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ABSTRACT

This publication recognizes the constantly changing requirements of the forestry/forest products industry and varying conditions for employment opportunities. It addresses the goal of relevance in education by enabling the educator to make timely adjustments in the subject matter of the forestry/forest products curriculum. There are six sections in this publication, each of which can assist the vocational education teacher in evaluating and improving existing material and in developing new subject matter. The sections cover the following topics: (1) program goals in the forestry/forest products cluster, (2) changing industry trends and trade practices, (3) employment trends in the forestry/forest products cluster, (4) equipment needs, (5) subject matter changes, and (6) essential learning skills. By using this information, the teaching staff may achieve higher levels of classroom productivity--a productivity that not only recognizes future needs but also fosters strong linkages between educators, students, and the associated industries. (This update represents the opinions of industry people and is not the result of a detailed analysis of occupations.) (KC)

Subject Matter Update 1986 - 87

Forestry/ Forest Products

Division of Vocational Education
Oregon Department of Education, Salem

Verne A. Duncan
State Superintendent
of Public Instruction

Subject Matter

Update

1986 - 87

Forestry/Forest Products

1985

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Foreword

In keeping with the theme for excellence in education as established by the Oregon Action Plan, the Department of Education is enthusiastically committed to strengthening its ability to provide education that is relevant and applicable. An effective vocational education program will meet the needs of the students and, at the same time, meet the goals of the State's education system.

This publication, Subject Matter Update—1986-87, recognizes the constantly changing requirements of industry and varying conditions for employment opportunities. It speaks to the goal of relevance in education by enabling the educator to make timely subject matter adjustments.

There are six sections in this publication, each of which assists the vocational education teacher in evaluating and improving existing material and in developing new subject matter. By using this information, the teaching staff may achieve higher levels of classroom productivity—a productivity that not only recognizes future needs but also fosters strong linkages between educators, students, and the associated industries.

This update represents the opinions of industry people and is not the result of a detailed analysis of occupations. The educator should regard it as a tool for the review of program subject matter. For further information, contact the Division of Vocational Education, 378-2127.

Verne A. Duncan
State Superintendent
of Public Instruction

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INTRODUCTION

Vocational Education--Responding to the Future

Educators must deal with a great many issues during the remainder of this decade if vocational education is to respond to the needs of students as well as business, industry and labor. The Oregon Action Plan for Excellence in Education clearly calls for schools to provide a balanced and comprehensive curriculum for each student Vocational education is an important part of that curriculum. As such, it is critical that programs in vocational education strive for excellence.

The most important component of excellence in vocational education is clearly the curriculum—what students are taught Thus, it is essential that subject matter be kept as current as possible. As industries change directions, new job skills become necessary. Gradually, new occupations emerge as industry moves to incorporate new development technology.

There must be a system in place to capture this change and transform it into updated curriculum in vocational programs It is not enough to say that five years from now there will be these new occupations requiring these kinds of skills and knowledge Rather, curriculum should be evaluated frequently based on the best advice of people who work in those industries and occupational areas so that five years from now, students will be competitive in the labor market.

Meeting the Challenge

This is the concept that the Oregon Department of Education's Division of Vocational Education feels is essential to address After all, subject matter really defines each occupational program, dictating facility and equipment needs, the skills of teachers and even the composition of program advisory committees. The first step then, is the formation of professional groups from industry and labor who have special knowledge about the needs and trends in their fields Their task is to review program and course goals, and to give their views of industry changes and labor market needs. Through a grant from the Department of Education to Oregon State University, these technical committees will provide teachers with updated information every two years so that local programs can continually meet the challenge of excellence.

About the Technical Committee

The Oregon Department of Education and Oregon State University considered the staffing of the technical committee a critical factor for the success of this project. The individuals selected have outstanding records of achievement and significant prior working experience in the occupations covered in the Forestry/Forest Products Cluster Program.

Members of the technical committee are

Hank Blessing
Management--Advisor
Forest Products Consultant
Salem

Kent Boring
Forest Manager
Simpson Lumber
Forest Grove

Howard Brock
Forest Products Specialist
Oregon Dept. of Education
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Safety Consultant
SAIF Insurance
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Contract Logging
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Wilbur Heath
Owner
Heath Logging Company
Cottage Grove

Leonard Hettwer
Log Truck Driver
OR Log Truck Drivers Assn. Rep.
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Noti

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Chemeketa Community College
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Creswell

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OR State Forestry Dept.
Salem

Brad Witt
Lumber Product
Industry Workers
Portland

This Subject Matter Update for Vocational Education Cluster programs is a joint project of Oregon State University and the Oregon Department of Education.

Program Goals in the Forestry/Forest Products Cluster

Oregon has been using a goal-based planning system. This means that the State determines state goals, districts look to these state goals in working out their district goals, various programs consider the district goals as individual program goals are developed, and finally, course goals are forumulated which support the program goals.

The technical committee members reviewed the State's Forestry/Forest Products Vocational Cluster Program goals and unanimously determined that all of the goals continue to be important to the occupations within the field. The nine established goals are given below in the order in which the committee ranked them—the most important listed first.

Students who complete the Forestry/Forest Products Program

1. Will have knowledge, habits, and attitudes which reflect intelligent concern for safety of tools and equipment common to the forestry/forest products industry.
2. Will be aware of the entrepreneurship opportunities and know what skills are needed for success.
3. Will know and be able to apply the basic math, science and communication skills common to the forestry/forest products industry.
4. Will know and use the tools, equipment, and processes in the application of technical skills.
5. Will know, use and maintain the tools and equipment common to the forestry/forest products industry.
6. Will know the fire prevention and suppression rules, laws and regulations, and use of forest fire tools and equipment common to the firefighters.
7. Will know the logging systems and use of the common tools and equipment applicable in the harvesting of forest products.
8. Will be able to apply fundamental leadership skills.
9. Will know the various forest products industries and occupations including products, raw materials and their basic processing flow.

The committee members determined that the most critical goals for persons seeking employment in the forestry/forest products industries were 1, 2, and 3, which deal with excellence in scholastic achievement, an intelligent concern for safety, and appropriate organizational behavior coupled with strong motivational skills—all of which maximize achievement.

Changing Industry Trends and Trade Practices

Industry Trends

The industries that employ graduates of the Forestry/Forest Products Program are undergoing major changes, some of which may create new job opportunities in the future. Many will require a more sophisticated set of skills and knowledge.

The committee identified seven trends and trade practices that will have the greatest impact on the Forestry/Forest Products Program:

1. **More involvement in safety practices.** The industry is taking positive steps to reduce personnel injuries. Employees are expected to be fully trained in mill operation and logging safety and to cooperate with state logging codes and accident prevention measures.

2. **Awareness of environmental regulations and procedures.** The industry must adhere to government environmental regulations for most of its operations. It must properly interpret these regulations and implement them in a cost effective manner. Employees are expected to adhere to company policy regarding appropriate environmental practices and to readily make the necessary adjustments for new laws and regulations. Therefore, it is imperative that today's students be taught the basics of expected environmental practices.

3. **Necessary brush management controls.** The industry has had to make extreme adjustments regarding brush management since arbitrary use of chemicals has become limited. Employees need to be aware of new procedures for controlling brush and should be physically capable of using the mechanical and hand brush-clearing procedures which have replaced the use of chemicals.

4. **Entrepreneurial possibilities.** Since the industry has reverted to labor-intensive methods for brush eradication, there is an opportunity for young technicians to competitively contract for these tasks. Additionally, since smaller logs are being harvested as a result of diminishing older timber stands and recent silvicultural practices, there are also opportunities for highly skilled and knowledgeable technicians to enter the logging market. This is mainly due to lower entry costs associated with harvesting small logs.

5. **Emphasis on multiple resource management.** The industry must consider return on investment from resources other than timber. It must also be cognizant of the importance of maintaining beneficial public relations. Therefore, responsible managers expect their employees to fully understand and respect the company's policies regarding multiple resource management—timber, recreation, watershed, rangeland, wildlife, and aesthetic values.

6. **Transition to desk and handheld micro-computers.** Personal computers are becoming a standard tool of the forestry/forest products industry. These systems augment the larger mainframe systems and are beginning to appear on the production lines in mills for testing and quality control. Additionally, loggers use the portable or handheld computers to analyze timber inventory data. These are examples of only a few of the necessary computer applications. It is appropriate for students in this CIP to become familiar with various computer applications.

7 **Increased responsibilities and broader skill diversification.** Employees are expected to possess diverse skills in order to compensate for any unusual reductions of the work force. Personnel must be prepared to assume decision-making responsibilities other than those previously dictated by their job description. This implies that personnel will be expected to be educated on matters dealing with skill diversification, team management principles, and basic organizational behavior skills.

Employment Trends in Forestry/Forest Products

Today's graduates will enter a job market that already has a surplus of workers. Considering both future employment outlook and the number of existing programs, ideas for new program development and expansion of existing ones must be examined with care. More important, only those students who have been exposed to the appropriate programs, who have excelled in those programs, and who possess excellent skills in communication—reading comprehension, technical writing, and oral expression—can expect to successfully compete for the limited job openings anticipated from 1986 to 1988.

The Oregon Employment Division forecasts forestry/forest products employment in 1986 at 37,511 jobs, which includes 1,560 new openings in the state. The 1988 forecast is somewhat higher—39,152 employed, with 1,626 new openings anticipated. The unemployment rate among forestry/forest products workers for 1983 was 19.1 percent, however 1984 reflected a slightly lower unemployment rate of 15.2 percent. These statistics do not include total employment and new openings for professional and technician foresters.

Data from the 1984 State of Oregon Labor Market Information report is presented here to establish forecasts for employment conditions and job openings for 1986 and 1988 for each Classification of Instructional Program (CIP) within the Forestry/Forest Products Cluster Program.

Papergoods Machine Operator. Reasonable employment opportunities do not exist due to a small demand. A balance of workers is indicated for this CIP. The ratio of unemployed to openings is about two to one. The unemployment rate for the entire CIP is below average at 7 percent. Job openings are expected to be 27 in 1986 and 28 during 1988.

Planing Mill Operations. Reasonable employment opportunities do not exist due to small demand. In addition, a surplus of workers is indicated for this CIP. The ratio of unemployed to openings is over eighteen to one. The unemployment rate for wood sanders is 13 percent. Job openings are anticipated to be 48 in 1986 and 51 in 1988.

Woodworker/Other. Reasonable employment opportunities do not exist due to a small demand and a large number of experienced unemployed workers. The ratio of unemployed to openings is less than two to one. The unemployment rate for lumber graders is above average at 14.5 percent. Job openings are forecasted to be 150 in 1986 and 156 during 1988.

Sawmilling. Reasonable employment opportunities do not exist due to a small demand and a surplus of workers. The ratio of unemployed to openings is three to one. The unemployment rate for cut-off saw operators is 10.9 percent. Job openings are expected to be 447 in 1986 and 467 during 1988.

Veneer/Plywood. Reasonable opportunities do not exist due to lack of demand and a surplus of workers. The ratio of unemployed to openings is four to one. The unemployment rate for core layers or sheet turners is above average at 16.8 percent. Jobs offered in 1986 are expected to be 386 and 403 during 1988

Logging. Reasonable employment opportunities do not exist due to a small demand and a large number of unemployed workers. The ratio of unemployed to openings is over ten to one. The unemployment rate for fallers or buckers is considerably above average at 39 percent. Job openings are expected to be 206 in 1986 and 214 during 1988.

Pulp and Paper. Reasonable employment opportunities do not exist due to small demand. However, there is a balance of workers indicated for this CIP. The ratio of unemployed to openings is about one to one. The unemployment rate for back tenders is below average at 3.4 percent. Occupations in this CIP are characterized by low turnover. High pay and very stable employment occur in this industry. Competition for entry level positions is very high. Job openings are forecasted to be 63 in 1986 and 64 during 1988.

Forest Products/Other. Reasonable employment opportunities do not exist due to a small demand and a surplus of workers. The unemployment to openings ratio is two to one. The unemployment rate for hook and chainers of 13.4 percent is about average. Job openings are expected to be 19 in 1986 and 19 in 1988.

Forestry/Related Science. Reasonable employment opportunities do not exist due to a considerable surplus of workers. Unemployment is highly influenced by forest conservation workers. The ratio of unemployment to openings is over ten to one. The unemployment rate for forest conservation workers is extremely high at 50 percent. Forestry positions such as brush cutters and conservation workers are characterized by low pay and seasonal employment. Job openings are expected to be 126 in 1986 and 131 during 1988. None of the workers in this CIP are classified as professionals or technician foresters. However, the framework of this discipline is intended to provide the necessary prerequisites for higher education forestry programs for those students who have the appropriate interests and who meet the minimum scholastic requirements.

Heavy Equipment Operation. Reasonable employment opportunities do not exist due to a small demand and a large supply of workers. The ratio of unemployed to openings is over four to one. The unemployment rate for yarder engineers is below average at 10.5 percent Job openings are forecasted to be 88 in 1986 and 93 during 1988.

In summary, the occupations in this cluster show a surplus of workers. The ratio of unemployed to openings is five to one. The unemployment rate for the entire cluster is 19 percent. The industrial growth rate for wood products is expected to be about average at 2.3 percent. However, much of the growth is due to recouping losses from the present recession. Even though there is a surplus of workers in this program now, industry maintains its concern about having an adequate supply of highly skilled workers for the future. Therefore, it is imperative that competent replacement technicians be prepared to meet this need. It is more important than ever to evaluate the training offered in the Forestry/Forest Products Cluster. To prepare students for the future, all educators must understand where that future lies.

Equipment Needs

The members of the technical committee were asked to make recommendations regarding equipment needed beyond the basic shop and field tools in the Forestry/Forest Product Program. They replied by stating that new equipment in use in today's modern forest product mills and in field operations is far too expensive for a high school to procure and maintain. Instead, they recommended that the student should receive a basic knowledge of forest management, logging, and mill operations by low-cost methods. Low-budget ways to provide basic training could be through industrial and high school co-sponsored field trips and viewing of video tapes depicting current and future industrial trends. Another low-cost approach could be a well-planned summer training camp specializing in the use of heavy equipment and conducted by industry under lateral agreements with high school administrators. In addition, the existing cooperative work experience program permits students to perform work throughout the year under a joint agreement between industry and the school. This program provides the appropriate training for heavy equipment operation while introducing the student to required job tasks and responsibilities. Essentially, the committee stated that the above methods should work to stimulate the student's interest in the various available job categories. Once the student develops a career interest, superior scholastic achievement and suitable individual behavior are more likely to result.

Rather than procurement of these items, the committee recommends exposure to

- Crawler tractors, skidders, yarders.
- Timber inventory equipment—relaskops, range finders, and table stereoscopes.
- Micro-computers—desk, portable, and handheld.
- Computer software—timber inventory and cruise packages, skyline logging packages, forest product operations packages, and basic spread sheet and data management packages.
- Safety equipment—field and mill operations.
- Current library of forestry/forest products literature and audio-visual aids.
- Surveying equipment.

Subject Matter Changes

The members of the technical committee were asked to evaluate current subject matter in the Forestry/Forest Products Program. The following chart illustrates their judgment and indicates the relative importance they assigned to each subject matter item. A zero represents total obsolescence of the subject matter item and a five indicates maximum importance. The majority of the committee members indicated that all of the subject matter material is valid. The committee also listed its recommendations for future requirements, which are summarized at the end of the chart.

	(1) SUBJECT MATTER ITEM	(2) RELATIVE IMPORTANCE RATE 0 - 5
1 0	TECHNICAL APPLICATION	
1.1	Cruising	5
1.2	Scaling	4
1 3	Surveying	4
1.4	Tree identification	3
2 0	LOGGING APPLICATION	
2.1	Harvesting systems	5
2.2	Splicing	4
2.3	Climbing	3
2.4	Heavy equipment	4
2.5	Falling and bucking	5
3.0	REFORESTATION	
3.1	Tree planting	3
4.0	MANUFACTURING	
4.1	Sawmill operation	3
4.2	Veneer plywood	3
4.3	Raw materials	3
4.4	Products	3
4.5	Flow of operations	4
5.0	FIRE PREVENTION AND SUPPRESSION	
5 1	Fire safety weather	4
5.2	Fire suppression	4
5.3	Fire prevention	5
6.0	SAFETY/FIRST AID INFUSED IN ALL UNITS	
6.1	Multi-media	5
6.2	CPR	4
7.0	BASIC SKILLS	
7.1	Science	4
7.2	Math	5
7.3	Communications	4
7.4	Forest terminology	4
8.0	TOOLS AND EQUIPMENT	
8.1	Identification of tools	3
8.2	Use and maintenance of hand tools	4
8.3	Use and maintenance of power tools	5
9.0	ENTREPRENEURSHIP	
9 1	Awareness	3
9 2	Career opportunities	4
9 3	Legalities	4

Recommendations for Subject Matter Evaluation

The technical committee offered these recommendations:

1. Integrate science, mathematics, and communication skills with other subject matter items Attempt to correlate these activities with instructors in other disciplines. Use practical and advanced problems in forestry/forest products as vehicles for teaching science and mathematics.

2. Provide more information through the use of industry media—trade journals and audio-visual aids—and well-planned field trips that will enable the student to better understand the importance of industry's demands, and, at the same time, actually visualize his or her position in a trade with a competitive edge In conjunction with these activities, encourage industry and association personnel to visit the high schools to lecture and lead discussions pertinent to the subject matter program and employment criteria and situations.

3 Encourage the student to recognize his or her responsibilities in the organization—contributions, leadership roles, status congruence, and social influence. Also stress the importance of customer relations.

4 Stress preventive industrial safety measures. Include this topic when lecturers visit the high schools and during field trips.

5. Emphasize management methods dealing with wild and controlled fires.

6 Provide 'real example' technical projects dealing with common situations in the field. Apply individual and group problem-solving methods.

The technical committee also suggested future requirements for subject matter items to be taught during the next five years. They include when financially feasible

1 Advanced computer applications—robotic controlled devices, production analyses, quality control, and production cost accounting;

2. State Forest Practices Act—state law and corporate polices; and

3 Organizational behavior classes which deal with improved work habits, attitudes in the work place, capacities for motivation and understanding, and methods for achievement and job satisfaction.

Essential Learning Skills

Young people make the transition from school to work through a variety of means and circumstances. For some, the transition to a practicing career is done because of goal-oriented planning, for others, the transition may be by happenstance Not too many years ago, the direction for a person's future work was determined principally by where he or she lived, the occupation of the father, and occupations of acquaintances and others. These provided sufficient exposure to jobs. Youth flowed fairly smoothly into the labor force.

Today, however, the transition for high school youth into the labor market is difficult. So is the transition for adults from obsolete occupations into different ones. In the years ahead, this transition promises to become more difficult because of major changes in the work force. These major changes will involve such factors as dual-career families, the impact of use of computers, the anticipated increase in white collar workers, a surplus of college graduates in relation to their job preparation areas, an increasing mismatch of skills and jobs, a growth in low-paying jobs, and an aging labor force.

A Lifetime of Learning

Thus, it becomes critical that students have the opportunity for further education and training so they can adapt to changes in society and their careers. Schools therefore must somehow prepare students to consider continuing education a viable and, in some cases, essential way to remain marketable in an increasingly competitive workforce.

Essential learning skills are those that individuals must master if they are to continue to grow, learn, and adapt to change They are not unique to any one subject area, rather students must learn them in order to help them acquire any other knowledge and skills. They consist of reading, writing, mathematics, listening, speaking, study skills, and reasoning, including critical thinking and scientific method.

The Importance of Basic Skills

Employer studies, reports and articles all show that these skills are important. Writing and speaking skills are ranked first in employers' views of areas needing improvement. Acquisition of skills to read printed matter required for jobs ranked fifth. With 90 percent of the work force of 1990 already in the labor market and with an estimated 10 million workers identified as functionally illiterate, change seems to be the order of the day. Mastering basic, essential skills to equip future workers for change is an important outcome of modern vocational education.

Concerned Oregonians are evaluating the Essential Learning Skills publication. By reviewing a preliminary copy, action can be taken to produce an improved vocational cluster program. The Department's Curriculum Director is prepared to furnish information and progress reports upon request for this important phase of the Action Plan for Excellence.

The following outline of performance standards for essential learning skills represents the range of skills that vocational teachers can teach and reinforce as they perform subject matter updating.

Students will be able to

1. **Demonstrate use of vocabulary, speech, numerals (figures, letters, words) and other appropriate symbol systems essential for effective communication, computation and problem solving**

   1.1 Recognize words commonly used in grade-level materials

   1.2 Determine meaning of unknown words commonly used in grade-level materials

   1.3 Speak with standard pronunciation, appropriate volume, rate, gestures and inflections

   1.4 Use number/numeric figures, letters, words, symbols, concepts to count, compute and communicate quantitative data

   1.5 Recognize and use geometric patterns, relationships and principles to describe and classify

   1.6 Recognize and use mathematical patterns, relationships and principles to quantify problems or make predictions

   1.7 Estimate and measure quantities, areas and objects, define problems, develop hypotheses, select appropriate methods of computation, solve problems

2. **Interpret the literal meanings of information in written, visual and/or oral communication**

   2.1 Identify main ideas, supporting details, facts, and opinions presented in written, oral and/or visual formats

   2.2 Use instructional materials as basis for gaining knowledge and/or improving comprehension

   2.3 Use oral communication to give/receive information and/or directions

3. **Interpret the implied meanings of information presented in written, oral and/or visual communications**

   3.1 Comprehend implied meanings of written and oral communication

   3.2 Use oral communication to imply meanings and convey ideas, feelings, attitudes

4. **Evaluate content and use of oral, audio and visual communications**

   4.1 Make judgments about the significance and accuracy of information and ideas presented in written materials

   4.2 Use oral communication to respond to others' efforts to persuade and/or to influence others' beliefs and actions

   4.3 Listen with discrimination to the sounds of nature, language, music, and environment

   4.4 Listen, read, view presentations of mass media with discrimination

5. **Generate, organize, express, and evaluate ideas in oral, written, or visual forms**

   5.1 Use a variety of techniques to generate writing and speaking topics (prewriting)

   5.2 Organize ideas in understandable sequence. introduction, body, conclusion, problem solving, spatial, chronological or topical (prewriting/planning)

5.3 Select appropriate form of writing based on audience and purpose

5.4 Present ideas in understandable sequence on the topic selected (drafting)

5 5 Use language, gestures, symbols appropriate to audience, purpose, topic and setting to convey oral information (making oral presentations)

5 6 Evaluate and revise own writing for meaning, clarity, and comprehensiveness (revision)

5 7 Apply the conventions of writing to produce effective communication (editing and proofreading)

6. Plan and carry out problem-solving strategies related to varied assignments in an organized and systematic manner

6.1 Use problem-solving strategies to address varied assignments

6 2 Select most appropriate tools, methodologies, processes, operations in solving problems related to varied assignments

7. Manage time, instructional resources, and personal habits and attitudes constructively in order to accomplish learning tasks

7.1 Clarify purposes of assignment

7.2 Use resources beyond the classroom

7.3 Use study techniques

7.4 Use reading rate appropriate for assignment

7.5 Follow a study plan

7.6 Keep study materials organized and accessible

7.7 Maintain appropriate physical and emotional practices

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