL JOB INTO ITS

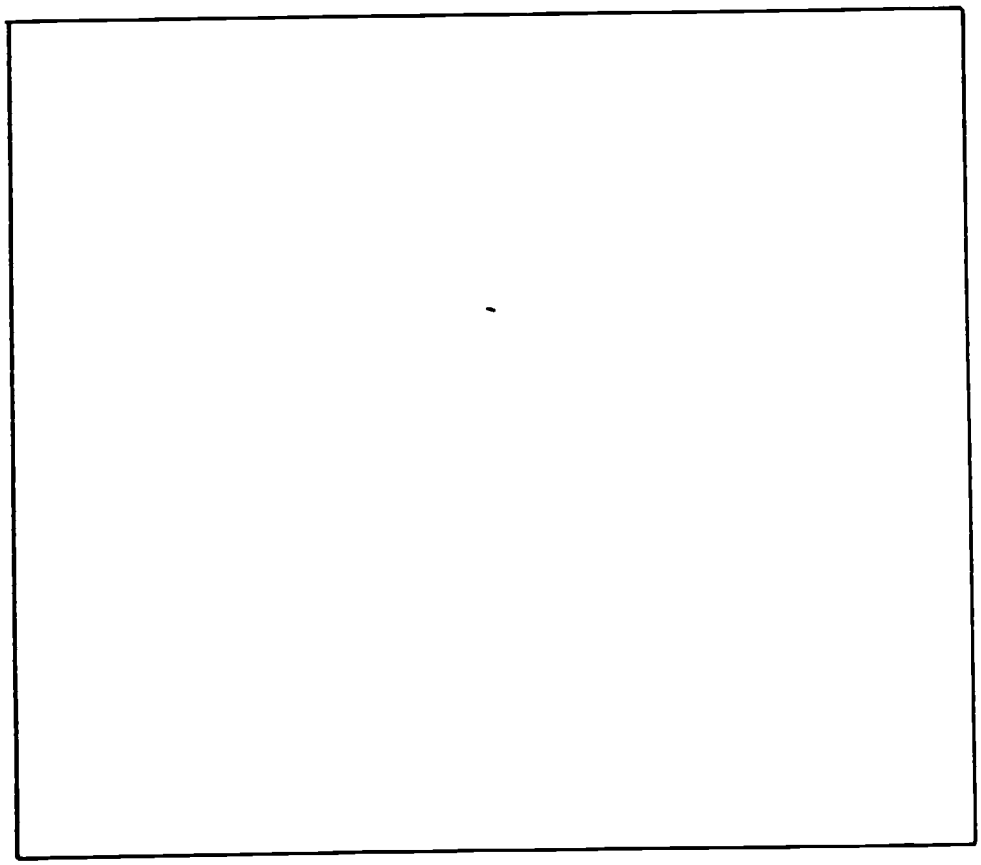
KEY AREAS FOR RESULTS

INCLUDE THE KEY AREAS

THAT ARE PART OF YOUR JOB NOW

AND ANY THAT YOU FEEL SHOULD BE ADDED.

YOUR JOB



APPENDIX B

WORKSHEET #2

COMPARATIVE RANKING OF KEY AREAS FOR RESULTS

LIST THE KEY AREAS FOR RESULTS	PROBLEMS & PRIORITIES	PROBABILITY OF ACCOMPLISHMENT	TENTATIVE ACTION PLANS

RANKING OBJECTIVES FOR SCHCOL IMPROVEMENT

For the Period Beginning and Ending

Objective No.	Statement of Objective	Degree of Importance (%)	Target Date(s)	Periodic Performance Check			
				Date	Deficient	Adequate	Superior
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

APPENDIX D:

FORMAT FOR DEVELOPING AN ACTION PLAN

PHASE III Objectives & Action Plans	Presented By: Date:	POSITION: School or Department:				
Objective # ____ of ____ Weight %	Reviewed By: Date:	Department:				
THE KEY RESULT TO BE ACHIEVED: WHAT, WHEN, & COST BENEFIT	STEPS IN THE ACTION PLAN How to accomplish the Objective	Completion Criteria	Who is to Complete	Contact Whom	Completion Date (When)	Check Date Completed
State Objective: Circulated to:						

APPENDIX E

INTERIM EVALUATION FORM

SCHOOL _____ POSITION _____

ADVISOR _____ SCHOOL YEAR _____

PROGRAM OBJECTIVE: _____

_____

STEP: _____ PRESENT DATE: _____

COMPLETION CRITERION: _____

SCHEDULED COMPLETION DATE: _____

DAYS REMAINING _____

1. As of this date, how certain are you that this step will be completed on schedule? (Check one)

   _____ (1) definitely certain

   _____ (2) very probable

   _____ (3) appears probable

   _____ (4) uncertain

   _____ (5) doubtful

   _____ (6) will not be completed on schedule

   (If 4, 5, or 6 is checked, please explain on back of form).

2. In your opinion should there be a review or revision of this plan?

   ( ) YES ( ) NO

_____ _____

NAME LOCATION

APPENDIX F

PERFORMANCE APPRAISAL

NAME _____ DATE _____

POSITION _____ SCHOOL _____ DEPARTMENT _____

STEP I	OBJECTIVE	PRIORITY	STARTING DATE	COMPLETION DATE	SET UP PERFORMANCE STANDARDS

STEP II BRIEFLY DISCUSS RESULTS ACCOMPLISHED FOR OBJECTIVE LISTED ABOVE.

STEP III AREA WHERE PERFORMANCE IS STRONGEST AREA WHERE PERFORMANCE IS WEAKEST

STEP IV	SPECIFIC WAYS TO IMPROVE ACTION PLAN:	RESPONSIBILITIES	DATES

SUPERVISOR _____ DATE _____ SUPERINTENDENT _____ DATE _____

DOCUMENT RESUME

ED 116 010 CE 005 919

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INSTITUTION	Southern Illinois Univ., Carbondale. Dept. of Agricultural Industries.
SPONS AGENCY	Illinois Professional and Curriculum Development Unit for Vocational and Technical Education, Springfield.
PUB DATE	30 Jun 75
NOTE	112p.; For Volumes 1-4 and 6-7, see CE 005 915-918 and CE 005 920-921
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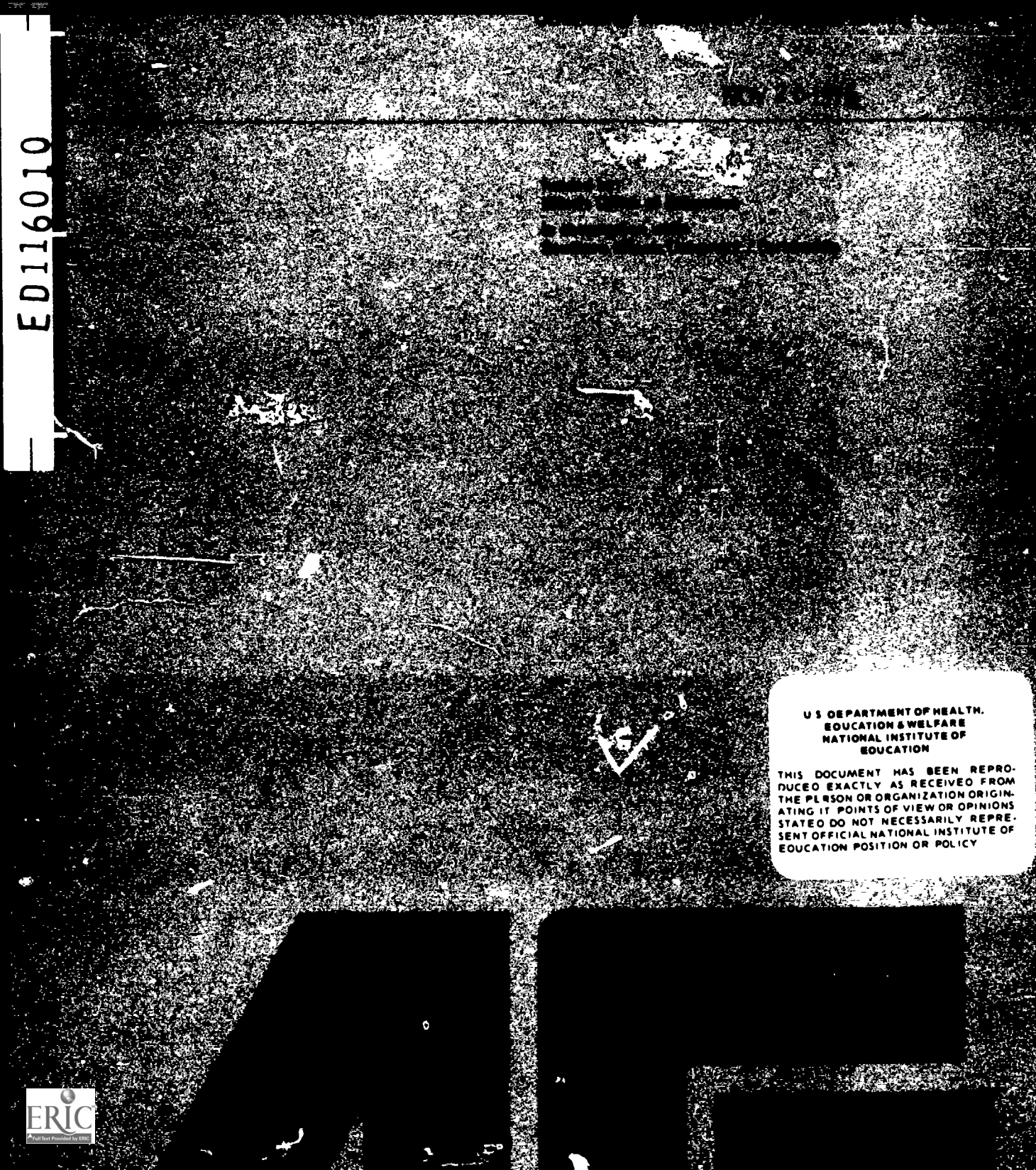
DESCRIPTORS	*Agricultural Education; Behavioral Objectives; *Course Content; *Curriculum Guides; Floriculture; Greenhouses; Landscaping; Lesson Plans; Nurseries (Horticulture); Occupational Clusters; Occupational Information; *Ornamental Horticulture Occupation; Post Secondary Education; Program Planning; Resource Guides; Secondary Education; Trees; Turf Management; Unit Plan; Units of Study (Subject Fields)

ABSTRACT

The program planning guide for ornamental horticulture was written to assist Applied Biological and Agricultural Occupations (ABAO) teachers in enriching existing programs and/or to provide the basis for expansion of offerings to include additional materials for the cluster areas of arboriculture, floriculture, greenhouse operation and management, landscaping, nursery operation and management, and turf management. Each guide includes the following components: an introduction (brief discussion of the subject matter); sample job titles and cluster areas (major job titles, D.O.T. numbers, O.E. numbers, and information about salaries, educational requirements, and career advancement opportunities); competencies for cluster areas and for job titles, stated as behavioral objectives; a core course outline (a representative sample of how a curriculum should be constructed, including references); sample teaching plans designed for one to five days in length (comprising cluster areas, unit titles, problem areas, a brief introduction, student performance objectives, a detailed outline of instructional content, learning activities, special materials and equipment, and student references). Also included are: specific and selected references; a brief description of school facilities; lists of equipment, supplies, and audiovisual materials; and a partial list of ways to increase teacher competencies. (BP)



Volume V

PROGRAM PLANNING GUIDE IN ORNAMENTAL HORTICULTURE

Guide Author

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Project Director

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Southern Illinois University

Project Title

Development of Teachers' Guide and Students' Instructional Materials for Seven Selected Applied Biological and Agricultural Occupation Related Areas (PCB-A5-031)

Produced as a result of a contractual agreement managed by:

Professional & Curriculum Development Unit
Board of Vocational Education & Rehabilitation
Division of Vocational & Technical Education

in cooperation with:

Agricultural Industries Department
School of Agriculture
Southern Illinois University
Carbondale, IL 62901

Date

June 30, 1975

TABLE OF CONTENTS

INTRODUCTION

The Program Planning Guides were written to assist the Applied Biological and Agricultural Occupations teacher in enriching the existing programs and/or to provide the basis for expansion of offerings to include an additional agricultural cluster area. For example, the current offering may be Agricultural Production with Agricultural Mechanics, and Agricultural Supplies and Services is to be added to the offering.

These guides are the result of a funded project coordinated by the Professional and Curriculum Development Unit, Division of Vocational and Technical Education, Board of Vocational Education and Rehabilitation in cooperation with the Agricultural Industries Department, Southern Illinois University, Carbondale, during the FY 1975. The project was entitled "Development of Teachers' Guide and Student Instructional Materials for Seven Selected ABAO (Applied Biological and Agricultural Occupations) Related Areas." The seven ABAO areas selected include:

1. Agricultural Production - O.E. Code 01.0100
2. Agricultural Supplies and Services - O.E. Code 01.0200
3. Agricultural Mechanics - O.E. Code 01.0300

4. Agricultural Products - O.E. Code 01.0400

5. Ornamental Horticulture - O.E. Code 01.0500

6. Agricultural Resources - O.E. Code 01.0600

7. Forestry - O.E. Code 01.0700

Major division, cluster area, and job titles were written with O.E. numbers, and only an occasional reference to D.O.T. The O.E. code was selected in that teachers in Illinois classify all of their students under this system.

The provisions of the SIU/C-DVTE project provided an opportunity for participation from throughout the Illinois Applied Biological and Agricultural Occupations staff. Each member contributed in his unique way, and they represent each of the four institutions which train DVTE staff, V.A.S., and ABAO teachers in community colleges and high schools.

The projects activities were coordinated by a Steering Committee. All major decisions on content, format, job titles, and final draft approval were the responsibility of the steering committee. They spent considerable time and effort in reviewing these guides. The steering committee was composed of the following members:

Name	ABAO Project Contribution
Mr. Lonnie Hart Assistant Coordinator DVTE Springfield, IL 62706	Chairman-Steering Committee
Mr. G. D. Coil Head Consultant, ABAO-DVTE Springfield, IL 62706	Steering Committee

Name	ABAO Project Contribution
Mr. Allan Utech Consultant, ABAO-DVTE Springfield, IL 62706	Steering Committee
Dr. Ed Breese Agriculture Department Western Illinois University Macomb, IL 61455	Steering Committee
Mr. P. E. Cross ABAO Instructor McLeansboro Community Unit McLeansboro, IL 62859	Steering Committee
Mr. Kyle Wittler Coordinator, Ag Business Parkland College 2400 West Bradley Champaign, IL 61820	Steering Committee
Dr. John Matthews Head Vocational Agriculture Service 434 Mumford Hall University of Illinois Urbana, IL 61801	Steering Committee

The project staff in alphabetical order are as follows:

Name	ABAO Project Contribution
Dr. Benton K. Bristol Associate Professor Department of Agriculture Illinois State University Normal, IL 61761	Agricultural Mechanics Guide Author
Dr. William A. Doerr Assistant Professor and Assistant Dean School of Agriculture Southern Illinois University at Carbondale Carbondale, IL 62901	Forestry Guide Co-Author
Mr. Carl German Graduate Student Agriculture Education Southern Illinois Univeristy at Carbondale Carbondale, IL 62901	Agricultural Resources Co-Author

Name	ABAO Project Contribution
Dr. L. R. Hilterbrand Division Chairman Agriculture Resources Shawnee College Road Ullin, IL 62992	Agricultural Resources Guide Co-Author
Mr. Michael Marks ABAO Teacher Farina LaGrove Community Unit Farina, IL 62838	Agricultural Supply and Service Guide Co-Author
Mr. B. L. Rich Division Chairman Agriculture Department Lake Land College Mattoon, IL 61938	Co-Author of Agricultural Production
Mr. Sam Robb ABAO Instructor Pinckneyville Community Unit Pinckneyville, IL 62274	Agricultural Projects Guide Co-Author
Mr. Roger Ross Applied Biological and Agriculture Occupations New Lenox, IL 60451	Ornamental Horticulture Co-Author
Dr. Thomas Stitt Professor Agricultural Industries Department Southern Illinois University at Carbondale Carbondale, IL 62901	Project Director, Agricultural Resources, Ornamental Horticulture, and Forestry Co-Author
Dr. Richard Welton Assistant Professor Agricultural Industries Department Southern Illinois University at Carbondale Carbondale, IL 62901	Agriculture Supply and Service and Agriculture Products Guides Co-Author
Dr. Eugene Wood Professor and Chairman Agricultural Industries Department Southern Illinois University at Carbondale Carbondale, IL 62901	Agricultural Production Guide Author and Principal Investigator of Project

Each guide includes the following component parts.

Introduction Unique consideration for the subject matter area.

Sample Job Titles and Cluster Areas This includes information about salary, education requirements and career advancement opportunities. These job titles and cluster areas are coordinated with a brochure entitled "Applied Biological and Agricultural Occupations Career Directory" published by the Division of Vocational and Technical Education, 1035 Outer Park Drive, Springfield, IL.

Competencies for Cluster Areas and Competencies for Job Titles The competencies, stated in measurable terms, are presented by cluster areas and job titles.

Core Course Outline The core course outline is a representative sample of how a curriculum could be constructed to present the program.

Exemplary Teaching Plans This is a section which incorporates teaching plans for selected units in the outline. Their function is to provide sample plans which the ABAO teacher may follow in developing his respective units.

Reference The references are coded into the teaching plan and listed with their source in the reference section.

School Facilities, Equipment, and Supplies This provides the ABAO teacher with a source for major items which will be required to operate the program.

Audio Visual Materials This is a listing of currently available visual materials for use in teaching the respective subject matter areas.

Teachers Competencies and Training Available This is a brief review of sources where the teacher could secure additional skills to assist in delivering a quality program.

These Program Planning Guides were prepared to improve the quality and increase the scope of Applied Biological and Agricultural Occupations offerings available in Illinois. The Guides can only be successful with your review, adaption, adoption, and implementation.

INTRODUCTION TO THE ORNAMENTAL HORTICULTURE
OCCUPATIONAL PROGRAM PLANNING GUIDE

Getting Started in an Ornamental Horticulture Program

Facilities are an important part of an ornamental horticulture program but a new department can function with a few basic garden tools and equipment that can be built in shop. Many existing vocational agriculture departments have land laboratories that produce a profit and this may be one source of departmental generated funds that may be tapped.

Indoors:

An ornamental horticulture program may take place in the classroom and shop. Foliage plants can be grown inside under lights and propagation of these plants can also be done inside. Even a sunny window in the classroom or shop is enough to get started growing plants.

Outdoors:

Most students enjoy the outdoors; therefore, the total horticulture program and course outline should coincide with the seasons. Examples of outdoor activities include:

1. Improving a segment of turf on the school property by fertilizing, weed control, or aerification (leave control strip for comparison). Use school equipment and supplies when possible. Check with your Building Superintendent or Head Custodian.

2. Pruning of the school trees and shrubs is a perfect follow-up after classroom instruction on the unit. If your department does not have pruning equipment, use the schools, teachers, students, or community resources.
3. Raising nursery stock plants is where principles of propagation, pruning, care, and pest control can be practiced.
4. A school vegetable or flower garden may be established to serve as testing plots for varieties; serve as an ideal garden; or to just practice good gardening principles.
5. A self-supporting program can be established in a school greenhouse or even leased greenhouse in the community. Polyethylene covered greenhouses are inexpensive and they are primarily what many commercial growers are now using. Plants grown in the school greenhouse can pay for the heat, electricity, and supplies needed to run the program. Plants may be sold in the high schools, to feeder grade schools, to the P.T.A., to church groups, and to other non-profit organizations. This allows for a bigger market and improves community public relations. The idea behind the greenhouse is to give students more practical experience, allow them to enjoy plants because they are better able to care for them, and finally,

to create consumers of horticultural plants and products.

The Purpose

This publication is designed to help the agriculture occupations teacher initiate a horticulture program or even improve an existing ornamental horticulture program. For the purpose of this program planning guide, seven representative areas of horticulture are listed with job titles under each. O.E. codes and D.O.T. numbers are included in the guide to assist the instructor in locating more information for the job titles. The areas of horticulture as listed are:

1. Arboriculture
2. Floriculture
3. Greenhouse Operation and Management
4. Landscaping
5. Nursery Operation and Management
6. Turf Management
7. Ornamental Horticulture, Other

A list of competencies was developed for each job title and stated in measurable terms. The job title objectives are written specifically to include most competencies the student should be able to do for entry level employment. The competency lists are not meant to be complete, but representative of student needs.

The evaluation procedures used in the competencies are examples of ways an instructor may evaluate a student. The degree of proficiency is arbitrary and may be changed to suit

the individual vocational agriculture department.

The references used in the competencies are listed in the core course outline as well as in the list of references.

A core course outline with selected references, was developed from the most commonly identified job title competencies. The references were selected to serve Illinois and the Midwest area where practical application is necessitated.

Detailed teaching plans are developed as examples in each of the areas. Hopefully, the equipment and references listed in the teaching plans will have a wide range of applicability based on a departments financial ability.

In writing this planning guide, many references such as curriculum guides and instructional materials were used from Ohio, Oregon, California, and Illinois.

A special thanks goes to my wife, Dianne, and to Teresa Sowski for their tremendous supportive efforts that helped complete this program planning guide.

SAMPLE CLUSTER AREAS AND JOB TITLES

The cluster areas and job titles included in this guide are:

Arboriculture

- Tree Surgeon Assistant

Floriculture

- Florist Salesman

Greenhouse Operation & Management

- Greenhouse Worker

Landscaping

- Landscape Worker
- Park Employee

Nursery Operation & Management

- Nursery Worker
- Garden Center Salesman

Turf Management

- Turf Worker

Ornamental Horticulture, Other

- Horticulture Maintenance Mechanic

SAMPLE JOB DESCRIPTIONS

MAJOR JOB TITLE	Tree Surgeon Assistant
O.E. NUMBER:	01.05 01
D.O.T. NUMBER:	409.186
LOCATION:	Private Tree Surgeon State and Federal Park Services Utilities Companies Orchards
SALARY:	Starting salary is $2.10/hr. on up ($4,200-$8,000 per year). Depends on degree of competency, experience, responsibility, and type and size of firm.
EDUCATION:	A high school education with a program in ornamental horticulture is usually required. A two-year degree from a community college is desirable. A B.S. degree can be obtained.
CAREER ADVANCEMENT:	Tree Surgeon Assistant Tree Surgeon Owner of business

MAJOR JOB TITLE:	Florist Salesman
O.E. NUMBER:	01.05 02
D.O.T. NUMBER:	260.458
LOCATION:	Private Retail Florists Wholesale Florists
SALARY:	Starting salary is $2.10/hr. on up ($4,200-$8,000 per year). Depends on degree of competence, experience, responsibility, and type and size of firm.

EDUCATION:	A high school education with a program in ornamental horticulture is usually required. A two-year degree from a community college is desirable. A B.S. degree can be obtained.
CAREER ADVANCEMENT:	Salesman Supervisor Assistant Manager Manager or Owner
MAJOR JOB TITLE:	Greenhouse Worker
O.E. NUMBER:	01.05 03
D.O.T. NUMBER:	406.887
LOCATION:	Commercial and Private Greenhouses Private Estates Seed Companies Large Companies
SALARY:	Starting salary is $2.10/hr. and up ($4,200-$8,000 per year). Depends on competence, experience, responsibility, and type and size of firm.
EDUCATION:	A high school education with a program in ornamental horticulture is usually required. A two-year degree from a community college is desirable. A B.S. degree is obtainable.
CAREER ADVANCEMENT:	Laborer Foreman or Supervisor Assistant Manager Manager or Owner
MAJOR JOB TITLE:	Landscape Worker
O.E. NUMBER:	01.05 04
D.O.T. NUMBER:	407.887
LOCATION:	Private Landscape Companies Private Estates State Institutions Large Companies

SALARY:	Starting salary is $2.10/hr. on up ($4,200-$8,000 per year). Depends on competence, experience, responsibility, and type and size of firm.
EDUCATION:	A high school education with a program in ornamental horticulure is usually required. A two-year degree from a community college is desirable. A B.S. degree can be obtained.
CAREER ADVANCEMENT:	Laborer Foreman or Supervisor Assistant Manager Manager or Owner of business

MAJOR JOB TITLE:	Park Employee
O.E. NUMBER:	01.05 04
D.O.T. NUMBER:	407.887
LOCATION:	State and Federal Park Services Private Recreation Areas State Conservation Department
SALARY:	Starting salary is $2.10/hr. on up ($4,200-$8,000 per year). Depends on degree of competence, experience, responsibility, and type and size of firm.
EDUCATION:	A high school education with a program in ornamental horticulture is usually required. A two-year degree from a community college is desirable. A B.S. degree can be obtained.
CAREER ADVANCEMENT:	Laborer Foreman Supervisor Manager

MAJOR JOB TITLE:	Nursery Worker
O.E. NUMBER:	01.05 05
D.O.T. NUMBER:	406.884

LOCATION:	Private Nursery Landscape Contractors Highway Department State Conservation Department
SALARY:	Starting salary is $2.10/hr. on up ($4,200-$8,000 per year). Depends on degree of competence, experience, responsibility, and type and size of firm.
EDUCATION:	A high school education with a program in ornamental horticulture is usually required. A two-year degree from a community college is desirable. A B.S. degree can be obtained.
CAREER ADVANCEMENT:	Laborer Foreman or Supervisor Assistant Manager Manager or Owner

MAJOR JOB TITLE:	Garden Center Salesman
O.E. NUMBER:	01.05 05
D.O.T. NUMBER:	277.358
LOCATION:	Large Retail Stores Nursery Local Garden Centers
SALARY:	Starting salary is $2.10/hr. on up ($4,200-$8,000 per year). Depends on degree of competence, experience, responsibility, and size and type of firm.
EDUCATION:	A high school education with a program in ornamental horticulture is usually required. A two-year degree from a community college is desirable. A B.S. degree can be obtained.
CAREER ADVANCEMENT:	Salesman Foreman or Supervisor Assistant Manager Manager or Owner

MAJOR JOB TITLE:	Turf Worker
O.E. NUMBER:	01.05 06

D.O.T. NUMBER:	407.884
LOCATION:	Country Clubs Golf Courses Turf Supply Companies State and Federal Parks Highway Department
SALARY:	Starting salary is $2.10/hr. on up ($4,200-$8,000 per year). Depends on degree of competence, responsibility, experience, and type and size of firm.
EDUCATION:	A high school education with a program in ornamental horticulture is usually required. A two-year degree from a community college is desirable. A B.S. degree can be obtained.
CAREER ADVANCEMENT:	Worker Foreman or Supervisor Assistant Manager Manager or Owner

MAJOR JOB TITLE:	Horticulture Maintenance Mechanic
O.E. NUMBER:	01.03
D.O.T. NUMBER:	638.281
LOCATION:	Highway Department Greenhouse Construction Private Recreation Areas State Institutions Landscaping Companies Lawn and Garden Centers
SALARY:	Starting salary is $2.10/hr. on up ($4,200-$8,000 per year). Depends on degree of competence, experience, responsibility, and type and size of firm.
EDUCATION:	A high school education with a program in ornamental horticulture is usually required. A two-year degree from a community college is desirable. A B.S. degree can be obtained.
CAREER ADVANCEMENT:	Laborer Supervisor or Foreman Manager or Owner

COMPETENCIES FOR CLUSTER AREAS

V. Ornamental Horticulture

A. Arboriculture

EE 1. The student, given trees and shrubs common to Illinois, shall be able to identify them from pictures.

DA 2. Given a fruit tree, a deciduous tree, and an evergreen common to Illinois, the student shall be able to prune them according to Circular #1033 Pruning Evergreens and Deciduous Trees and Shrubs.

DA 3. Given tree insects, diseases and rodents common to Illinois, the student shall be able to identify them and determine how to control them according to The Nursery Worker Part II.

DA 4. Given a soil sample, the student shall be able to test the soil; interpret results, giving limestone and fertilizer application rates according to the V.A.S. Unit 4002 pH Test for Soil Acidity.

DA 5. Given horticultural hand tools and small power tools, the student shall demonstrate how to use them according to manufacturer's specifications.

DA 6. The student shall engage in keeping simple records, writing out customer orders, sales reports and cards according to The Nursery Worker Part II.

B. Floriculture

EE 1. Given the house plants and flowers sold in Illinois, the student shall be able to identify them in writing from pictures.

KEY: EE-ESSENTIAL for ENTRY
DA-DESIRABLE for ADVANCEMENT

EE 2. Given common house plants, bulbs, or artificial flowers, sold in Illinois, the student will demonstrate how to sell the item according to the Ohio State Unit Selling and Salesmanship.

DA 3. Given a variety of plant material, the student shall be able to design and make up floral arrangements and corsages according to the V.A.S. Unit #5009 Arranging Flowers in Vases and Bowls and Flowers to Wear Parts I, II, and III.

DA 4. Given cut flowers, a student shall demonstrate how to recondition, grade, package, and load the flowers according to The Nursery Worker, Part II.

EE 5. The student will role play in meeting customers and taking sales over the phone, according to the unit Selling and Salesmanship.

EE 6. The student will prepare a simple budget and a preliminary order of florist supplies for a full year according to The Nursery Worker, Part II.

C. Greenhouse Operation and Management

EE 1. Given common greenhouse plants, insects and diseases, the student will identify them, in writing from pictures.

EE 2. A student shall be able to propagate plants asexually or sexually depending on the plant according to the Ball Red Book.

EE 3. Given a variety of soil growing medias, the student shall prepare a common greenhouse potting mix of 1 part soil, 1 part perlite, and 1 part peat moss according to the Ball Red Book.

DA] 4. The student shall demonstrate his ability to care for chrysanthemums by propagating, potting, disbudding, spraying, lighting, pinching and cutting the plants over a given period of time according to Flower and Plant Production in the Greenhouse.

DA 5. The student shall be able to determine how to regulate the greenhouse environment for a crop of chrysanthemums according to the Ball Red Book.

EE 6. The student shall be able to apply insecticides, fungicides, herbicides, growth regulants, fumigants and rodenticdes as outlined on the label.

D. Landscaping

EE 1. Given trees, shrubs, ground cover and bulbs commonly used for landscaping in Illinois, the student will be able to plant it according to the reference Landscaping Your Home.

EE 2. Given a plot of ground to seed into lawn, the student shall grade, condition, lime, fertilize, seed, water, and establish a suitable lawn according to V.A.S. Unit #5008 Establishing a Lawn.

EE 3. Given pictures of trees, shrubs, ground covers, grasses and flowers commonly used for landscaping in Illinois, the student shall be able to identify them in writing from pictures.

EE 4. Given a home layout, the student will inventory the property, interview the owner, and then draw up a landscape plan to fit the families need according to Landscaping Your Home.

DA 5. Given hand tools and small power equipment used in landscaping, the student will demonstrate how to use and recondition the tools according to the manufacturer's specifications.

E. Nursery Operation and Management

EE 1. Given trees and shrubs commonly used in landscaping in Illinois, the student will be able to identify them from pictures in writing.

EE 2. The student shall be able to propagate sexually or asexually, trees and shrubs commonly used in Illinois according to the text Plant Propagation.

EE 3. The student shall be able to transplant, prune, spray, fertilize, and water stock plants in a nursery according to The Nursery Worker, Part II.

EE 4. The student shall be able to take soil sample tests and make recommendations based on the soil analysis according to the Urbana Laboratory Soil Test Chart.

EE 5. The student shall be able to use and operate hand tools, small power equipment, trucks and tractors according to the manufacturer's specifications.

EE 6. Given a tree or a shrub commonly used in landscaping in Illinois the student shall be able to ball and burlap it according to the V.A.S. slidefilm Balling and Burlapping Trees and Shrubs.

F. Turf Management

EE 1. The student shall be able to identify turf grass specimens and grass seeds commonly used in Illinois from pictures.

EE 2. Given a plot of ground the student will prepare the ground, apply lime and fertilizer, sow seed and irrigate the lawn seedbed according to the V.A.S. Unit #5008 Establishing a Lawn.

EE 3. Given the following, a student will appply them according to the label:
a. Weedicide
b. Herbicide
c. Insecticide
d. Fungicide
e. Rodenticide
f. Pesticide

DA 4. Given the following equipment, the student will demonstrate how to operate them according to the manufacturer's recommendations:
a. Fertilizer spreader
b. Sprayer
c. Rototiller
d. Aerator
e. Turf mowers
f. Truck
g. Tractor

DA 5. Given a non-functioning small engine the student will troubleshoot the problem and get the engine running according to Small Engines, Volume I.

DA 6. Given an existing disease, whether the disease be insects, weeds, or other pests; the student will identify the problem and tell in writing how to control the pest according to the appropriate V.A.S. unit.

G. Ornamental Horticulture, Other

EE 1. Given one of the following a student will complete the exercise according to Shopwork on the Farm:
   a. Electrical schematic
   b. Plumbing exercise
   c. Woodworking exercise
   d. Concrete laying exercise
   e. Arc welding exercise
   f. Oxyacetylene exercise

DA 2. Given an existing greenhouse, a student will demonstrate ability to do the following exercises according to the manufacturers recommendations and the Ball Red Book:
   a. Light a gas heating unit
   b. Set timer on an automatic watering system
   c. Set timer to light chrysanthemums at night
   d. Set thermostats for a given day and night temperature

EE 3. Given an Operators Manual, the student will complete an exercise in writing on engine specifications, lubrication frequency, periodic adjustments, and other maintenance requirements.

DA 4. Given a small engine the student will be able to do the following according to the Operators Manual:
   a. Check fluid levels
   b. Tune-up engine
   c. Dismantle engine and take specifications
   d. Reassemble the engine and make adjustments
   e. Lubricate engine

EE 5. The student will be able to do adjustments, maintenance, and service on horticultural power tools according to the manufacturer's specifications.

EE 6. The student will sharpen horticultural tools according to the manufacturer's specifications and or the book Shopwork on the Farm.

V. Ornamental Horticulture

A. Arboriculture

Tree Surgeon Assistant

EE 1. The student given 50 trees common to Illinois shall be able to identify them in writing, from pictures, with 80 per cent accuracy.

EE 2. The student given 50 shrubs common to Illinois shall be able to identify them in writing, from pictures, with 80 per cent accuracy.

DA 3. Given a fruit tree common to Illinois, the student shall be able to prune it to the satisfaction of the instructor, with 80 per cent accuracy according to recommended procedures.

DA 4. Given a deciduous tree common to Illinois, the student shall be able to prune it to the satisfaction of the instructor, with 80 per cent accuracy according to recommended procedures.

DA 5. Given an evergreen shrub common to Illinois, the student shall be able to prune it to the satisfaction of the instructor, with 80 per cent accuracy according to recommended procedures.

DA 6. Given a specific tree and shrub, the student shall be able to advise orally and in writing another person on their proper use and care based on The Nursery Worker, Part II, with 80 per cent accuracy.

DA 7. The student shall be able to determine how to add soil conditioners to a soil based on soil analysis, by putting it down in writing, with 80 per cent accuracy.

KEY: EE-ESSENTIAL for ENTRY
DA-DESIRABLE for ADVANCEMENT

DA 8. The student shall be able to test a sample of soil, by testing a soil sample for pH according to Urbana Laboratories Soil Test Chart with 90 per cent accuracy.

DA 9. Given soil sample analysis results, the student will add fertilizer elements and lime based on the test results.

DA 10. The student shall know how to correct poor drainage and put it down in writing when given an example of such, to the satisfaction of the instructor.

EE 11. Given examples of ten tree insects common to Illinois, the student shall be able to identify them in writing, from pictures, with 80 per cent accuracy.

EE 12. Given examples of ten tree diseases common to Illinois, the student shall be able to identify them in writing, from pictures, with 80 per cent accuracy.

EE 13. Given examples of five tree rodents common to Illinois, the student shall be able to identify them in writing, from pictures, with 80 per cent accuracy.

DA 14. Given a tree insect common to Illinois, the student shall be able to determine how to control the insects according to the V.A.S. Unit #5005a Tree and Shrub Insects and Their Control, by putting it down in writing to the satisfaction of the instructor.

DA 15. Given a tree disease common to Illinois, the student shall be able to determine how to control the disease according to the V.A.S. Unit #5005a Tree and Shrub Insects and Their Control, by putting it down in writing.

DA 16. Given a tree rodent common to Illinois, the student shall be able to determine how to control the rodents according to The Nursery Worker, Part II, putting it down in writing.

DA 17. The student shall be able to mix spray materials according to the manufacturer's specifications.

DA 18. The student shall be able to apply an insecticide, fungicide, and rodenticide according to

manufacturer's specifications, with 80 per cent accuracy.

DA 19. The student shall be able to determine how to apply chemicals to control pests according to The Nursery Worker, Part II, by actually applying the chemicals with 80 per cent accuracy.

DA 20. The student shall use and condition five hand tools according to the satisfaction of the instructor.

DA 21. The student shall be required to engage in keeping simple records (time, work schedule, maintenance record, and inventory of plant materials and equipment) according to The Nursery Worker, Part II, by handing in the written records.

EE 22. The student will apply himself to both written and oral orders given by the instructor. The orders must be carried out to the satisfaction of the instructor.

EE 23. Given directions and product information, the student will read them from the label aloud before the teacher, with 90 per cent accuracy.

EE 24. The student will engage in writing out customer orders, sales reports, and cards to the satisfaction of the instructor.

EE 25. The student will role play the taking of orders over the phone, to the satisfaction of the instructor.

EE 26. The student will prepare a list of thirty items that will help him get along better with customers, employers, and fellow workers and hand this list in at the end of the period. This is to be based on the reference, Human Relations in Business, and is to meet the satisfaction of the instructor.

EE 27. Given a specific tree, the student shall remove the tree from the nursery according to The Nursery Worker, Part II with 80 per cent accuracy.

EE 28. Given a specific tree or shrub common to Illinois, the student shall plant it according to The Nursery Worker, Part II with 80 per cent accuracy.

DA 29. Given a small power tool, the student shall demonstrate how to operate it according to manufacturer's specifications with 80 per cent accuracy.

DA 30. Given a diseased tree, the student shall scrape the decayed matter from cavities and fill the holes with cement, according to the teacher reference entitled Tree Maintenance, by P. R. Pirone.

B. Floriculture

Florist Salesman

EE 1. Given 100 house plants and flowers, the student shall be able to identify them in writing from pictures with 80 per cent accuracy.

DA 2. Given a specific occasion, the student shall select the proper natural or artificial flowers and foliage, according to the V.A.S. Unit #5009 Arranging Flowers in Vases and Bowls.

EE 3. The student shall be able to determine when 5 plants need water by checking the soil moisture in the pot with his fingers and observing wilting of plant leaves with 80 per cent accuracy.

EE 4. Given a common cut flower used in flower arrangements, the student shall be able to give proper advice on the care of the plant material according to the V.A.S. Unit #5009 Arranging Flowers in Vases and Bowls with 80 per cent accuracy.

EE 5. Given a common house plant, the student will demonstrate how to sell the item according to the Ohio State unit Selling and Salesmanship, to the satisfaction of the instructor.

EE 6. Given a tulip bulb, the student will demonstrate how to sell the item according to the Ohio State unit Selling and Salesmanship, to the satisfaction of the instructor.

EE 7. Given an artificial flower, the student will demonstrate how to sell the item according to the Ohio State unit Selling and Salesmanship, to the satisfaction of the instructor.

EE 8. The student will role play the taking of orders over the phone according to the Ohio State Unit Selling and Salesmanship, to the satisfaction of the instructor.

DA 9. The student shall demonstrate how to set up a sales display according to the Ohio State Unit Advertising and Promotion, to the satisfaction of the instructor.

DA 10. The student shall advise customers on two common house plant problems in writing with 80 per cent accuracy.

DA 11. The student shall be able to select and hand in, in writing, the five most popular house plants based on local market demand, with 80 per cent accuracy.

EE 12. The student shall be able to demonstrate how to recondition a type of cut flower based on the V.A.S. Unit #5009 Arranging Flowers in Vases and Bowls with 80 per cent accuracy.

EE 13. Given two different kinds of flowers, the student shall demonstrate how to cut them based on the V.A.S. Unit #5009 Arranging Flowers in Vases and Bowls, with 80 per cent accuracy.

DA 14. The student given a variation of plant material, shall be able to design and make up a floral arrangement based on the V.A.S. Unit #5009 Arranging Flowers in Vases and Bowls to the satisfaction of the instructor.

DA 15. Given the plant materials, the student shall design and make up a corsage according to the California Polytechnic College Slidefilms Flowers to Wear Parts I, II, and III, to the satisfaction of the instructor.

EE 16. The student shall be able to design a simple window display according to the Ohio State Unit Advertising and Promotion to the satisfaction of the instructor.

DA 17. The student shall be able to demonstrate how to package a plant according to The Nursery Worker, Part II with 80 per cent accuracy.

DA 18. The student shall be able to demonstrate the proper way of loading five different kinds

of plants and materials according to The Nursery Worker, Part II with 80 per cent accuracy.

EE 19. The student shall be able to demonstrate by example how to grade five plants according to size and quality with 80 per cent accuracy.

DA 20. The student will be required to engage in keeping simple records (time, work schedule, inventory of materials and equipment, etc.) according to The Nursery Worker, Part II, with 80 per cent accuracy.

DA 21. The student will prepare a simple budget according to The Nursery Worker, Part II meeting a minimum of 80 per cent of the criterion established by the instructor.

DA 22. The student will prepare a record of invoices, post bills, and file according to The Nursery Worker, Part II, meeting a minimum of 80 per cent of the criterion.

DA 23. The student will prepare a summary audit of a budget meeting 80 per cent of the criterion established by the instructor.

DA 24. The student shall prepare a preliminary order of florist supplies for a full year based on the previous year's records and hand it in, in writing, with 80 per cent accuracy.

EE 25. The student will be required to role play the meeting of customers, and answering questions and complaints, according to the Ohio State Unit Selling and Salesmanship, to the satisfaction of the instructor.

EE 26. The student will apply himself to both oral and written orders given by the instructor. The orders must be carried out to the satisfaction of the instructor.

EE 27. Given directions and product information, the student will read them aloud before the teacher, with 90 per cent accuracy.

EE 28. The student will engage in writing out customer orders, sales reports, and cards given by the instructor orally, with 80 per cent accuracy.

EE 29. The student will role play the taking of orders over the phone according to the Ohio State Unit Selling and Salesmanship, to the satisfaction of the instructor.

EE 30. The student will prepare a list of 30 items that will help him get along better with customers, employers, and fellow workers. This is to be based on Human Relations in Business, and is to meet the satisfaction of the instructor

C. Greenhouse Operation and Management

Greenhouse Worker

EE 1. Given 100 common greenhouse plants, the student shall be able to identify them from pictures in writing, with 80 per cent accuracy.

EE 2. The student shall be able to select 10 plants suitable for hanging baskets and pot them so that they are suitable for sale.

EE 3. The student shall be able to prepare and treat seeds so that they will germinate and have 90 per cent survival.

EE 4. The student shall be able to demonstrate how to plant 10 different kinds of seeds and seedlings as to get 90 per cent survival.

DA 5. The student shall be able to demonstrate how to propagate 10 plants by budding, grafting, layerage, and division with 80 per cent suvvival.

EE 6. The student shall be able to take and propagate 5 cuttings of 10 different plants with 80 per cent survival.

EE 7. Given 10 rooted cuttings, the student shall be able to transplant them properly into containers or the field with 80 per cent survival.

EE 8. The student shall be able to prepare a rooting medium according to the V.A.S. Unit #5006 Producing Plants by Asexual Propagation, to the satisfaction of the instructor.

EE 9. The student shall be able to demonstrate how to care for young plants according to the

Ball Red Book, to the satisfaction of the instructor.

EE 10. The student shall be able to demonstrate how to care for stock plants according to the Ball Red Book, to the satisfaction of the instructor.

EE 11. The student shall be able to demonstrate how to prepare a plant growing media according to the Ball Red Book, to the satisfaction of the instructor.

EE 12. The student shall be able to determine when geraniums need fertilizer according to the Ball Red Book, to the satisfaction of the instructor.

EE 13. The student shall be able to determine when chrysanthemums need water according to the Ball Red Book, to the satisfaction of the instructor.

EE 14. The student shall be able to demonstrate how to apply spray materials to control pests according to manufacturer's specifications.

DA 15. The student shall be able to determine how to regulate temperature, light, and humidity on african violets according to the Ball Red Book, to the satisfaction of the instructor.

DA 16. The student shall be able to explain how to regulate plant growth through use of chemicals on chrysanthemums, according to the manufacturer's specifications.

EE 17. The student will be given pots of chrysanthemums, and will be able to demonstrate how to plant, pot, disbud, cut and grade the plants over a given period of time according to Flower and Plant Production in the Greenhouse, to the satisfaction of the instructor.

EE 18. The student, given five plants shall be able to remove dead blossoms and bulb tops according to Ball Red Book, to the satisfaction of the instructor.

EE 19. Given a certain amount of soil and proper equipment the student will sterilize the soil according to Ball Red Book, to the satisfaction of the instructor.

EE 20. The student shall be able to demonstrate how to prepare two kinds of soil mixtures as specified by the instructor.

EE 21. The student shall be able to determine how to add soil conditioners to a soil for a given purpose according to Ball Red Book, to the satisfaction of the instructor.

EE 22. The student shall be able to demonstrate how to test a sample of soil for pH according to the Urbana Laboratories Soil Test Chart with 90 per cent accuracy.

EE 23. Given a soil sample the student shall be able to add fertilizer elements and lime as needed according to the Urbana Laboratories Soil Test Chart with 80 per cent accuracy.

EE 24. Given a pot with poor drainage, the student shall correct the poor drainage according to Ball Red Book, to the satisfaction of the instructor.

DA 25. The student shall be able to diagnose five common plant pest problems according to Ball Red Book with 80 per cent accuracy.

DA 26. Given five greenhouse pest problems, the student will be able to determine control measures according to Ball Red Book with 80 per cent accuracy.

DA 27. The student shall demonstrate how to apply an insecticide, a fungicide, and a rodenticide as outlined on the label with 80% per cent accuracy.

EE 28. The student shall be able to identify 20 annual bedding plant seedling specimens, in writing, with 80 per cent accuracy.

EE 29. The student shall properly use and condition five hand tools according to Shopwork on the Farm, to the satisfaction of the instructor.

DA 30. The student shall be required to engage in keeping simple records (time, work schedule, maintenance record, inventory of plant materials and equipment) according to the Ohio State Unit Greenhouse Worker with 80 per cent accuracy.

D. Landscaping

Landscape Worker

EE 1. Given a blue print, the student shall take 10 measurements and hand them in, in writing, with 80 per cent accuracy.

EE 2. Given a shrub, the student shall be able to dig a hole according to Landscaping Your Home, to the satisfaction of the instructor.

EE 3. The student shall be able to properly plant a shrub according to Landscaping Your Home, to the satisfaction of the instructor.

EE 4. Given a ground cover, the student shall plant it according to Landscaping Your Home, to the satisfaction of the instructor.

EE 5. Given a tree, the student shall be able to plant it according to Landscaping Your Home, to the satisfaction of the instructor.

EE 6. Given a bulb, the student shall be able to plant it according to Landscaping Your Home, to the satisfaction of the instructor.

EE 7. Given a shrub, the student shall be able to ball and burlap it according to the V.A.S. Slidefilm Balling and Burlapping Trees and Shrubs, to the satisfaction of the instructor.

EE 8. The student shall be able to plant a ground cover on a steep grade or bank according to the V.A.S. Slidefilm Ground Covers and Their Uses, to the satisfaction of the instructor.

EE 9. Given a kind of edging material, the student shall be able to install it to contain soil, aggregate, or turf according to manufacturer's specifications.

EE 10. Given an aggregate (river, rock, gravel) the student shall install it according to Landscaping Your Home, to the satisfaction of the instructor.

DA 11. The student shall be able to install simple structures (fences, wood decks, paths, patios, and waterfalls) into a landscape according to Landscaping Your Home, to the satisfaction of the instructor.

EE 12. Given a tractor with grading blade, the student shall practice all safety precautions while grading, as specified by the instructor.

EE 13. Given a selection of plants and materials, the student shall load them according to The Nursery Worker, Part II, to the satisfaction of the instructor.

DA 14. The student shall demonstrate how to prepare a seedbed for a lawn according to the V.A.S. Unit #5008 Establishing a Lawn, to the satisfaction of the instructor.

EE 15. Given a seedbed, the student shall install a lawn from seed according to the V.A.S. Unit #5008 Establishing a Lawn, to the satisfaction of the instructor.

EE 16. The student shall be able to install sod for a lawn according to V.A.S. Unit #5008 Establishing a Lawn, to the satisfaction of the instructor.

EE 17. The student shall demonstrate how to irrigate a lawn according to the V.A.S. Unit #5008 Establishing a Lawn, to the satisfaction of the instructor.

EE 18. The student shall demonstrate how to fertilize a lawn as needed according to the V.A.S. Unit #5008 Establishing a Lawn, to the satisfaction of the instructor.

EE 19. The student shall demonstrate how to cut, edge, and sweep a lawn according to the V.A.S. Unit #5008 Establishing a Lawn, to the satisfaction of the instructor.

EE 20. The student shall demonstrate how to reseed and patch a lawn according to the V.A.S. Unit #5008 Establishing a Lawn, with 80 per cent accuracy.

EE 21. Given 10 basic hand tools, the student shall use them correctly as demonstrated by the instructor.

EE 22. Given 10 small pieces of small power equipment, the student shall operate them correctly as demonstrated by the instructor.

DA 23. Given the instructions, the student shall be able to calibrate sprayer and fertilizer spreading equipment according to the manufacturer's specifications.

EE 24. Given a soil mixture to prepare, the student shall be able to prepare it according to the California State Polytechnics Nursery Management Manual with 80 per cent accuracy.

EE 25. Given a sample of soil, the student shall be able to determine need for soil conditioners according to Landscaping Your Home, to the satisfaction of the instructor.

EE 26. Given a sample of soil, the student shall be able to add soil conditioners according to Guide to Organic Gardening, to the satisfaction of the instructor.

EE 27. Given a sample of soil, the student shall test it for pH according to Urbana Laboratories Soil Test Chart, with 90 per cent accuracy.

EE 28. Given 100 pictures of trees and shrubs commonly used in landscaping in Illinois, the student shall be able to identify them in writing with 80 per cent accuracy.

EE 29. Given a home layout, the student will draw views for both front and back yards of the house and draw them according to the book Landscaping Your Home, to the satisfaction of the instructor.

EE 30. Given a landscaping site, the student will inventory the liabilities of the property and its surroundings according to the book Landscaping Your Home, to the satisfaction of the instructor.

Park Employee

EE 1. The student shall be able to describe in writing how to mow turf according to the Circular #1082 Illinois Lawn Care and Establishment.

EE 2. The student shall be able to irrigate turf, flowers, shrubs, and trees according to the Circular #1082 Illinois Lawn Care and Establishment.

EE 3. The student shall be able to fertilize turf according to the recommendations specified on the fertilizer label.

EE 4. Given a shrub, the student shall trim it according to Circular #1033 Pruning Evergreens and Deciduous Trees and Shrubs, to the satisfaction of the instructor.

EE 5. Given a tree, the student shall prune it according to Circular #1033 Pruning Evergreens and Deciduous Trees and Shrubs, to the satisfaction of the instructor.

DA 6. The student shall spray turf and shrubs according to the labels recommendations.

EE 7. The student, given a plant bed shall be able to remove weeds manually and with a hoe, to the satisfaction of the instructor.

DA 8. The student shall be able to explain in writing how to control rodents and moles according to the reference The Nursery Worker, Part II, with 80 per cent accuracy.

EE 9. Given a tree, the student shall be able to plant it according to Landscaping Your Home, to the satisfaction of the instructor.

EE 10. Given a shrub, the student shall be able to plant it according to the reference Landscaping Your Home, to the satisfaction of the instructor.

EE 11. The student shall lay sod in order that it grows to the satisfaction of the instructor.

DA 12. The student shall be able to do minor electrical repairs on an exercise which simulates a building with an electrical problem according to Shopwork on the Farm, with 80 per cent accuracy.

DA 13. Given surfaces of wood, metal, and cement, the student shall demonstrate how to paint them according to Shopwork on the Farm, with 80 per cent accuracy.

DA 14. The student shall describe in writing how to build a fence according to Shopwork on the Farm, to the satisfaction of the instructor.

EE 15. Given a concrete floor, the student shall explain in writing how to maintain it according to Shopwork on the Farm, with 80 per cent accuracy.

DA 16. Given a tractor, a gang mower, a plow tiller, a scraper, a fertilizer spreader, and a truck, the student shall operate them according to the operator's manuals.

EE 17. The student, given 10 basic hand tools, shall demonstrate how to use them according to the manufacturer's recommendations.

DA 18. The student shall be able to explain in writing how to maintain a given kind of irrigation system according to the manufacturer's specifications, with 80 per cent accuracy.

EE 19. The student shall apply himself to both written and oral orders given by the instructor. The orders must be carried out to the satisfaction of the instructor.

DA 20. The student shall be required to engage in keeping simple records according to The Nursery Worker, Part II, with 80 per cent accuracy.

EE 21. Given 50 trees common to Illinois, the student shall be able to identify them from pictures, in writing, with 80 per cent accuracy.

EE 22. Given 50 shrubs common to Illinois, the student shall be able to identify them from pictures, in writing, with 80 per cent accuracy.

EE 23. Given 50 kinds of flowers commonly grown in Illinois, the student shall be able to identify them from pictures, in writing, with 80 per cent accuracy.

DA 24. The student shall demonstrate how to repair and paint a bench surface area according to Shopwork on the Farm, with 80 per cent accuracy.

DA 25. The student will prepare a list of 30 items and hand them in, in writing, that will help him get along better with customers, employers, and fellow workers. This is to meet the satisfaction of the instructor. The list is to be based on the reference Human Relations in Business.

DA 26. The student shall be able to explain in writing how to dispose of picked up paper and rubbish until all areas are clean and neat.

DA 27. Given a welding exercise, the student shall properly complete the exercise according to the text Shopwork on the Farm, with 80 per cent accuracy.

DA 28. Given directions and product information, the student will read them aloud before the teacher, and to the satisfaction of the instructor.

DA 29. The student will engage in writing out orders, reports, and cards, so that they are 90 per cent complete.

DA 30. The student, given a landscape plan, shall be able to list in writing, plant materials to be used in their respective areas according to Landscaping Your Home, to the satisfaction of the instructor.

E. Nursery Operation and Management

Nursery Worker

EE 1. Given 50 trees commonly used in landscaping in Illinois, the student shall be able to identify them from pictures, in writing, with 80 per cent accuracy.

EE 2. Given 50 shrubs commonly used in landscaping in Illinois, the student shall be able to identify them from pictures, in writing, with 80 per cent accuracy.

DA 3. Given a landscape plan, the student shall select plant materials for the plan according to the reference Landscaping Your Home, and submit them in writing, to the satisfaction of the instructor.

EE 4. The student shall be able to plant 10 tree or shrub seedlings commonly used in landscaping in Illinois, according to the reference Landscaping Your Home, with 80 per cent accuracy.

EE 5. The student shall be able to propagate 10 plants by either budding, grafting, layerage, or division, according to Plant Propagation, with 80 per cent survival.

EE 6. The student shall be able to take and propagate 10 cuttings of plants commonly used in landscaping in Illinois, according to Plant Propagation with 80 per cent survival.

EE 7. Given 10 rooted cuttings, the student shall be able to transplant them into containers or the field, with 80 per cent survival.

EE 8. The student shall be able to prepare a rooting medium according to Plant Propagation, with 80 per cent accuracy.

EE 9. The student shall be able to care for young plants commonly used in landscaping in Illinois, based on the reference Landscaping Your Home, to the satisfaction of the instructor.

EE 10. The student shall be able to care for stock plants according to the reference The Nursery Worker, Part II, to the satisfaction of the instructor.

EE 11. The student shall be able to prepare a plant growing media according to Basic Gardening Illustrated, with 80 per cent accuracy.

EE 12. The student shall be able to apply fertilizer to the growing media based on the manufacturer's label.

EE 13. The student shall be able to water plants for a period of one month, with the plants remaining in a vigorous state of growth.

EE 14. The student shall be able to apply spray materials to control pests according to the label.

DA 15. The student shall be able to explain how to regulate growth through use of chemicals according to Ball Red Book, in writing, with 80 per cent accuracy.

EE 16. Given a tree commonly used in landscaping in Illinois, the student shall plant it according to Landscaping Your Home, to the satisfaction of the instructor.

EE 17. Given a shrub commonly used in landscaping in Illinois, the student shall plant it according to Landscaping Your Home, to the satisfaction of the instructor.

EE 18. The student, given 5 plants shall be able to remove dead blossoms and bulb tops according to Ball Red Book, to the satisfaction of the instructor.

EE 19. Given a shrub commonly used in landscaping in Illinois, the student shall be able to ball and wrap it according to the V.A.S. Slidefilm Balling and Burlapping Trees and Shrubs, to the satisfaction of the instructor.

EE 20. Given a shrub commonly used in landscaping in Illinois, the student shall prune it, according to Circular #1033 Pruning Evergreens and Deciduous Trees and Shrubs, to the satisfaction of the instructor.

EE 21. Given a tree commonly used in landscaping in Illinois, the student shall prune it, according to Circular #1033 Pruning Evergreens and Deciduous Trees and Shrubs, to the satisfaction of the instructor.

EE 22. Given a sample of soil, the student shall be able to determine the need for soil conditioners and make recommendations in writing, with 80 per cent accuracy.

EE 23. Given a sample of soil, the student shall test it for pH according to the Urbana Laboratories Soil Test Chart, with 90 per cent accuracy.

EE 24. Given a soil test result, the student shall make fertilizer and lime recommendations, in writing, according to the Urbana Laboratories Soil Test Chart, as needed with 90 per cent accuracy.

EE 25. Given 10 basic hand tools used in landscaping, the student shall demonstrate how to use them according to the manufacturer's recommendations.

EE 26. Given 5 pieces of small power equipment, the student shall operate them according to the manufacturer's recommendations.

DA 27. The student shall operate a tractor according to the operator's manual and to the satisfaction of the instructor.

DA 28. The student shall operate a truck according to the operator's manual and to the satisfaction of the instructor.

DA 29. Given 10 plants commonly used in landscaping in Illinois, the student shall grade them according to size and quality, with 80 per cent accuracy.

DA 30. The student shall be able to tell in writing how to market plants and materials commonly used in landscaping in Illinois, according to the reference The Nursery Worker, Part II, with 80 per cent accuracy.

Garden Center Salesman

EE 1. Given 100 common house and garden plants, the student will identify them in writing from pictures, with 80 per cent accuracy.

DA 2. The student will select 10 plants and hand them in, in writing, that are from the V.A.S. Slidefilm #610, #611, or #612 Foliage Plant Identification Parts I, II, III, with 80 per cent accuracy.

EE 3. Given a hand or power tool, the student will demonstrate how to sell the item according to the reference Selling and Salesmanship, to the satisfaction of the instructor.

EE 4. Given a bag of lawn fertilizer, the student will demonstrate how to sell the item according to the reference Selling and Salesmanship, to the satisfaction of the instructor.

DA 5. Given a bag of some type of soil conditioner, the student will demonstrate how to sell the item according to Selling and Salesmanship, to the satisfaction of the instructor.

EE 6. Given a pesticide, a student will demonstrate how to sell the item according to Selling and Salesmanship, to the satisfaction of the instructor.

EE 7. Given a packet of garden seeds, the student will demonstrate how to sell the item according to the reference Selling and Salesmanship, to the satisfaction of the instructor.

EE 8. Given a house plant, the student will demonstrate how to sell the item according to

Selling and Salesmanship, to the satisfaction of the instructor.

EE 9. Given a tulip bulb, the student will demonstrate how to sell the item according to Selling and Salesmanship, to the satisfaction of the instructor.

EE 10. The student shall be able to demonstrate by example how to take a sales order in person and by phone according to the reference Selling and Salesmanship, with 80 per cent accuracy.

EE 11. The student shall demonstrate how to set up a sales display according to the reference Advertising and Promotion, to the satisfaction of the instructor.

EE 12. The student shall be able to explain how to advise customers in writing on two common gardening problems according to Circular #1091 Illinois Vegetable Garden Guide, with 80 per cent accuracy.

DA 13. The student shall be able to list the five most popular house plants based on a current market demand, with 80 per cent accuracy.

DA 14. The student shall be able to demonstrate how to recondition a type of cut flower according to the reference A Teacher's Guide to Flower Arrangement, with 80 per cent accuracy.

DA 15. The student shall be able to design a simple window display according to the reference Advertising and Promotion, to the satisfaction of the instructor.

DA 16. The student shall be able to demonstrate how to cut two different kinds of flowers according to the V.A.S. Unit # 5009 Arranging Flowers in Vases and Bowls, with 80 per cent accuracy.

DA 17. The student shall be able to demonstrate how to market a plant according to the reference The Nursery Worker, Part II, to the satisfaction of the instructor.

EE 18. The student shall be able to describe in writing how to take inventory according to the reference The Nursery Worker, Part II, with 80 per cent accuracy.

DA 19. The student shall be able to demonstrate by example how to grade five plants according to size and quality, according to The Nursery Worker, Part II, with 80 per cent accuracy.

DA 20. The student will be required to engage in keeping simple records (time, work schedule, equipment rental and maintenance record, inventory of plant materials and equipment) while working in a garden center and hand them in, in writing. These must meet the criterion according to The Nursery Worker, Part II.

DA 21. The student will prepare a simple budget meeting a minimum of 80 per cent of the criterion established by The Nursery Worker, Part II.

DA 22. The student will prepare records of invoices, post bills, and file, meeting a minimum of 80 per cent of the criterion established by The Nursery Worker, Part II.

DA 23. The student will prepare a summary audit of the budget meeting a minimum of 80 per cent of the criterion established by The Nursery Worker, Part II.

DA 24. The student will prepare a preliminary order of garden center supplies for a full year based on the previous years records. The budget must be done according to The Nursery Worker, Part II to the satisfaction of the instructor.

EE 25. The student will be required to role play the meeting of customers, answering questions and complaints according to Human Relations in Business, to the satisfaction of the instructor.

EE 26. The student will apply himself to both oral and written orders given by the instructor, and carry out the orders to the satisfaction of the instructor.

EE 27. Given directions and product information, the student will read them aloud before the teacher and to the satisfaction of the instructor.

DA 28. The student will engage in writing out customer orders, sales reports, and cards according to The Nursery Worker, Part II, with 80 per cent accuracy.

EE 29. The student will role play the taking of sales orders over the phone to the satisfaction of the instructor.

EE 30. The student will prepare a list of thirty items, in writing, that will help him get along better with customers, employers, and fellow workers. This is to meet the satisfaction of the instructor. The list will be based on Human Relations in Business.

F. Turf Management

Turf Worker

EE 1. The student shall list, in writing, 10 types of turf grasses commonly used in Illinois, according to Circular #1066 Lawn Establishment, with 80 per cent accuracy.

EE 2. Given 10 turf grass specimens commonly used in Illinois, the student will select the proper turf sample for a given purpose according to Circular #1066 Lawn Establishment, with 80 per cent accuracy.

DA 3. Given a turf disease commonly found in Illinois, the student will be able to give advice, in writing, according to the publication NC-12 Lawn Diseases of the Midwest, with 80 per cent accuracy.

EE 4. Given a grass seed variety commonly used in Illinois, the student will be able to properly stratify and treat the seed according to The Nursery Worker, Part II, with 80 per cent accuracy.

EE 5. Given a turf grass seed variety commonly used in Illinois, the student will demonstrate how to sow the turf grass seed according to the V.A.S. Unit #5008 Establishing a Lawn, to the satisfaction of the instructor.

EE 6. Given a 10' x 10' area of ground, the student will properly prepare the grass seedbed according to the V.A.S. Unit #5008 Establishing a Lawn, to the satisfaction of the instructor.

EE 7. Given an existing turf plot, the student will demonstrate how to apply fertilizer according to Circular #1082 Illinois Lawn Care and Establishment, to the satisfaction of the instructor.

EE 8. Given an existing turf plot, the student will demonstrate how to water and determine the proper amount to apply according to Circular #1082 Illinois Lawn Care and Establishment, with 80 per cent accuracy.

EE 9. Given a turf plot, the student will demonstrate spraying the plot to control a specific turf pest based on the label recommendations.

DA 10. Given a turf plot, the student will demonstrate how to apply growth regulant chemicals based on the manufacturer's recommendations, to the satisfaction of the instructor.

EE 11. Given a plot of ground, the student will demonstrate how to properly grade and level the site according to the V.A.S. Unit #5008 Establishing a Lawn, to the satisfaction of the instructor.

EE 12. Given a turf plot, the student will add soil conditioners as needed according to Basic Gardening Illustrated.

EE 13. Given a turf plot, the student will identify all the broad leaf weeds in the plot, according to the slidefilm #650 Lawn Weeds-Identification and Control, with 80 per cent accuracy.

EE 14. Given a soil sample, the student will be able to test the sample for pH, phosphorus, and potassium according to the Urbana Laboratories Soil Test Charts, with 80 per cent accuracy.

EE 15. Given a soil sample test result, the student will determine the proper amount of lime and fertilizer to apply on a one acre plot; write out the recommendations, and hand them in, with 80 per cent accuracy.

DA 16. Given a diseased turf plot, the student will be able to identify the disease based on the publication NC-12 Lawn Diseases of the Midwest, with 80 per cent accuracy.

DA 17. After the student has diagnosed a turf disease, he will be able to give the control measures, in writing, according to the slidefilm #640 Lawn Weeds-Identification and Control, to the satisfaction of the instructor.

EE 18. Given a turf plot, the student will apply insecticides, fungicides, and rodenticides as needed, according to the manufacturer's recommendation, to the satisfaction of the instructor.

EE 19. Given 10 lawn weed grasses common to the state of Illinois, the student will be able to identify them according to the slidefilm #650 Lawn Weeds-Identification and Control, with 80 per cent accuracy.

EE 20. Given samples of rolled sod, the student will lay the sod so it will look neat and survive, to the satisfaction of the instructor.

EE 21. Given a turf plot, the student will demonstrate how to aerate the lawn and remove thatch according to Circular #1082 Illinois Lawn Care and Establishment.

DA 22. Given a basic customer lawn weed problem, the student will select weedicides and herbicides to correct the problem according to the V.A.S. slidefilm #650 Lawn Weeds-Identification and Control, to the satisfaction of the instructor.

EE 23. Given a lawn herbicide, the student will apply the herbicide according to the label, to the satisfaction of the instructor.

EE 24. Given 5 basic hand tools, the student will use and condition them according to the manufacturer's specifications, to the satisfaction of the instructor.

DA 25. Given a non-functioning small engine, the student will trouble-shoot the problem and get the engine running according to the reference Small Engines, Volume I.

DA 26. Given a piece of small power equipment used on a golf course and home lawns, the student will operate, adjust, maintain and service the equipment based on the Operator's Manual, to the satisfaction of the instructor.

EE 27. Given a turf sprayer, the student will properly adjust the sprayer according to the manufacturer's specifications, with 80 per cent accuracy.

EE 28. Given a fertilizer spreader, the student will explain how to properly adjust the fertilizer spreader according to the manufacturer's specifications, with 80 per cent accuracy.

DA 29. Given turf trucks, tractors, or other equipment, the student will operate and maintain the equipment based on the Operator's Manual, to the satisfaction of the instructor.

EE 30. The student will prepare a list of 30 items in writing that will help him get along better with customers, employers, and fellow workers. This is to be based on the reference Human Relations in Business and is to meet the satisfaction of the instructor.

G. Ornamental Horticulture, Other

Horticulture Maintenance Mechanic

EE 1. Given an electrical schematic, the student will be able to wire up the exercise so it is functional according to the book Shopwork on the Farm, and meets the satisfaction of the instructor.

EE 2. Given a plumbing exercise, the student will complete the exercise and check the plumbing to see that it is functional according to the book Shopwork on the Farm, and meets the satisfaction of the instructor.

EE 3. Given a weed working exercise, the student will be able to complete the exercise according to the plans and to the satisfaction of the instructor.

DA 4. Given a concrete block laying exercise, the student will set up a wall according to the book Shopwork on the Farm, and to the satisfaction of the instructor.

DA 5. Given a greenhouse ventilating system, the student will adjust and service the electric motor according to the book Shopwork on the Farm, to the satisfaction of the instructor.

DA 6. Given a gas heating unit, the student will demonstrate how to light and adjust the heating unit according to the manufacturer's specifications.

DA 7. Given an automatic watering system, the student will set the timer and adjust watering nozzles according to the manufacturer's recommendations, to the satisfaction of the instructor.

EE 8. Given ten basic hand tools, the student will be able to sharpen, repair, and maintain them according to the manufacturer's specifications.

EE 9. Given an Operator's Manual, the student will complete an exercise in writing on engine specifications, lubrication frequency, periodic adjustments, and other regular maintenance requirements. The student will complete this with 90 per cent accuracy.

DA 10. Given a new lawn mower, the student will ready the equipment for operation, assemble, and set up attachments according to the manufacturer's specifications.

EE 11. Given an arc welding exercise, the student will weld together two pieces of 1/4 inch metal that must withstand the brake test.

EE 12. Given an oxyacetylene cutting torch, the student will cut 1/4 inch metal to the satisfaction of the instructor.

EE 13. Given an oxyacetylene welding exercise, the student will braze together two pieces of 1/8 inch metal that must withstand the brake test.

EE 14. Given a lawn mower, the student will disassemble it to gain access, remove and replace defective parts, reassemble, and operate equipment to check work. This will be done to manufacturer's specifications.

EE 15. Given a lawn mower engine, the student will disassemble, take specifications, replace worn parts, clean parts, reassemble, start engine and adjust for proper operation. This will be done to the manufacturer's specifications.

EE 16. Given the following equipment, a student will do adjustments, maintenance, and service:

lawn mower	renovator	chain saw
sweeper	rototiller	spray equipment
edger	electric	compost grinder
aerator	hedge	soil shredder
sod cutter	trimmer	

This will be done to the manufacturer's specifications.

EE 17. The student will maintain sprayer and fertilizer spreading equipment according to the manufacturer's specifications.

DA 18. The student will straighten, grind, polish, paint and buff equipment that has had to have body work done. This will be done according to the book Shopwork on the Farm, and to the satisfaction of the instructor.

EE 19. Given ten different lubrication oils, the student will select the one necessary for the equipment according to the manufacturer's specifications.

EE 20. Given a flat tire, the student will repair the tire, inflate, and check the tire for defects according to the manufacturer's specifications.

DA 21. Given a hydraulic greens mower, the student will explain how the system works according to the Operator's Manual and to the satisfaction of the instructor.

EE 22. Given the following, the student will sharpen the tools according to the manufacturer's specification or the book Shopwork on the Farm.

hedge trimmer	grafting knife
pruning shears	shovel
pruning loppers	hoe
lawn mower blade	axe
drill bits	chain saw

DA 23. Given remote controls for irrigation equipment, the student will establish the time and length of time to irrigate a turf green. This will be done according to weather conditioning, soil type, type of green and to the satisfaction of the instructor.

EE 24. Given a small engine, a student will do a tune-up jcb on the engine and have it running according to the manufacturer's specification.

EE 25. Given a tractor, the student will be able to do routine maintenance and repairs according to the manufacturer's specifications.

DA 26. Given a tractor, the student will be able to adjust the clutch and brakes according to the manufacturer's specifications.

EE 27. Given a tractor, the student will check the radiator antifreeze and adjust the antifreeze so that it withstands minus twenty degree weather. This will be done according to the antifreeze product label.

EE 28. Given a tractor, the student will clean, check fluid level, and adjust fluid level according to the Operator's Manual.

EE 29. The student will apply himself to both written and oral orders given by the instructor. The orders must be carried out to the satisfaction of the instructor.

DA 30. The student will engage in filling out repair bills, figuring parts, labor, taxes and service charges to the satisfaction of the instructor.

EE 31. The student will prepare a list in writing of thirty items that will help him get along with customers, employers, and fellow workers. This is to be based on the reference Human Relations in Business and is to meet the satisfaction of the instructor.

CORE COURSE OUTLINE FOR ORNAMENTAL HORTICULTURE

Course Outline	Reference Code	Reference
V. Ornamental Horticulture		
i. Orientation and Guidance		
1. Becoming familiar with horticulture programs in area vocational schools	TR	Illinois Board of Vocational Education and Rehabilitation Annual Directory-Illinois Association of Vocational Agriculture Teachers (1)
2. Becoming familiar with horticulture programs in community colleges	SR	Community College Catalogues
3. Understanding opportunities in horticulture in state universities	SR	University Catalogues
4. Planning how to reach goals in horticultural business	SR	Ohio State University Marketing Agricultural Products, Unit #11 (2)
ii. Plant Identification		
1. Woody Plants	SR	Ohio State University Shrubs for Landscaping (3)
	SR	Ohio State University Trees for Landscaping (4)
	SR	Watts, May Theilgaard Master Tree Finder (5)
	SR	V.A.S. Filmstrip Recognizing Medium Size Shrubs (48 av.)
	SR	V.A.S. Filmstrip Recognizing Large Shrubs and Small Trees (49 av.)

KEY: TR-TEACHER REFERENCE
SR-STUDENT REFERENCE

Course Outline	Reference Code	Reference
	SR	V.A.S. Filmstrip Recognizing Small Shrubs (50 av.)
2. Herbaceous Plants	TR	Kromdyk, G. 200 House Plants in Color (6)
	TR	Coleman, L. Jan. Foliage Plants for Modern Living (7)
	SR	V.A.S. Filmstrip Garden Flowers, Annuals Part I (45 av.)
	SR	V.A.S. Filmstrip Garden Flowers, Annuals Part II (46 av.)
3. Greenhouse Plants	SR	V.A.S. Filmstrip Foliage Plant Identification, Part I (39 av.)
	SR	V.A.S. Filmstrip Foliage Plant Identification, Part II (40 av.)
	SR	V.A.S. Filmstrip Foliage Plant Identification, Part III (41 av.)
iii. Plant Propagation	SR	Ohio State University The Nursery Worker, Part II (11)
	TR	Mahlstide, John P. and Haber, Ernest S. Plant Propagation (12)
1. Sexual Propagation of Plants		
a. Collecting seeds	SR	Hartman, Hudson T. and Kester, Dale E. Plant Propagation-Principles and Practices, Ch. 5 (8)
b. Treating Seeds	SR	(8) Ch. 7
c. Germinating Seeds	SR	(8) Ch. 7
	SR	V.A.S. Unit Buying Bedding Plants (9)
d. Understanding factors influencing success in propagation by seeds	SR	(8) Ch. 8
2. Asexual Propagation of Plants		

Course Outline	Reference Code	Reference
a. Producing plants from bulbs and related structures	SR	V.A.S. Unit Producing Plants by Asexual Propagation (10)
b. Producing plants from cuttings	SR	(10) (11) Part II
c. Producing plants by layerage	SR	(10) (11) Part II
d. Budding and grafting as methods of plant propagation	SR	(10) (11) Part II
A. Arboriculture	SR	(11)
1. Care of Ornamental Trees and Shrubs		
a. Fertilizing trees and shrubs	SR	V.A.S. Unit Fertilizing and Watering Shade and Ornamental Trees (29)
	TR	Murphy, Richard C. and Meyer, William E. The Care and Feeding of Trees (30)
b. Pruning and training trees and shrubs	SR	V.A.S. Unit Pruning Shade Trees (32)
	TR	Hudson, Roy L. Pruning Handbook-A Sunset Book (31)
c. Controlling insects and diseases	SR	V.A.S. Unit Tree and Shrub Insects and Their Control (35)
	TR	Pirone, P. R. Tree Maintenance (28)
d. Using general maintenance practices	SR	(11) Part II (28) Part I
2. Preparing to Plant Trees and Shrubs		
a. Selecting trees and shrubs	SR	V.A.S. Unit Selecting Trees for Home Planning (33)

Course Outline	Reference Code	Reference
b. Prepaing the soil	TR	(28)
	SR	V.A.S. Filmstrip Landscaping Homestead "4' (55 av.)
3. Planting and Transplanting Trees and Shrubs	SR	(11) Part II
a. Balling and Burlapping trees and shrubs	SR	V.A.S. Unit Transplanting Shade Trees (34)
	SR	V.A.S. Filmstrip Balling and Burlapping Trees and Shrubs (38 av.)
b. Moving trees and shrubs	SR	(34)
c. Planting and transplanting deciduous trees and shrubs	SR	(34)
d. Planting and transplanting evergreens	SR	(34)
B. Floriculture		
1. Flowers for Holidays		
a. Understanding the importance of holidays to the florist industry	SR	Nelson, Kennard Flower and Plant Production in the Greenhouse Chapter 1 (23)
b. Becoming familiar with chrysanthemum production	SR	(23) Chapter 7
c. Becoming familiar with poinsettia production	SR	V.A.S. Unit Producing Poinsettias Commercially (25)
d. Becoming familiar with production of Easter Lilies	SR	V.A.S. Unit Growing Lilies (26)
2. Floral Design		
a. Constructing holiday flower arrangements	TR	Fox, Raymond T. A Teachers Guide to Flower Arrangement (24)
	SR	V.A.S. Unit Arranging Flowers in Vases and Bowls (27)

Course Outline	Reference Code	Reference
b. Making corsages	SR	California State Polytechnic College Filmstrip Flowers to Wear Part I (31)
	SR	California State Polytechnic College Filmstrip Flowers to Wear Part II (32)
	SR	California State Polytechnic College Filmstrip Flowers to Wear Part III (33)
c. Designing flowers for special occasions	TR	(24)
	SR	(27)
C. Greenhouse Operation and Management		
1. Greenhouse Environment		
a. Controlling light, temperature, and moisture (water, humidity)	SR	(23)
	SR	George J. Ball, Inc. The Ball Red Book (38)
b. Ventilating the greenhouse	SR	(38)
c. Identifying and controlling insects in the greenhouse	SR	(38)
d. Identifying and controlling disease in the greenhouse	SR	(23)
2. Greenhouse Practice	TR	Ohio State University The Greenhouse Worker (39)
a. Securing stock plants, cuttings, seeds, bulbs, and materials	SR	(38)
b. Transplanting, bedding, and potting	SR	(38)
c. Harvesting, grading, and preparing for market	SR	(23)
d. Pinching, disbudding, and tying	SR	(23)
e. Caring for stock plants and bulbs	SR	(23)

Course Outline	Reference Code	Reference
D. Landscaping		
1. The Landscape Plan		
a. Determining landscape needs	SR	Nelson, Williams R. Landscaping Your Home Chapter 1 (13)
b. Understanding principles of design	SR	(13) Chapter 6
c. Analyzing a site	SR	(13) Chapter 3
d. Developing a landscape plan	SR	(13) Chapter 2
e. Beautifying the home grounds and lawn	SR	(13) Chapter 13
2. Plants in the Landscape Plan		
a. Fitting trees to the plan	SR	(13) Chapter 7
b. Fitting shrubs to the plan	SR	(13) Chapter 8
c. Fitting flowers to the plan	SR	(13) Chapter 9
d. Planting ornamentals	SR	(13) Chapter 12
3. Landscape Structures		
a. Choosing landscape structures	SR	(13) Chapter 4
b. Selecting construction materials	SR	(13) Chapter 5
c. Locating and constructing driveways, walks, terraces, and pools	SR	(13) Chapter 2
E. Nursery Operation and Management		

Course Outline	Reference Code	Reference
1. Soils in the Nursery	SR	(11) Part I
a. Selecting a nursery site	SR	(11) Part I
	TR	Brown, Harvard Nursery Management (40)
b. Testing the soil	SR	V.A.S. Unit pH Test for Soil Acidity (36)
	SR	The Urbana Laboratories Soil Test Color Chart-Directions and Interpretations (42)
c. Maintaining soils	SR	(11) Part I
	TR	(40)
2. Nursery Practice	SR	(11)
a. Lining out stocks	TR	(40)
b. Planting and transplanting nursery plants	SR	(11) Part I
	TR	(40)
c. Pruning and training nursery plants	SR	(11) Part II
	TR	(40)
d. Growing stock in containers	TR	(40)
3. Care of Nursery Plants		
a. Fertilizing and watering nursery plants	TR	(40) (39)
b. Cultivating nursery plants	TR	Lane Magazine and Book Company Basic Gardening Illustrated-A Sunset Book (41)
c. Mulching nursery plants	TR	(41)
d. Identifying and controlling insects and diseases	SR	(11) Part II
	TR	(40)
e. Controlling weeds in the nursery	SR	(11) Part II
	TR	(41)
E. Turf Management	TR	Musser, H. Burton Turf Management (17)
	TR	Pennsylvania State University Turf Grass Maintenance and Establishment-A Teachers Manual (21)
	TR	Ohio State University Establishment and Maintenance of Lawns (50)

Course Outline	Reference Code	Reference
1. Establishing Lawns and Turf	SR	Turgeon, A. J. and Mazur, A. R. Lawn Establishment (18)
a. Identifying and selecting grasses	SR	V.A.S. Unit Establishing a Lawn (16)
b. Making soil tests to determine nutrient needs	SR	(18)
c. Fertilizing and liming a new lawn	SR	(18)
d. Preparing the soil for a lawn	SR	(16)
e. Seeding and mulching a new lawn	SR	(16) (18)
f. Watering a new lawn	SR	(18)
2. Maintaining Lawns and Turf		
a. Fertilizing an old lawn	SR	University of Illinois Illinois Lawn Care and Establishment (19)
b. Watering an old lawn	SR	(19)
c. Weed identification	SR	V.A.S. Filmstrip Lawn Weeds Identification and Control (4 av.)
d. Lawn diseases	SR	Frolik, E. F. and Adams, J. L. Lawn Diseases in the Midwest (20)
G. Ornamental Horticulture, Other		
Horticulture Mechanics	SR	Jones, Mack Shopwork on the Farm (43)
1. Shop Orientation		
a. Planning and preparing shop projects	SR	(43) Chapter 1
b. Understanding safety practices and shop procedures	SR	(43) Chapter 1
2. Electricity	SR	(43) Chapter 19

Course Outline	Reference Code	Reference
a. Electrical wiring	SR	(43)
b. Selecting and maintaining electric motors	SR	(43)
c. Selecting and using electrical controls	SR	(43)
3. Structures		
a. Using concrete	SR	(43) Chapter 10
b. Glazing and painting	SR	(43) Chapter 6
c. Plumbing	SR	(43) Chapter 15
d. Drawing, sketching, and interpreting plans	SR	(43) Chapter 2
e. Constructing horticultural equipment (wood)	SR	(43) Chapter 3
4. Small Engines		
a. Servicing small engines	SR	American Association for Vocational Instructional Materials Small Engines, Volume I (44)
b. Starting and operating engines	SR	(44)
c. Storing engines	SR	(44)
5. Horticulture Business		
a. Succeeding on the job in horticulture		
(1) Becoming a salesman in horticultural business	SR	Ohio State University Selling and Salesmanship Unit #5 (45)
(2) Understanding the types of customers	SR	Ohio State University Human Relations in Business Unit #4 (46)
	SR	(11) Part II
(3) Understanding the fundamentals of presenting a product	SR	(2) (11) Part II

Course Outline	Reference Code	Reference
(4) Keeping inventories up to date	SR SR	(11) Part II Ohio State University Office Procedures and Records (47)
b. Sales and Services in Horticulture		
(1) Marking and tagging products	SR	(2)
(2) Displaying horticultural plants and products	SR SR	(11) Part II Ohio State University Advertising and Promotion Unit #8 (48)
(3) Advertising and promoting horticultural products and services	SR	(48) (11) Part II
(4) Selling plants and products	SR	(45)

EXEMPLARY TEACHING PLANS

V. Ornamental Horticulture

A. Plant Propagation

UNIT: 1. Asexual Plant Propagation

PROBLEM AREA: a. Producing Plants from Cuttings

TEACHING PLAN

I. INTRODUCTION: Cuttings method of propagation is the only way to reproduce certain plants. Plants produced from cuttings assure you plants with the same characteristics as the parent. This method of propagation is faster than growing from seed and therefore is a faster money maker.

II. STUDENT PERFORMANCE OBJECTIVES:

A. Given stock plants of the following, a student shall take 5 cuttings 3-4 inches long from each and get 80 per cent rooted.

1. Geranium
2. Chrysanthemum
3. Poinsettia
4. Fuchsia
5. Lantana
6. Wandering Jew
7. Begonia
8. Impatiens

B. The student shall do the following propagation procedure with the cutting taken in step #1.

1. Dip the bottom one-half inch of the cutting in a hormone powder to stimulate rooting.

2. Insert the base of the cutting to a depth of one and one-half to two inches in the rooting media.

3. Water immediately. Water daily or as needed.

4. Set in a warm (65°) but shaded place.

5. Pot cuttings when roots are about one-half inch long.

III. OUTLINE OF INSTRUCTIONAL CONTENT:

A. Asexual propagation defined

1. The production of a new plant from a growing part of a parent plant.

B. Four types of stem cuttings

1. Hardwood cuttings (of deciduous species)

a. Take from wood of previous season's growth
b. Cuttings 4-12 inches long including 2 leaf nodes.

2. Semihardwood cuttings

a. Usually broad-leaved evergreen species are used.
b. Cuttings are taken 3-6 inches long with upper leaves on, lower leaves removed.
c. Base cut is made on a slant just below the node.
d. Use "Rootone".
e. Root in condition of a high humidity.

3. Softwood

a. Cuttings taken from current season's growth of deciduous and evergreen species during summer.
b. Leaves are left attached.
c. Use growth promoting substances.
d. Root best under conditions of high humidity.

4. Herbaceous

a. Take cuttings 3-4 inches long from strongest, healthy stems.
b. Dip the bottom one-half inch of the cutting in a hormone powder.
c. Insert the base of the cutting to a depth of one and one-half to two inches in the rooting media.
d. Water immediately and thoroughly. Water daily or as needed.
e. Place in warm (65°) but shaded place.
f. Pot cuttings when roots are about one-half inch long.

IV. POSSIBLE STUDENT LEARNING ACTIVITIES:

A. Students will take five cuttings from each of the following plants using the procedure used in class:

1. Geranium
2. Chrysanthemum
3. Poinsettia
4. Fuschia
5. Lantana
6. Wandering Jew
7. Begonia
8. Impatiens

V. SPECIAL MATERIALS AND EQUIPMENT:

A. Stock plants of the above mentioned plants, plants can be obtained from local greenhouses or even house plants students have at home.

B. Jiffy mix or a mix of:

1 part of peat

1 part sterile sand, perlite, or vermiculite or straight sand can be used.

C. Rooting hormone powder (maybe optional)

D. Heating cable with thermostat or place to keep rooting media warm (65°)

E. 600 plastic, clay, pots, or used milk cartons for 15 students.

VI. STUDENT REFERENCES:

Producing Plants by Asexual Propagation
V.A.S. Unit #5006

V. ORNAMENTAL HORTICULTURE

B. Arboriculture

UNIT: 1. Care of Ornamental Trees and Shrubs

PROBLEM AREA: a. Fertilizing Trees and Shrubs

TEACHING PLAN

I. INTRODUCTION: Proper fertilizing will stimulate trees to grow more rapidly. The leaves of many trees become darker green following fertilization and this makes them more conspicuous and attractive. A vigorously growing tree is less susceptible to certain diseases and insect pests than is a less vigorous tree.

II. STUDENT PERFORMANCE OBJECTIVES:

A. The student will measure a planting bed to mathematically determine the area and hand it in, in writing, with 80 per cent accuracy.

B. The student will calculate and apply fertilizer to a landscape planting based on soil test results, and hand them in, in writing, having 80 per cent accuracy.

C. The student will list and explain the functions of fertilizer according to V.A.S. Unit #5003, with 80 per cent accuracy.

III. OUTLINE OF INSTRUCTIONAL CONTENT:

A. What is a fertilizer? (V.A.S. #5003-pgs. 203)

1. Nitrogen-promotes vegetative growth.
2. Phosphorus-essential for active root growth.
3. Potassium-involved in changing a plant's food into forms it can use for growth and other functions. It acts as a balancing agent between nitrogen and phosphorus utilization.

B. Should I fertilize? (V.A.S. #5003, pgs. 3-5)

1. If trees have poor growth or pale green leaves, fertilizer may make them grow faster and give them a darker green color. If trees are attacked by canker-causing fungi or borers, fertilizer will make them more vigorous and less subject to these troubles.

2. Determine the rate of annual growth
3. Determine the soil conditions
4. Consider the disadvantages of fertilizing.

C. When should I fertilize and with what? (V.A.S. #5003 pgs. 5-6)

1. Time of application
2. Rate of application

D. How should I fertilize? (V.A.S. #5003, pgs. 6-9)

IV. STUDENT LEARNING ACTIVITIES:

A. Given the length and width of a piece of property, the student will determine the square footage and acreage involved.

B. Once the student has determined area as in step A., he will than calculate the proper amount of fertilizer to apply for trees and shrubs for the determined area.

V. SPECIAL MATERIALS AND EQUIPMENT:

A. Fertilizer bag

B. Paper and pencil

VI. STUDENT REFERENCES:

Fertilizing and Watering Shade and Ornamental Trees Urbana, Illinois: Vocational Agriculture Service, Unit #5003

V. Ornamental Horticulture

C. Floriculture

UNIT: 2. Floral Design

PROBLEM AREA: c. Designing Flowers for Special Occasions

TEACHING PLAN

I. INTRODUCTION: Floral design allows for flowers to be enjoyed in the home rather than just out of doors. Jobs are available in floral design in the larger communities. The pay is relative to the talent of the individual and working conditions are excellent.

II. STUDENT PERFORMANCE OBJECTIVES:

A. Given a specific occasion, the student shall select the proper natural or artificial flowers and foliage for the occasion, according to the V.A.S. Unit #5009 Arranging Flowers in Vases and Bowls.

B. The student given a variation of plant material, shall be able to design and make up a floral arrangement based on the V.A.S. Unit #5009 Arranging Flowers in Vases and Bowls, to the satisfaction of the instructor.

III. OUTLINE OF INSTRUCTIONAL CONTENT:

How Do I Design A Flower Arrangement

A. There are three main types of arrangements:

1. Line arrangement
2. Mass arrangement
3. Line-mass arrangement

B. Types of arrangements defined.

1. Line arrangements - use relatively few materials. The lineal effect is created with few flowers and branches. Typical line arrangements are crescents, "L" shape, 3-line and 5- to 7-line triangles, vertical or horizontal lines, spiral, and fan shapes.

2. Mass arrangements - these arrangements require a large number of flowers. They are usually oval or triangular in shape and get their effect from a solid placement of color.
3. Line-mass arrangements - the line-mass arrangements combine the lineal effect of line arrangements with the crowded effect of mass arrangements.

C. Planning line arrangements

1. Have a focal point, where the lines converge at the base of the design.
2. Branches of pussy willow, forsythia, apple, cherry, privet, flowering quince or any other simple lineal branches can be used for the lines of the designs.
3. A few flowers, such as daffodils, tulips, iris, roses, peonies, zinnias, asters, chrysanthemums, or carnations can be used as focal point flowers.

D. Refer to the V.A.S. Unit #5009 for a detailed explanation of how the different floral designs are completed.

IV. POSSIBLE STUDENT LEARNING ACTIVITIES:

A. Make a simple line arrangement.

B. Have student judge the arrangements of each of the students.

V. SPECIAL MATERIALS AND EQUIPMENT:

A. Use plant material that may be in season.

B. Low containers (8) could use plastic cereal bowl, wooden salad bowl, etc. (see local florist).

C. Oasis (8)

D. Pruning shears (8).

VI. STUDENT REFERENCES:

A. Arranging Flowers in Vases and Bowls, V.A.S. Unit #5009.

V. Ornamental Horticulture

D. Greenhouse Operation and Management

UNIT: 1. Greenhouse Environment

PROBLEM AREA: a. Identifying and Controlling Disease in the Greenhouse

TEACHING PLAN

I. INTRODUCTION: Most of the problems that are encountered in plant growth are caused by common and ordinary events of some kind. Disease in the greenhouse can destroy many of the existing plants and therefore be disastrous as far as making any money or even to the point of having a job.

II. STUDENT PERFORMANCE OBJECTIVES:

A. The student, given pictures of common diseases in the greenhouse, shall be able to identify them, in writing, with 80 per cent accuracy.

B. Given five common disease problems in the greenhouse, the student shall determine the method of control for each according to the text Flower and Plant Production, and hand it in, in writing, with 80 per cent accuracy.

III. OUTLINE OF INSTRUCTIONAL CONTENT:

A. Compare the plant trouble with unaffected plants. Look for a pattern. (Ref. 23, pgs. 283-284)

B. Make a list of what has been done during the time the trouble has been suspected. (Ref. 23, pgs. 284-285)

C. Some troubles and some possible causes. (Ref. 23, pgs. 285-299)

1. Short growth
2. Small leaves
3. Chlorosis
4. Small flowers
5. Leaf spots
6. Loss of tip of stem
7. Witting
8. Weak stems
9. Twisted or malformed shoots

D. Diseases can be caused by fungi, bacteria, or viruses. (Ref. 23, pgs. 293-295)

E. Stem and root diseases. (Ref. 23, pgs. 299-302)

F. Leaf and flower diseases. (Ref. 23, pgs. 299-302)

G. Use the best method for getting the control material on the plant at the right time. (Ref. 23, pgs. 302-307)

H. Use pesticides and fungicides carefully, thoroughly, and wisely. (Ref. 23, pgs. 307-311)

IV. POSSIBLE STUDENT LEARNING ACTIVITIES:

A. Student shall search thoroughly the schools' plants and plants at home for possible plant disease to be brought and identified by the class.

B. Once plant diseases have been identified the class members must determine the proper method of control for the disease.

V. SPECIAL MATERIALS AND EQUIPMENT:

A. Diseased plants from the greenhouses in the community, agriculture department plant, diseased plants of teachers in the school system, diseased plants of students in the high school system or even feeder grade schools.

B. Materials to apply to diseased plants may also be obtained from any of the persons in step number one, once you have determined what you need.

Note: Your Cooperative Extension Agent can also be of great assistance especially if he specializes in horticulture. Other reference people can be people from local garden clubs, 4-H leaders and horticulture businesses.

VI. STUDENT REFERENCES:

Nelson, Kennard. Flower and Plant Production in the Greenhouse. Danville, Illinois: Interstate Printers and Publishers, Inc., 1966.

V. Ornamental Horticulture

E. Landscaping

UNIT: 1. Landscaping

PROBLEM AREA: a. Determining Your Landscaping Needs

TEACHING PLAN

I. INTRODUCTION: The function of landscape architecture is to create and preserve beauty and make the surroundings useful at the same time. The skill of determining landscape needs is highly desirable and often required for entry in a landscape job. Landscaping a home improves the value of the home, extends your living activities into the landscape, allows for more privacy, emphasizes attractive views and blocks out unattractive or objectionable views.

II. STUDENT PERFORMANCE OBJECTIVES:

A. Given a house layout, the student will draw views for both the front and back of the house according to the reference Landscaping Your Home, to the satisfaction of the instructor.

B. Given a landscaping site, the student will inventory the liabilities of the property and its surroundings according to the reference Landscaping Your Home, to the satisfaction of the instructor.

III. OUTLINE OF INSTRUCTIONAL CONTENT:

A. Landscape architects job is to design a plan within the terms of agreement with his client.

B. Successful landscape planning involves three considerations.

1. Consider the lot or site as a cube of space, very much like a room.
2. Study the floor plan, window locations, and primary living areas of your house so that there is a relationship between living and service areas in the house and similar areas out of doors.

3. Consider the landscape design from outside the house as viewed by yourself and others.

C. Inventory family activities

1. Hobbies
2. Type and frequency of entertaining
3. Type of outdoor recreation the family members enjoy

D. Study geographical location of house

1. Climate largely determines the plants you can use.
2. Locate shade trees where they will best shade the house, terrace, and outdoor living areas.

E. Inventory property liabilities

1. Unsightly views of neighboring property
2. Height of surrounding land and houses
3. Grade changer
4. Soil pH, texture, humus content, and drainage

F. Inventory property assets

1. Existing vegetation
2. A distant view
3. Water features as a stream or brook

IV. POSSIBLE STUDENT LEARNING ACTIVITIES:

A. The student can be given a house blue print with the rooms layout and draw in the lines for the views from inside the house.

B. Given a house blueprint with room layout, the student will label outside areas corresponding to the room layout of the house.

V. SPECIAL MATERIALS AND EQUIPMENT:

A. House blue prints and pictures can be obtained from local contractors, carpenters, the Industrial Arts Department, teachers building homes and student's parents.

B. Pencils.

C. Architect rules (optional)

VI. STUDENT REFERENCES:

Nelson, William R., Landscaping Your Home, Urbana, Illinois: Cooperative Extension Service, College of Agriculture, Univeristy of Illinois, 1963.

V. Ornamental Horticulture

F. Nursery Operation and Management

UNIT: 1. Nursery Practice

PROBLEM AREA: a. Growing Stock in Containers

TEACHING PLAN

I. INTRODUCTION: The name of the game in horticulture is being able to reproduce, grow, and sell plants. This is where experience pays off in having some knowledge of plants. Job entry pay is usually much higher for a person who has experience in growing plants rather than one who has not. A student is evaluated on his ability to grow saleable plants in containers.

II. STUDENT PERFORMANCE OBJECTIVES:

A. The student will care for and grow 5 one gallon containers of the following woody plants to the satisfaction of the instructor.

1. Privet
2. Boxwood
3. Myrtle
4. Juniper

B. The student shall correctly label and do weed control on his 5 one gallon containers according to the reference The Nursery Worker Part I, to the satisfaction of the instructor.

III. OUTLINE OF INSTRUCTIONAL CONTENT:

Container-grown stock

A. Plants are grown in cans or similar containers for ease in handling and for future planting in the group.

B. They do not remain in containers as do potted plants or tub specimens.

C. Sizes of containers used commercially include 1, 3, 5, and 15 gallon cans.

D. Examples of container grown stock are Juniper and Boxwood. Plants that can be grown in this manner include nearly all species of conifers and broadleaf evergreen trees and shrubs.

E. Since container stock remains in the nursery longer than some other kinds of plants, it requires more fertilizer and spraying. Watering is a continual problem as is weed control and labeling. Regardless of the size of container, the plant should not remain in it long enough to become "root-bound".

IV. POSSIBLE STUDENT LEARNING ACTIVITIES:

A. Student to care for 5 one gallon containers of woody plants.

B. Student can correctly label and weed container grown plants.

V. SPECIAL MATERIALS AND EQUIPMENT:

A. Watering hose and watering nozzle

B. Woody labels

C. One gallon cans

Note: Gallon cans for container grown plants can be obtained from a school cafeteria.

VI. STUDENT REFERENCES

The Nursery Worker Part I. Columbus, Ohio: Ohio Agricultural Education Curriculum Materials Service, The Ohio State University, 1971.

V. Ornamental Horticulture

G. Turf Management

UNIT: 1. Establishing Lawns and Turf

PROBLEM AREA: a. Fertilizing and Liming a New Lawn

TEACHING PLAN

I. INTRODUCTION: The reason for fertilizing and liming a new lawn is so that it gets off to a good start and we increase the probability that the new lawn establishment will be a success. Jobs related to establishing lawns are available in most communities, especially where new housing is being built. A person can save some of the cost of establishing a lawn by seeding, fertilizing, and watering the lawn himself.

II. STUDENT PERFORMANCE OBJECTIVES:

A. Given an existing turf plot, the student will demonstrate how to apply fertilizer according to the Circular #1082 Illinois Lawn Care and Establishment, to the satisfaction of the instructor.

B. Given soil sample test results, the student will determine the proper amount of lime and fertilizer to apply on a one acre plot; write out the recommendations and hand them in, with 80 per cent accuracy.

III. OUTLINE OF INSTRUCTIONAL CONTENT:

Fertilizing a New Lawn

A. Items to Consider:

1. The plant food elements
2. Fertilizer grades
3. Amount of fertilizer to apply
4. Method of application
5. Fertilizer forms

B. Related Information

1. The plant food elements
All new lawns should have fertilizer applied before seeding. A good weed-free lawn needs plenty of plant food in the soil.

Nitrogen is the plant food that grass needs most, because it stimulates rapid growth and dark green leaves. Although it is generally present in small amounts, it leaches out of the soil fairly easy and needs to be replaced.

Phosphourus promotes root growth. Grass needs a well developed root system to support a luxuriant top growth. A deep root system increases the ability of desirable grasses to serv..ce midsummer conditions better without frequent watering than will poorly rooted grasses that have to be watered frequently.

Potassium helps to increase vigor, hardiness and disease resistance of lawns. Of the three major plant food elements, potassium is least likely to be lacking.

2. Fertilizer grades
On every bag of fertilizer sold there appears a grade, which is the minimum guaranteed analysis of the major plant nutrients contained in that material. Such a grade might be 5-20-20, which means that the fertilizer contains by weight 5% nitrogen, 20% phosphorous as P_2O_5, and 20% potassium, expressed as K_2O.

3. Amount of fertilizer to apply
When a soil test is made, use the amount and analysis suggested for the specific location. In the absence of a soil test, the following amounts should be adequate:

For common Kentucky bluegrass or a bluegrass mixture, apply 40 to 50 pounds per 1000 square feet of a high phosphate analysis fertilizer, such as 6-24-12, 8-16-16, 6-10-4, 4-12-4, 5-10-5, or similar analysis.

For Merion Kentucky bluegrass use the same amount of 15-15-15, 12-12-12, 10-10-10 or similar analysis.

4. Method of application
The needed fertilizer may be raked into the soil surface for most new lawns. Where soil test shows extreme lack of phosphorus, work the soil deeper.

5. Fertilizer forms
Some form granulated or pelleted fertilizers are hard to get through some lawn spreaders; they may work better in the spinner types of spreaders.

Many brands and formulas of liquid fertilizers and soluble powders are available. These produce no better results than the same quantities of plant nutrients supplied from dry fertilizers. Liquids may be more convenient for you to apply; however, they may be more expensive than dry fertilizer.

IV. POSSIBLE STUDENT LEARNING ACTIVITIES:

A. Test soil.

B. Measure lawns and compute fertilizer requirements.

C. Apply fertilizers to lawns with different types of applicators.

V. SPECIAL MATERIALS AND EQUIPMENT:

A. Soil sampling tube.

B. Lawn fertilizer spreader.

C. Samples of fertilizer and fertilizer forms.

D. Sample of soil test sheet.

E. Charts.

VI. STUDENT REFERENCES:

Lawn Establishment. Urbana, Illinois: Cooperative Extension Service, College of Agriculture, University of Illinois. 1972. Circular #1066.

V. Ornamental Horticulture

H. Ornamental Horticulture, Other

UNIT: 1. Horticulture Mechanic

PROBLEM AREA: a. Starting Engines

TEACHING PLAN

I. INTRODUCTION: Most operators have more trouble with starting a small engine than they do with any other phase of operation. Jobs are available to good mechanics that can repair and properly operate engines. The individual can save money by being able to get his engine started and keeping it in operating condition.

II. STUDENT PERFORMANCE OBJECTIVES:

A. Given the following equipment, a student will do adjustments, maintenance, and service:

1. Lawn mower
2. Sweeper
3. Edger
4. Renovator
5. Rototiller
6. Electric hedge trimmer
7. Aerator
8. Sod cutter
9. Chain saw
10. Spray equipment
11. Compost grinder
12. Soil shredder

This will be done to the manufacturer's specifications.

B. Given a lawn mower engine, the student will disassemble, take specifications, replace worn parts, clean parts, reassemble, start engine and adjust for proper operation. This will be done to the manufacturer's specifications.

III. OUTLINE OF INSTRUCTIONAL CONTENT:

A. Preparing to Start the Engine
Read the operator's manual first
1. See that it has been serviced properly
2. Move engine outside
3. See that the area is clean
4. See that the engine is level and well balanced
5. Apply brakes if the equipment has them
6. Disengage clutch on all power-driven equipment when possible
7. Adjust carburetor if needed.

B. Starting the Engine

1. Open the fuel shut off valve if your equipment is equipped with one.
2. Close the choke valve or prime the carburetor.
3. Set throttle at position recommended for your engine.
4. Turn ignition switch if engine has one.
5. Crank the engine.
6. Open the choke valve part or all the way when the engine starts
7. Adjust the throttle for warm up.
8. Repeat steps 1 through 4 if the engine does not start.

IV. POSSIBLE STUDENT LEARNING ACTIVITIES:

A. Have students start lawn mower engines following the above procedure.

B. Read operator's manuals.

V. SPECIAL MATERIALS AND EQUIPMENT:

A. Lawn mowers

B. Operator's manuals (from home)

VI. STUDENT REFERENCES:

Small Engines Volume I. Care-Operation-Maintenance-Repair. Athens, Georgia: Engineering Center, American Association for Vocational Materials, 1969.

REFERENCES

Specific References

V. Ornamental Horticulture

1. Annual Directory-Illinois Association of Vocational Agriculture Teachers. State of Illinois-Board of Vocational Education and Rehabilitation, Springfield, Illinois.

   The publication is revised each year and mailed to all vocational agriculture teachers in the State of Illinois. It gives name, address, and section the teacher is in.

2. Marketing Agricultural Products Unit #1. Columbus, Ohio: Ohio Agricultural Education Curriculum Materials Service, The Ohio State University, 1971.

   This is similar to the Illinois Vocational Agriculture Service Units in size. It is about 30 pages that states objective unit areas of study and has many good student exercises in it.

3. Shrubs for Landscaping. Columbus, Ohio: Ohio Agriculture Education Curriculum Materials Service, The Ohio State University, 1972.

   Excellent publication that gives simplified identification, culture and use of approximately 25 shrubs used for landscaping. The illustrations of the plant material are top quality.

4. Trees for Landscaping. Columbus, Ohio: Ohio Agricultural Education Curriculum Materials Service, The Ohio State University, 1972.

   This is an excellent publication that gives simplified identification, culture, and use of approximately 25 commonly used trees for landscaping.

5. Watts, May Theilgaard. Master Tree Finder. Berkeley, California: Nature Study Guide, 1963.

   Inexpensive pocket sized publication that is used primarily for identification purposes of native trees.

6. Kromdyk, G. 200 House Plants in Color. New York: Herder and Herder, New York, 1967.

   Retails $7.50. This is probably one of the best books to have as a single copy for reference. It has excellent color photos and gives the culture of each plant.

7. Coleman, L. Jane. Foliage Plants for Modern Living. Kalamazoo, Michigan: Merchants Publishing Company, 1974.

   This publication costs approximately $3.00. The 80 page publication has top quality photos for identification. The culture for the plants is given very briefly.

8. Hartman, Hudson T. and Kester, Dale E. Plant Propagation-Principles and Practices. Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1959.

   The book covers general aspects of propagation, sexual propagation, asexual propagation, and propagation of selected plants. The book is 560 pages and is very well illustrated.

9. Buying Bedding Plants. Urbana, Illinois: Vocational Agriculture Service Unit #5010.

   This 20 page unit covers how to start or germinate plants from seed, recommends varieties and tells how to care for bedding plants.

10. Producing Plants by Asexual Propagation. Urbana, Illinois: Vocational Agriculture Service, Unit #5006.

    This 20 page unit covers how to propagate, materials needed, and grafting of plants. It is brief and to the point.

11. The Nursery Worker, Parts I and II. Columbus, Ohio: Ohio Agricultural Education Curriculum Materials Service, The Ohio State University, 1971.

    The two-volume set of reference material is a course of study for a nursery worker. They deal with the complete realm of what a nursery worker has to know and do.

12. Mahlstide, John P. and Haber, Ernest S. Plant Propagation. New York: John Wiley and Sons, Inc., 1966.

    The book is 413 pages which covers basic concepts and principles of propagation, sexual propagation, asexual propagation, propagation structures, and propagation of specific plants. It is very well illustrated.

13. Nelson, William R. Landscaping Your Home. Urbana, Illinois: Cooperative Extension Service, College of Agriculture, University of Illinois, 1963.

The 153 page publication is inexpensive and complete. It covers landscaping needs, analyzing site, landscape structures, use of plant material, care of plant material, and lists selected plant material.

14. Landscape Maintenance and Establishment, A Teacher's Manual. University Park, Pennsylvania: The Pennsylvania State University, 1968.

The material covered is of sufficient breadth to cover the objectives of this unit.

15. Landscaping Your Home. Columbus, Ohio: Vocational Agricultural Service, Department of Education, 1964.

This is a 72 page publication that covers developing a landscape plan for the home grounds, landscaping the various areas surrounding the home and care and pruning of ornamental shrubs and shade trees.

16. Establishing a Lawn. Urbana, Illinois: Vocational Agriculture Service, Unit #5008.

The 8 page unit covers soil preparation, grasses to use, seeding practices, care of a new lawn, and establishing a lawn with sod.

17. Musser, H. Burton. Turf Management. New York: McGraw Hill Book Company, 1962.

The 356 page book is a complete turf management reference. It covers production of special-purpose turf, soil, fertilizers, drainage, propagation, maintenance, weed control, disease control, insect control and golf course operation.

18. Turgeon, A. J. and Mayar, A. R. Lawn Establishment. Urbana, Illinois: Cooperative Extension Service, College of Agriculture, University of Illinois, 1972. Circular #1066.

19. Illinois Lawn Care and Establishment. Urbana, Illinois: Cooperative Extension Service, College of Agriculture, University of Illinois. Circular #1082.

20. Frolik, E. F. and Adams, J. L. Lawn Disease in the Midwest. Urbana, Illinois: Cooperative Extension Service, College of Agriculture, University of Illinois, 1966. Circular #NC-12.

21. Turf Grass Maintenance and Establishment-A Teacher's Manual. University Park, Pennsylvania: Department of Agricultural Education, The Pennsylvania State University, 1968.

This manual includes technical data necessary for establishing turf areas by seeding and vegetative plantings.

22. Turf Management. Columbus, Ohio: Ohio Agricultural Education Curriculum Materials Service, The Ohio State University, 1973.

The manual's section of turf propagation provides a good source of easily understood information for this unit.

23. Nelson, Kennard, Flower and Plant Production in the Greenhouse. Danville, Illinois: Interstate Printers and Publishers, Inc., 1966.

The 335 page book covers the floriculture industry, structures, environment, soils, reproduction of plants, care of cut flower crops and pot plant crops, plus pests and diseases.

24. Fox, Raymond T. A Teachers Guide to Flower Arrangement. Ithaca, New York: Department of Floriculture and Ornamental Horticulture, New York State College of Agriculture, Cornell University, 1960.

The 40 page guide gives the history, tools, containers, care of flowers and flower arrangement demonstration procedures necessary for teaching this type of unit.

25. Producing Poinsettias Commercially. Urbana, Illinois: Vocational Agriculture Service. Unit #5013.

The 12 page unit covers varieties culture, propagation, transplanting, scheduling for Christmas, common problems, and preparing plants for sale.

26. Growing Lilies. Urbana, Illinois: Vocational Agriculture Service. Unit #5014.

The 20 page unit covers propagation, timing for Easter sale, and culture.

27. Arranging Flowers in Vases and Bowls. Urbana, Illinois: Vocational Agriculture Service. Unit #5009.

The 20 page unit covers selecting plant material, tools needed, containers, preparing flowers for arrangement, and design.

28. Pirone, P. R. Tree Maintenance. New York: Oxford University Press, 1959.

The 483 page text Part I covers general maintenance practices dealing with soil, transplanting, fertilizers, pruning, cavity treatments, bracing, and suitability of trees for various locations. Part II covers specific abnormalities of trees such as: diagnosing, non-parasitic injuries, insect control, spraying equipment, and tree diseases.

29. Fertilizing and Watering Shade and Ornamental Trees. Urbana, Illinois: Vocational Agriculture Service, Unit #5003.

The 12 page unit covers the why, what, when and how to fertilize and water shade and ornamental trees.

30. Murphy, Richard C. and Meyer, William E. The Care and Feeding of Trees. New York: Crown Publishers, Inc., 1969.

The 164 page book covers planning, planting, soil, fertilizing, pruning, insects and pests, and an array of 10 useful charts.

31. Hudson, Roy L. Pruning Handbook-A Sunset Book. Menlo Park, California: Lane Magazine and Book Company, 1968.

This is a rather complete publication on pruning. The 80 page reference covers the objectives and effects of pruning, tools, do's and don'ts of pruning, plus pruning of shrubs, trees, berries and ornamental vines.

32. Pruning Shade Trees. Urbana, Illinois: Vocational Agriculture Service. Unit #5004.

The 8 page unit covers the why, when and what of pruning. Pruning equipment is also listed.

33. Selecting Trees For Home Planning. Urbana, Illinois: Vocational Agriculture Service. Unit #5001.

This 40 page unit covers what factors you need to consider when buying trees. It also gives information on about 50 different trees for home planting.

34. Transplanting Shade Trees. Urbana, Illinois: Vocational Agriculture Service. Unit #5002.

The 12 page unit tells how to prepare, plant, and protect a tree that is to be transplanted.

35. Tree and Shrub Insects and Their Control. Urbana, Illinois: Vocational Agriculture Service, Unit #5005a.

The 36 page unit gives facts about insects, a description of pests, and control measures.

36. pH Test for Soil Acidity. Urbana, Illinois: Vocational Agriculture Service. Unit #4002.

37. Pruning Evergreens and Deciduous Trees and Shrubs. Urbana, Illinois: Cooperative Extension Service, College of Agriculture, University of Illinois. Circular #1033.

38. The Ball Red Book. West Chicago, Illinois: George J. Ball, Inc., 1973.

The 501 page book is recently revised. It covers almost every aspect of flower production in the greenhouse and includes discussion of over 100 individual crops. Cost is approximately $7.00.

39. The Greenhouse Worker. Columbus, Ohio: Ohio Agricultural Education Curriculum Materials Service, The Ohio State University, 1974.

40. Brown, Harvard. Nursery Management. San Luis Obispo, California: California State Polytechnic College.

The 90 page publication tells about the nursery industry, starting an ornamental horticulture program, operating a high school nursery, plus much more.

41. Basic Gardening Illustrated-A Sunset Book. Menlo Park, California: Lane Magazine and Book Company, 1972.

The 125 page publication is gardening condensed. It has many illustrations and it will cover soil, propagation, planting, watering, pruning, pest control, weeding, tools, and plant specialities.

42. Soil Test Color Chart-Directions and Interpretations. Urbana, Illinois: The Urbana Laboratories.

The color charts help to interpret the soil test results so that recommendations can be made to correct any deficiencies. They give brief, concise, directions for each soil test.

43. Jones, Mack. Shopwork on the Farm. St. Louis, Missouri: McGraw-Hill Book Company, 1955.

The 626 page text includes most all areas to be covered in teaching a shop class. Examples of the areas covered are sketching and drawing, woodwork, sharpening and fitting tools, concrete and plumbing, etc.

44. Small Engines, Volume I. Athens, Georgia: Engineering Center, American Association for Vocational Instructional Materials, 1969.

The 158 page publication is one of the best. It has multi-colored illustrations that make it excellent for high school students. It covers all aspects of care and operations of small engines.

45. Selling and Salesmanship, Unit #5. Columbus, Ohio: Ohio Agricultural Education Curriculum Materials Service, The Ohio State University, 1971.

One of a series, this 27 page publication gives unit objectives and area of study. It has many excellent student exercises.

46. Human Relations in Business, Unit #4. Columbus, Ohio: Ohio Agricultural Education Curriculum Materials Service, The Ohio State University, 1971.

One of a series, this 47 page unit gives objectives and study areas for office procedures. It has many good student exercises included.

48. Advertising and Promotion, Unit #8. Columbus, Ohio: Ohio Agricultural Education Curriculum Materials Service, The Ohio State University, 1971.

One of a series, this 52 page unit gives objectives and study areas for advertising. It includes many good student exercises.

49. Wilson, Scott. Landscape Maintenance. San Luis Obispo, California: California State Polytechnic College.

The 50 page publication covers soils, fertilizers, irrigation, turf, garden pests and control, plant diseases, arboriculture, gardening tools, scheduling and business practices. The publication is well illustrated.

50. Establishment and Maintenance of Lawns. Columbus, Ohio: Vocational Agriculture Service and Department of Agricultural Education; The Ohio State University, 1965.

Selected References for More Information

PLANT PROPAGATION

Haring, Elda. The Complete Book of Growing Plants from Seed. Grandview, Missouri: Diversity Book, Inc., 1967.

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GENERAL HORTICULTURE

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2. Growers Talk
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   George J. Ball, Inc.
   West Chicago, IL 60185

3. The Landscaper
   Circulation Manager
   Midwest Landscaping
   P. O. Box 440
   St. Charles, IL 60174

4. Lawn and Garden Marketing
   Intertec Publishing Corp.
   1014 Wyandette Street
   Kansas City, MO 64105

5. American Horticulturist
   The American Horticultural Society
   7931 East Boulevard Drive
   Alexandria, VA 22308

6. Florists' Review
   Florists' Publishing Company
   343 South Dearborn Street
   Chicago, IL 60604

7. Plants Alive
   Plants Alive
   2100 North 45th
   Seattle, WA 98103

8. Organic Gardening and Farming
   Organic Gardening and Farming
   33 East Minor Street
   Emanaus, PA 18049

9. American Nurseryman
   American Nurseryman Publishing Co.
   343 South Dearborn Street
   Chicago, IL 60604

SCHOOL FACILITIES, EQUIPMENT AND SUPPLIES

Suggested Facilities for Ornamental Horticulture Program

The following suggestions are intended as guides for facilities for an adequate program with space allocations for accommodating three classes of 15 to 20 students per class.

Space Allocations

Classroom	700-750 sq. ft.
Office	120 sq ft. per instructor
Headhouse	500-600 sq. ft.
Greenhouse	1800-2400 sq. ft.
Mechanics Laboratory	12-1600 sq. ft.
Land Laboratory	3-5 acres

Classroom

A standard classroom equipped with a library unit and a demonstration table with hot and cold water and 115 volt electricity is advisable.

Office

Office space of approximately 120 square feet per teacher provides space for filing cabinet, desk, and teaching supplies.

Headhouse

The Headhouse may be attached to the greenhouse but need not be of the same construction. The floor should be of concrete. The headhouse should be equipped with portable benches, chalkboard, sink, refrigerator, soil sterilizer, storage shelves for pots, and soil bins for soil and other growth media.

The Greenhouse

The most practical greenhouse is a well-constructed commercial type. On a cost per square foot basis, wider houses tend to be more economical than narrow houses. A house of approximately 30 feet in width and 60 to 80 feet in length is suggested.

Greenhouse Systems

1. Heating--overhead gas or electricity, available at all times to maintain temperature.

2. Ventilation--fully automatic, no-draft fan jet type with plastic sleeve and automatic motorized ridge ventilator.

3. Cooling--fan and pad, fully automatic

4. Watering--provision for automatic watering and overhead outlets for hand watering.

5. Electrical Outlets--115 volt waterproof outlets every ten feet around the perimeter and one row of waterproof outlets overhead at the approximate center and every ten feet the length of the house.

Mechanics Laboratory

From 1200 to 1600 square feet of shop space should be provided for the instructional program in maintenance of small gas engines, larger power units, field and garden equipment, and small hand tools. The mechanics laboratory should have a concrete floor, adequate lighting, ventilation, heating, and electrical power for operating repair equipment, including arc welder.

Land Laboratory

Three acres of good land should be provided for the development of a nursery, arboretum, turf plots, container stock area, student practice plots, and for landscape design practice.

Suggested Equipment and Supplies

The following list of individual and groups of tools, equipment, and supplies can be used as a guide in ordering

and assembling those items needed for the ornamental horticulture program. The extent and type of instruction a department undertakes will determine the needs for materials and equipment.

1. Small Shop Tools and Equipment for:
   a. Carpentry
   b. General maintenance and repair
   c. Pipe fitting
   d. Glazing
   e. Small engine maintenance and repair

2. Hand Field Tools and Equipment for:
   a. Cultivating
   b. Lawn maintenance
   c. Masonry
   d. Pruning and trimming

3. Power Field Equipment for:
   a. Cultivating
   b. Lawn maintenance
   c. Seeding and fertilizing
   d. Spraying
   e. Transporting
   f. Tree maintenance

4. Greenhouse and Headhouse Equipment
   a. Black cloth
   b. Chemical fogging, dusting, and spraying devices
   c. Fixtures (benches, bins, shelving, etc.)
   d. Greenhouse carts
   e. Growing lights
   f. Heating equipment
   g. Misting equipment
   h. Ventilating equipment
   i. Watering devices

5. Classroom and Laboratory Equipment
   a. Display facilities
   b. Instructional media
   c. Refrigeration
   d. Storage facilities (various types)
   e. Test and inspection equipment

6. Safety Equipment for:
   a. Fire protection
   b. Personal protection
      1. Eye
      2. Apparel
      3. Respiratory
   c. Poison storage
   d. Ventilation

7. Nursery and Greenhouse Equipment and Supplies
   a. Containers
      1. Flats
      2. Pots
   b. Display materials
      1. Hangings baskets
      2. Labels
      3. Stakes
      4. Twine
      5. Shadow boxes
      6. Racks
      7. Foil
      8. Ribbons
      9. Tapes
      10. Paper
      11. Vases
      12. Wreaths
      13. Preservatives
      14. Spray paints
      15. Foam
      16. Arrangement media
      17. Wire
      18. Packaging
   c. Growing supplies
      1. Bark dust
      2. Bulbs, seeds, plants
      3. Budding strips
      4. Stock plants
      5. Cuttings
      6. Fertilizers and lime
      7. Fumigants and pesticides
      8. Peat moss
      9. Perlite and vermiculite
      10. Plastic
      11. Soil, sand, gravel
      12. Hormones (growth, defoliation)
   d. Miscellaneous
      1. Burlap
      2. Grafting supplies

Reference:

Curriculum Guide for Ornamental Horticulture, Oregon Board of Education: Superintendent of Public Instruction, June, 1969.

AUDIO VISUAL SOURCES AND MATERIALS

1 av. Beginning Techniques in Flower Arranging
California State Polytechnic College N/A

2 av. Fertilizing and Watering Shade and Ornamental Trees #640
Vocational Agriculture Service
University of Illinois
Urbana, Illinois

3 av. Lets Explore a Lawn
Society of Visual Education
1345 Crawford Avenue
Evanston, Illinois 60201

4 av. Lawn Weeds Identification and Control #650
Vocational Agriculture Service
434 Mumford Hall
Urbana, Illinois

5 av. Fruits: Their Growth and Classification
Society of Visual Education
1345 Crawford Avenue
Evanston, Illinois 60201

6 av. Steps to a Better Lawn #651
Vocational Agriculture Service
434 Mumford Hall
Urbana, Illinois

7 av. Planting a Terrarium and How to Keep It #647
Vocational Agriculture Service
434 Mumford Hall
Urbana, Illinois

8 av. Greenhouse-Use and Design #680
Vocational Agriculture Service
College of Agriculture
University of Illinois
Urbana, Illinois 61801

9 av. Plant Identification
Ornamental Horticulture Dept. N/A

10 av. Exhibiting Plant Products at the Fair
California State Polytechnic College N/A

11 av. Controlling Wild Hemp Marijuana
Vocational Agriculture Service
434 Mumford Hall
Urbana, Illinois

12 av. Landscaping-Do's and Don'ts #642
Vocational Agriculture Service
434 Mumford Hall
Urbana, Illinois

13 av. Ground Covers and Their Uses #646
Vocational Agriculture Service
434 Mumford Hall
Urbana, Illinois 61801

14 av. Growing Media for Ornamental Plants
Vocational Education Production
California State Polytechnic College
San Luis, California 93401

15 av. The Elements of Pruning
Vocational Education Production
California State Polytechnic College
San Luis, California 93401

16 av. Fertilizing Ornamental Plants
Vocational Education Production
California State Polytechnic College
San Luis, California 93401

17 av. Propagating Ornamental Plants
Vocational Education Production
California State Polytechnic College
San Luis, California 93401

18 av. Controlling Pests of Ornamental Plants
Vocational Education Production
California State Polytechnic College
San Luis, California 93401

19 av. Lawns and Ground Covers
Vocational Education Production
California State Polytechnic College
San Luis, California 93401

20 av. Identifying Illinois Turfgrasses #652
Vocational Agriculture Service
434 Mumford Hall
Urbana, Illinois 61801

21 av. Selecting Container Evergreens Part I #681
Vocational Agriculture Service
434 Mumford Hall
Urbana, Illinois 61801

22 av. Selecting Container Evergreens Part II #682
Vocational Agriculture Service
434 Mumford Hall
Urbana, Illinois 61801

23 av. Selecting Container Evergreens Part III #683
Vocational Agriculture Service
434 Mumford Hall
Urbana, Illinois 61801

24 av. Practice Set for Foliage Plants Part II #611 (Supp.)
Vocational Agriculture Service
434 Mumford Hall
Urbana, Illinois 61801

25 av. Structure of Flower Plants
Society of Visual Education
1345 Crawford Avenue
Evanston, Illinois 60201

26 av. Plant Factories
Society of Visual Education
1345 Crawford Avenue
Evanston, Illinois 60201

27 av. Let's Explore a Garden
Society of Visual Education
1345 Crawford Avenue
Evanston, Illinois 60201

28 av. What Makes Up a Flower Family
Society of Visual Education
1345 Crawford Avenue
Evanston, Illinois 60201

29 av. Flowers, Their Parts and Functions
Society of Visual Education
1345 Crawford Avenue
Evanston, Illinois 60201

30 av. Flowers, Fruits, and Seeds
Society of Visual Education
1345 Crawford Avenue
Evanston, Illinois 60201

31 av. Flowers to Wear Part I
California State Polytechnic College
San Luis, California 93401

32 av. Flowers to Wear Part II
California State Polytechnic College
San Luis, California 93401

33 av. Flowers to Wear Part III
California State Polytechnic College
San Luis, California 93401

34 av. Vegetables
California State Polytechnic College
San Luis, California 93401

35 av. Propagation by Air Layering #600
Vocational Agriculture Service
434 Mumford Hall
Urbana, Illinois 61801

36 av. Flowers and You
Society of American Florists
Washington, D.C.

37 av. Pruning Flowering Trees #645
Vocational Agriculture Service
434 Mumford Hall
Urbana, Illinois 61801

38 av. Balling and Burlapping Trees and Shrubs #641
Vocational Agriculture Service
434 Mumford Hall
Urbana, Illinois 61801

39 av. Foliage Plant Identification Part I #610
Vocational Agriculture Service
434 Mumford Hall
Urbana, Illinois 61801

40 av. Foliage Plant Identification Part II #611
Vocational Agriculture Service
434 Mumford Hall
Urbana, Illinois 61801

41 av. Foliage Plant Identification Part III #612
Vocational Agriculture Service
434 Mumford Hall
Urbana, Illinois 61801

42 av. Foliage Plant Identification Practice Set Part I #610 (Supp.)
Vocational Agriculture Service
434 Mumford Hall
Urbana, Illinois 61801

43 av. Practice Set for Garden Flowers Part I #601 (Supp.)
Vocational Agriculture Service
434 Mumford Hall
Urbana, Illinois 61801

44 av. Practice Set for Garden Flowers Part II #602 (Supp.)
Vocational Agriculture Service
434 Mumford Hall
Urbana, Illinois 61801

45 av. Garden Flowers, Annuals Part I #601
Vocational Agriculture Service
434 Mumford Hall
Urbana, Illinois 61801

46 av. Garden Flowers, Annuals Part II #602
Vocational Agriculture Service
434 Mumford Hall
Urbana, Illinois 61801

47 av. Pruning and Grafting Fruit Trees
Nasco/NIA

48 av. Recognizing Medium Size Shrubs #661
Vocational Agriculture Service
434 Mumford Hall
Urbana, Illinois 61801

49 av. Recognizing Large Shrubs and Small Trees #662
Vocational Agriculture Service
434 Mumford Hall
Urbana, Illinois 61801

50 av. Recognizing Small Shrubs #660
Vocational Agriculture Service
434 Mumford Hall
Urbana, Illinois 61801

51 av. Landscaping Homestead (I)
Division of Vocational Education
State Dept. of Education
Agriculture Education
Atlanta, Georgia

52 av. Landscape Homestead (II)
Division of Vocational Education
State Dept. of Education
Agriculture Education
Atlanta, Georgia

53 av. Landscape Homestead (III)
Division of Vocational Education
State Dept. of Education
Agriculture Education
Atlanta, Georgia

54 av. Telling Trees Apart
Society of Visual Education
1345 Crawford Avenue
Evanston, Illinois 60201

55 av. Landscaping Homestead (IV)
Division of Vocational Education
Agriculture Education
Atlanta, Georgia

56 av. Plantings I
Division of Vocational Education
Agriculture Education
Atlanta, Georgia

57 av. Plantings II
Division of Vocational Education
Agriculture Education
Atlanta, Georgia

58 av. Pruning Ornamental Shrubs
California Polytechnic College
San Luis, California 93401

59 av. Pruning Orchards
Division of Vocational Education
State Dept. of Education
Agriculture Education
Atlanta, Georgia

60 av. Pruning Evergreens #643
Vocational Agriculture Education
434 Mumford Hall
Urbana, Illinois 61801

61 av. Pruning Deciduous Shrubs and Trees #644
Vocational Agriculture Service
434 Mumford Hall
Urbana, Illinois 61801

Transparencies

Vocational Agriculture Service
434 Mumford Hall
Urbana, IL 61801

Landscape Planting and Bed Preparation

Landscape Construction

Landscape Construction Accessories

Shrubs - Identification

TEACHER COMPETENCIES AND TRAINING AVAILABLE

Opportunities are available for instructors in Ornamental Horticulture to upgrade themselves and keep abreast in their field. Following is a partial listing of ways to increase teacher competencies:

1. Attend inservice workshops held during the Annual Agricultural Occupations Teachers Conference.

2. Request area community colleges or senior colleges to conduct a workshop held in your area of interest.

3. Attend state-wide meetings such as:
   a. Illinois Landscapers Annual Field Day.
   b. Flower Quality Judging Workshop.
   c. The Mid-America Horticultural Trade Show sponsored by Illinois State Nurserymen, Illinois Landscape Contractors Association, and Wisconsin Landscape Federation.

4. Attend area meetings conducted by the local County Cooperative Extension Service.

5. Request the D.V.T.E., I.V.A., V.A.S., and the industry to conduct workshops in your special interest area.

6. Enroll in course work at a university, either on-campus or extramural. On the following pages is a list of colleges and universities in the United States that offer training in Ornamental Horticulture.

COLLEGES AND UNIVERSITIES OFFERING PROFESSIONAL TRAINING

HORTICULTURE AND
* ORNAMENTAL HORTICULTURE
(Only the schools with asterisks include ornamental horticulture)

University of Arizona, Tucson
*California State Polytechnic College, San Luis Obispo
*University of California, Davis Campus, Davis
*Fresno State College, Fresno
*Colorado State University, Fort Collins
University of Connecticut, Storrs
University of Delaware, Newark
*University of Florida, Gainesville
Florida Southern College, Lakeland
*University of Illinois, Urbana
Southern Illinois University, Carbondale
Purdue University, Lafayette
Iowa State University of Science and Technology, Ames
McNeese State College, Lake Charles
*Michigan State University, East Lansing
University of Missouri, Columbi.
University of New Hampshire, Durham
New Mexico State University, University Park
*Cornell University, Ithaca and New York City
Agricultural and Technical College of North Carolina, Greensboro
*Ohio State University, Columbus
Oklahoma State University, Stillwater
Oregon State University, Corvallis
Pennsylvania State University, University Park
Delaware Valley College of Science and Agriculture, Doylestown
University of Rhode Island, Kingston
Clemson University, Clemson
*Texas Technological College, Lubbock
Texas A & M College, College Station
Utah State University of Agriculture and Applied Science, Logan
Virginia Polytechnic Institute, Blacksburg, Cedar City and Ephraim
Washington State University, Pullman
University of Wisconsin, Madison

FLORICULTURE
(All are 4-year programs except schools marked with asterisks, which are 2-year programs.)

Auburn University, Auburn

University of California, Los Angeles
*City College of San Francisco, San Francisco
Colorado State University, Fort Collins
University of Connecticut, Storrs
University of Florida, Gainesville
University of Illinois, Urbana
Purdue University, Lafayette
Iowa State University of Science and Technology, Ames
University of Maryland, College Park
*University of Massachusetts, Amherst
Michigan State University, East Lansing
University of Minnesota, Minneapolis
Mississippi State University, Starkville
*University of Missouri, Columbia
University of New Hampshire, Durham
Rutgers, The State University, New Brunswick
*New York State Agricultural and Technical Institute at Alfred, Cobleskill, and Farmingdale (Cornell)
Agricultural and Technical College of North Carolina, Greensboro
*North Dakota School of Forestry, Bettineau
Ohio State University, Columbus
Oregon State University, Corvallis
Delaware Valley College of Science and Agriculture, Doylestown
Pennsylvania State University, University Park
Texas A & M College, College Station
Washington State University, Pullman
University of Wisconsin, Madison

LANDSCAPE ARCHITECTURE

California State Polytechnic College, San Luis Obispo
University of California, Berkeley Campus, Berkeley
University of Georgia, Athens
University of Illinois, Circle Campus, Chicago
Iowa State University of Science and Technology, Ames
Kansas State University, Manhattan
Louisiana State University, New Orleans
University of Massachusetts, Amherst and Boston
Harvard University, Cambridge, Massachusetts
Michigan State University, East Lansing
University of Michigan, Ann Arbor
New York State University College of Forestry, Syracuse University, Syracuse
North Carolina State University, Raleigh
Ohio State University, Columbus
University of Oregon, Eugene and Portland
University of Pennsylvania, Philadelphia
Pennsylvania State University, University Park
Rhode Island School of Design, Providence
University of Wisconsin, Madison

TURF MANAGEMENT

University of Florida, Gainesville
University of Massachusetts, Amherst and Boston
Cornell, Ithaca and New York
New York State University Institute, Farmingdale
University of Rhode Island, Kingston
University of Wisconsin, Madison

PROFESSIONAL AND TECHNICAL SOCIETIES AND ORGANIZATIONS

American Association of Botanical Gardens and Arboretums
Department of Horticulture, New Mexico University, Box 530, University Park, New Mexico 88070

American Association of Nurserymen, Inc.
835 Southern Building, 15th and H Streets, N.W., Washington, D.C. 20005

American Forestry Association
919 17th Street, N.W., Washington, D.C. 20006

American Horticultural Society, Inc.
1600 Bladensburg Road, N.W., Washington, D.C. 20002

American Institute of Park Executives, Inc.
Ogleybay Park, Wheeling, West Virginia 26003

American Rhododendron Society
3514 North Russet Street, Portland, Oregon 97200

American Rose Society
4048 Rosella Place, Columbus, Ohio 43200

American Seed Trade Association
Southern Building, Suite 803, 1030 15th Street, N.W., Washington, D.C. 20005

American Society for Horticultural Science
Department of Horticulture, Michigan State University, East Lansing, Michigan 48823

American Society of Landscape Architects, Inc.
2000 K Street, N.W., Washington, D.C. 20006

Holly Society of America, Inc.
P.O. Box 8445, Baltimore, Maryland 21234

International Plant Propagator's Society
Rutgers, The State University, Department of Horticulture, New Brunswick, New Jersey 08903

International Shade Tree Conference
1827 Neil Avenue, Columbus, Ohio 43210

Men's Garden Clubs of America
50 Eaton Street, Morrisville, New York 13408

National Arborists Association
P.O. Box 426, Wooster, Ohio 44691

National Association of Gardeners, Inc.
194 Old Country Road, Mineola, New York 15501

National Landscape Nurserymen's Association
P.O. Drawer 281, Leesburg, Florida 32748

National Parks Association
1300 New Hampshire Avenue, N.W., Washington, D.C. 20036

Society of American Florists
Suite H-220, Sheraton Park Hotel, Washington, D.C. 20008

Society of American Foresters
Suite 3000, 1010 16th Street, N.W., Washington, D.C. 20036

Women's National Farm and Garden Association
3017 Military Road, Washington, D.C. 20015

Inclusion or omission of an organization or society in this list does not imply approval or disapproval of it. Additional information regarding local chapters or sections of these organizations or societies may be obtained by writing directly to the executive secretary at the listed address.