

DOCUMENT RESUME

ED 217 160

CE 032 519

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TITLE Literature Search. Teaching Basic Skills through Vocational Education. Technical Report.
INSTITUTION State Univ. of New York, Ithaca. Cornell Inst. for Occupational Education.
SPONS AGENCY Office of Vocational and Adult Education (ED), Washington, DC.
PUB DATE Apr 80
CONTRACT 300-79-0744
NOTE 119p.; For related documents see CE 032 517-520 and CE 032 569-570.

EDRS PRICE MF01/PC05 Plus Postage.
DESCRIPTORS *Basic Skills; Data; Employment Patterns; *Employment Projections; Enrollment; *Enrollment Trends; *Instructional Materials; Integrated Activities; Learning Activities; Literature Reviews; Secondary Education; *Vocational Education
IDENTIFIERS *Teaching Basic Skills Through Vocational Education

ABSTRACT

A literature search conducted during the Project, Teaching Basic Skills Through Vocational Education, focused on three main topics: instructional program data, basic skills, and instructional materials. High enrollment areas and high employment areas were first identified using such instructional program data as enrollment patterns and projected job openings for program completers of vocational education. Location and analysis of developments in job-related basic skills was the second major task undertaken. The seven major studies identified provided a broad perspective for the project, served as guides in developing instructional materials, provided examples of the occupational application of concepts, generated instructional materials, and provided field tested instructional guides. The final task of the literature search was to identify instructional materials--texts that are significant and/or dominate the vocational commercial scene and vocationally relevant basic skills materials. (Appendixes, amounting to over one-half of the report, include a complete list of enrollment of vocational education programs and projected annual average openings, list of mathematics and communication skills and concepts, Basic Skills Distribution Chart for selected occupations, and three lists of instructional materials--significant and/or dominant commercially available vocational instructional materials, ERIC and CRIS searches, and vocational-related basic skills materials.) (YLB)

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TEACHING BASIC SKILLS THROUGH VOCATIONAL EDUCATION

TECHNICAL REPORT

Literature Search

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TEACHING BASIC SKILLS THROUGH VOCATIONAL EDUCATION

LITERATURE SEARCH

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Cornell Institute for Occupational Education
Ithaca, New York

April 1980

 CIOE

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CONTENTS

PART I

	Page
PREFACE	iv
CHAPTER ONE INSTRUCTIONAL PROGRAM DATA	1
* Procedures	2
Results	3
Implications	4
CHAPTER TWO BASIC SKILLS	8
Generic Skills - A Canadian Approach	8
The Occupational Analysis Approach	12
The Related Concepts Approach	16
The Pennsylvania Survey	20
Reading and Language Arts Analysis	23
The Human Resources Research Organization (HumRRO) Effort	26
Reading Power in the Content Areas (VRP)	27
Summary of the Implications	28
CHAPTER THREE INSTRUCTIONAL MATERIALS	30
Procedures	30
Significant and/or Dominant Vocational Texts	31
ERIC and CRIS Data Base Sources	32
Basic Skills Materials	32
Implications	33
REFERENCES	35

CONTENTS

PART II

	Page
APPENDICES	
Appendix A	
ENROLLMENT OF VOCATIONAL EDUCATION PROGRAMS AND PROJECTED ANNUAL AVERAGE OPENINGS	41
Appendix B	
MATHEMATICS AND COMMUNICATION SKILLS AND CONCEPTS	49
Appendix C	
BASIC SKILLS DISTRIBUTION CHARTS	51
Appendix D	
SIGNIFICANT AND/OR DOMINANT COMMERCIALY AVAILABLE VOCATIONAL INSTRUCTIONAL TEXTS	77
Appendix E	
ERIC AND CRIS SEARCHES FOR BASIC SKILLS PROJECT	93
Appendix F	
VOCATIONAL RELATED BASIC SKILLS MATERIALS	101

PREFACE

The review of relevant literature is a critical part of any research and development effort. Its purpose is to determine the state of the art in these areas germane to the research at hand so as to build on previously discovered information rather than having to rediscover it. An important intersection of two areas of the educational literature is evident from the title of this project, Basic Skill Development Through Vocational Education. Therefore, it was these two areas, basic skills and vocational education, which were the focus of the literature search (Task E) reported here.

The literature search had four focal points within the two broad areas just mentioned. Each focal point represents a key topic in the literature which is directly related to the Basic Skills project. These topics were incorporated into the subtasks specified in the project's technical proposal.

The technical proposal lists two major sub-tasks of the literature search. The first is to specify the basic skills required for entry-level jobs. Inherent in this task are two key topics. The first is the definition of basic skills and the second is an explanation of their relationship to vocational education areas. The next literature search task embodies a key topic: to identify assessment and instructional material options which may be recommended to secondary-level vocational teachers to assist them in providing basic skill instruction to their students. The major materials to be used to make recommendations to teachers are the project's Resource and Teacher Guides.

There was a fourth focal point and, therefore, another task which was deemed essential for the efficient implementation of the two major sub-tasks of the literature search. This supporting task was to determine those secondary-level vocational programs with the highest enrollment and,

where possible, those with the greatest potential for employment. In implementing this task, the foundation was laid for the efficient specification of basic skills, since only those jobs related to important programs would need to be analyzed. In addition, this task directed attention toward those assessment and instructional materials which would be interesting to large numbers of teachers. In so doing it set the stage for the organization of the Resource and Teacher Guides.

Consistent with the tasks associated with the literature search, this report contains three chapters. The first chapter describes the search for those programs of greatest enrollment and employment potential. The second chapter describes the research on basic skills associated with vocational education programs. The third chapter of this report describes instructional material options to be used in the Resource and Teacher Guides. The assessment options are discussed in detail in a separate deliverable on Standardized Test Selection (Task D) and Assessment Instruments for Measuring Occupational Competencies (Task F) by Walker.

There are four appendices at the end of this report. Each appendix contains specific information referred to in the body of the report. In the first appendix is the complete list of enrollment of vocational education programs and projected annual average openings. The other three appendices contain lists of instructional materials.

Thanks go to C. Liu for his thorough review of the literature as presented in this report and especially for his painstaking work on the Basic Skills Distribution Charts which appear in Appendix C. In this regard, thanks also go to L. Snyder for her expert typing of the charts, to P. Yeh for her assistance in compiling the information for them, and to L. Bentle for her competent typing of the final draft.

James A. Dunn
Principal Investigator and
Director, Cornell Institute for
Occupational Education

CHAPTER ONE
INSTRUCTIONAL PROGRAM DATA

Instructional program data were identified and analyzed in order to provide direction to the project. Several objectives were related to this supporting task as follows:

1. To understand current vocational education enrollment patterns at the national level.
2. To identify projected annual average openings for vocational education program completers at the national level.
3. To provide guidelines for the development of project materials.
4. To provide a rationale for selecting potential instructional programs for field testing of project materials.

The basic underlying assumption for the task was that in order to maximize the impact of the materials developed by the project, high enrollment and high employment demand areas should be identified and used to guide the development of the materials for field testing.

By assembling the most recent United States Office of Education (U.S.O.E.) vocational education program enrollment data (1978 program year) and employment and average annual projected openings data (1979-90) from the U. S. Bureau of Labor Statistics, guidelines were developed to accomplish project objectives. Appendix A provides a summary of secondary level vocational education program enrollment by U.S.O.E. vocational education program codes. Total enrollment and annual completions of all types of programs (i.e., secondary, post-secondary, adult, and cooperative education) are also included. Certain cells of the projected annual average openings of the Bureau of Labor Statistics publications are empty due to the complexity of deciding the source of entering workers' education and training backgrounds.

To enhance the utility of the compiled data for selecting vocational instructional programs, and to guide the literature search of assessment and instructional materials, the following procedures were implemented.

Procedures

A list of potential instructional programs for field testing was developed by applying the following criteria:

- a. strong secondary enrollment, as compared to total enrollment (a high Secondary Enrollment Domination Index value),
- b. high growth opportunities, as defined by an estimated average annual openings in excess of annual completions, and
- c. occupationally directed programs (these excluded industrial arts, consumer education, and vocational guidance programs).

A Secondary Enrollment Domination Index (SEDI) was calculated for each program. This index is the ratio of secondary vocational program enrollment to total vocational program enrollment:

$$\text{SEDI} = \frac{\text{Secondary Vocational Enrollment}}{\text{Total Vocational Enrollment}}$$

Inasmuch as this project is concerned with only secondary level basic skills development, it is reasonable to select those programs with high values of SEDI.

A Growth Index was also calculated. Here the index is the ratio of projected average annual openings in the labor market to total annual completions of vocational education programs:

$$GI = \frac{\text{projected average annual openings}}{\text{total annual completions}}$$

GI $>$ 1 indicates growth

GI = 1 indicates no growth

GI $<$ 1 indicates saturation

Results

Table 1 shows the secondary vocational programs selected for their high secondary enrollment and high employment demand. The predominant criterion used in the selection was the Secondary Enrollment Domination Index value since not all programs had GI information. The SEDI represents the percentage of enrollment that is at the secondary level. For example, in the distributive education occupational area, 63% of the enrollees of program 04.0800, General Merchandising, are in secondary level vocational programs compared to only 37% in post-secondary, adult and cooperative education programs. High Growth Index values are reported whenever available. All the selected vocational programs are occupationally directed programs.

As shown in Table 1 a minimum of three U.S.O.E. instructional programs were selected from six vocational service areas: Agriculture, Distributive Education, Health, Occupational Home Economics, Office Occupations, and Trades and Industry. Only one vocational program was selected from Technical Education, since this area has a relatively small number of secondary students. Due to the diversity of instructional programs and significant enrollments within the trade and industrial educational area, eleven programs were selected here. Examples of courses and curricula from selected vocational instructional programs are illustrated in Table 2. Those courses and curricula with an asterisk before them are the ones for which we found information about relevant basic skills.

Implications

There are two major implications of the data presented in Tables 1 and 2. The first concerns their utility for guiding the efficient organization of other parts of the research associated with the Basic Skills Project. For example, many different studies of basic skills related to vocational education are presented in the next chapter of this report. However, only the data on programs with high SEDIs and, when possible, GIs will be subjected to further analysis in preparation for their use in developing sets of generic basic skills for the Resource and Teacher Guides.

A second implication of the results of the first literature search is the identification of programs on which it would be appropriate to focus. It would be impossible to include in the project's Resource and Teacher Guides examples from all vocational education programs. But, by determining those programs with the highest SEDIs and, when possible, with the highest GIs, the guides can be written to appeal to the greatest numbers of potential users. Both of these implications will enhance the guides' usability, effectiveness, and generalizability: the three evaluation criteria by which the guides will be judged.

Table 1
 MAJOR SECONDARY SCHOOL VOCATIONAL PROGRAMS
 FOR FIELD TEST CONSIDERATION

<u>OCC. ED.</u> <u>AREA</u>	<u>U.S.O.E. CODE</u>	<u>PROGRAM TITLE</u>	<u>SEDI</u>	<u>GI</u>
Ag. Ed.	01.0100	Ag. Production	0.65	--
	01.0300	Ag. Mechanics	0.81	--
	01.0500	Ag. Ornamental Horticulture	0.64	--
Dist. Ed.	04.0200	Apparel and Accessories	0.66	--
	04.0700	Food Services	0.60	--
	04.0800	General Merchandising	0.63	4.33
Health Ed.	07.0101	Dental Assisting	0.37	1.37
	07.0303	Nursing Assisting	0.30	22
	07.0904	Medical Assisting	0.37	--
Occ. H. E.	09.0201	Care & Guidance of Children	0.42	--
	09.0202	Clothing, Mgt., Prod. Services	0.68	--
	09.0203	Food Mgt., Prod., Service	0.70	--
Office Ed.	14.0100	Accounting & Computing	0.52	2.40
	14.0300	Filing, Office Machines	0.77	--
	14.0700	Steno., Secy., & Related	0.56	1.79
	14.0900	Typing & Related	0.72	0.41
Tech. Ed.	16.0108	Electronic Technology	0.10	0.31
T. & I.	17.0301	Automotive Body & Fender	0.53	0.33
	17.0302	Automotive Mechanics	0.62	0.37
	17.1001	Carpentry	0.60	1.30
	17.1300	Drafting Occupations	0.64	0.33
	17.1500	Electronics Occupations	0.49	--
	17.1900	Graphic Arts Occupations	0.49	--
	17.2302	Machine Shop	0.48	1.35
	17.2306	Welding and Cutting	0.28	0.68
	17.2602	Cosmetology	0.66	1.05
	17.2900	Quantity Food Occupation	0.54	13.57
	17.3600	Woodworking Occupations	0.66	--

Table 2
 SELECTED VOCATIONAL PROGRAMS AND
 EXAMPLES OF COURSES AND CURRICULA

<u>USOE Code</u>	<u>Program Title</u>	<u>Examples of Courses and Curricula</u>
01.010C	Agriculture Production	*Farm Management Crop Production Soil Use and Management Agronomy Animal Science Animal Husbandry Laboratory Animal Caretaker Poultry Science
01.0300	Agriculture Mechanics	Agriculture Mechanization Farm Mechanics
01.0500	Agricultural Ornamental Horticulture	*Agri-industrial Equipment Service Wholesale Florist *Horticulture Equipment & Service *Retail Florist *Landscape Service Person *Garden Center Employee Ornamental Horticulture Horticulture Floriculture Floral Design & Arrangement Floriculture Merchandising & Production Greenhouse Occupations Landscaping and Design Turf Management
04.0200	Apparel and Accessories	Fashion Merchandising
04.0700	Food Services	(sales and sales supporting)
04.0800	General Merchandising	Distribution Introduction to Marketing Marketing/Business *General Sales Direct Selling Merchandising & Sales Supporting Retail Business Management Retailing Wholesaling Foreign Trade *Small Business Manager
07.0101	Dental Assisting	*Dental Assistant
07.0303	Nursing Assisting	Nurse's Aide Services Nursery Assistant
07.0904	Medical Assisting	*Medical Assistant (assisting in physician's offices)
09.0201	Care and Guidance of Children	Child Care Services Nursery Education *Nursery Teacher's Aide
09.0202	Clothing Manage- ment, Production and Services	Clothing Services Dry Cleaning/Laundrying
09.0203	Food Management, Production and Services	*Food Services - Front of House -Waiter/Waitress *Catering
14.0100	Accounting and Computing (Book- keeping)	Accounting *Machine Bookkeeping *Bank Teller Recordkeeping Income Tax Preparation *Data Accountant *Bookkeeper

11

<u>USOE Code</u>	<u>Program Title</u>	<u>Examples of Courses and Curricula</u>
14.0300	Filing, Office Machines	Clerical Practice Office Practice Office-Machine Operations Filing Office Reproduction Equipment Operation Machine Transcription *Information Receptionist *Clerical Aide *Terminal Clerk *Word Processor
14.0700	Stenographic, Secretarial and Related Occupations	Manual Shorthand Manual Shorthand Transcription Accelerated Shorthand Machine Shorthand Secretarial Practice *Secretary—Medical, Legal, Executive, etc.
14.0900	Typing & Related	Typist
16.0108	Electronic Technology	Electronics (Technical) Industrial Electronics Technology Computer Circuitry *Telecommunications
17.0301	Automotive Body and Fender	*Auto Body Mechanic
17.0302	Automotive Mechanics	*Auto Mechanics *Automotive Service Specialist
17.1001	Carpentry	*Carpenter
17.1300	Drafting Occupations	Mechanical Drafting Industrial Drafting Architectural Drafting Electrical/Electronics Drafting Drafting Technology Blueprint Reading *Draftsman
17.1500	Electronics Occupations	Industrial Electronics *Radio & TV Repair *Telecommunications Electronic Technician
17.1900	Graphic Arts Occupations	General Printing Offset Lithography *Offset Press Operator *Lithocameraman *Offset Plate Maker *Bindery *Offset Stripper *Layout & Design Compositor
17.2302	Machine Shop	Machinist & Machine Operator *Machine Tradesman Tool and Die Maker Pattern and Model Maker
17.2306	Welding and Cutting	*Welders and Flame Cutters Solderers
17.2602	Cosmetology	*Cosmetology/Beauty Culture
17.2900	Quantity Food Occupations	Commercial Foods *Baker *Cook/Chef *Salad Maker *Fast Food Counter Person *Fast Food Manager Food Processing Meatcutting/Packaging Hostess Training Domestic Food Trades
17.3600	Woodworking Occupations	Cabinet Making Furniture and Wood Finishers *Millwright

* Basic Skills Distribution Chart available.

CHAPTER TWO

BASIC SKILLS

The next major task undertaken in the literature search was to locate and analyze developments in job-related basic skills. As a result of our search, seven major studies were identified which contained information relevant to our project. In this chapter each of these studies is described and the implications for the project are stated.

Generic Skills - A Canadian Approach

Generic Skills is a project of the Advanced Development Division of the Occupational and Career Analysis and Development Branch, Canada Employment and Immigration Commission. The senior consultant, Arthur Smith (1978) stated that generic skills are those job behaviors which one actively used in work performance, which are transferable from one job or occupation to another and which are needed for promotion to higher level positions. By this definition most communications, arithmetic and reasoning skills are highly generic, but advanced algebra and science skills are not.

The generic approach is an attempt to examine the commonality of skills among occupations/jobs rather than their uniqueness. Examples of generic skills are listed below (Smith, 1978).

1. Academic skills - multiplying whole numbers and reading to determine job requirements.
2. Manipulative skills - hand/eye coordination and using proper body posture for lifting.
3. Science skills - using the scientific method to solve job related problems.
4. Reasoning skills - scheduling work and diagnosing work problems.
5. Interpersonal skills - giving and receiving rewards and discipline.

The major objective of the Canadian approach is to formulate generic skills to identify their uses for certain occupational groups, and to prepare specifications for instructional modules in an attempt to provide greater flexibility in training. Another objective of the study is to determine skill transferability between jobs/occupations. Workers have been surveyed in 49 occupations and "supervisors as workers" have been surveyed in 28 occupations. The agreement on the skills requirements between workers and the workers' immediate supervisors has been extremely high.


Figure 1, Generic Communication Skills, summarizes the communication requirements for 10 occupational families and for 28 foreman/supervisory occupations. The shade (color in original) code indicates the ratio of occupations in which the skill is used by the workers.

Figure 2, Generic Mathematics Skills, summarize the mathematics requirements for 10 occupational families and for 28 foreman/supervisory occupations. The shade (color in original) code indicates the ratio of occupations in which the skill is used by the workers.

Implication for Basic Skills Project

Despite differences between the objectives of the Generic Skills project and our Basic Skills project, the skills categories of the Generic Skills project (i.e., generic communication skills, generic mathematics skills) are remarkably useful. Data contained in Figure 1 and Figure 2 can be used as a general guide to basic skills which should be included in instructional materials. However, one major weakness concerning the usefulness of the generic skills data is that both the skills and occupational families dimensions are too general to indicate precisely those skills and jobs which are related.

Figure 1
CANADIAN APPROACH'S GENERIC COMMUNICATION SKILLS*

SKILL NEED  <ul style="list-style-type: none"> - Nil - Few - Many - Most/All 	OCCUPATIONAL FAMILIES									
	Clerical	Engineering Technologists	Medical / Health	Sales	Service	Machining	Fabricating, Assembly and Repair	Construction	Motor Transport	Farmers
READING										
Read. Forms	[Skill Need Matrix]									
Notes / Letters	[Skill Need Matrix]									
Charts / Tables	[Skill Need Matrix]									
Books / Manuals	[Skill Need Matrix]									
Literal Comprehension	[Skill Need Matrix]									
Interpretative Comprehension	[Skill Need Matrix]									
Evaluative Comprehension	[Skill Need Matrix]									
WRITING										
On Forms	[Skill Need Matrix]									
Memos	[Skill Need Matrix]									
Letters	[Skill Need Matrix]									
Info. Reports	[Skill Need Matrix]									
Recommendation Reports	[Skill Need Matrix]									
Technical Reports	[Skill Need Matrix]									
LISTENING										
Literal Comprehension	[Skill Need Matrix]									
Interpretative Comprehension	[Skill Need Matrix]									
Evaluative Comprehension	[Skill Need Matrix]									
Physical Attending	[Skill Need Matrix]									
Cognitive Attending	[Skill Need Matrix]									
Reactive Attending	[Skill Need Matrix]									
CONVERSING										
Elementary Conversation	[Skill Need Matrix]									
Task Conversation	[Skill Need Matrix]									
Express Point of View	[Skill Need Matrix]									
Personable Conversation	[Skill Need Matrix]									
Persuasive Conversation	[Skill Need Matrix]									
Group Discussion	[Skill Need Matrix]									
Oral Presentations	[Skill Need Matrix]									
Instructional Talks	[Skill Need Matrix]									

* Smith (1978)

Figure 2
CANADIAN APPROACH'S GENERIC MATHEMATICS SKILLS*

SKILL NEED	OCCUPATIONAL FAMILIES										
	Clerical	Engineering Technologists	Medical / Health	Sales	Service	Mechanics	Fabricating, Assembly and Repair	Construction	Motor Transport	Formers	Foremen / Supervisors
<p>SKILL NEED</p> <ul style="list-style-type: none"> - Nil - Few - Many - Most / All 											
ARITHMETIC											
Whole Numbers											
Fractions											
Decimals											
Percent											
Ratio / Proportion											
Mixed Operations											
Measure: Time											
Weight											
Distance											
Capacity											
GEOMETRIC FIGURES											
Calculate: Perimeter											
Area											
Volume											
Draw / Sketch											
Read: Scale Drawings											
Assembly Drawings											
Schematic Drawings											
Graphs											
Draw: Graphs											
Scale Drawings											
INTERMEDIATE MATHEMATICS											
Solve Given Formulae											
1 Variable Algebra											
Algebra Powers / Roots											
2 Variable Algebra											
Quadratics											
Logarithms											
Trigonometry											

* Smith (1978)

The Occupational Analysis Approach

The Occupational Analysis project was conducted by the Instructional Materials Laboratory, Trade and Industrial Education, the Ohio State University in conjunction with the Ohio State Department of Education, Division of Vocational Education pursuant to a grant from the U.S. Office of Education.

The occupational analysis approach was used to train vocational educators in making a comprehensive occupational analysis including not only job tasks but also basic skills in communications and math. Instructors were selected from agriculture, business, distributive, home economics, and trade and industrial education. Representatives from business, industry, and education were involved with the vocational instructors in conducting the analysis.

The analysis process was thorough in scope and execution. Two-week workshops were held during which teams of vocational instructors conducted an analysis of the occupations in which they had employment experience. The instructors were assisted by both occupational consultants and subject matter specialists in math and communications.

Occupational analysis data were generated for 98 occupations/jobs. The analysis included a statement of the various tasks performed in each occupation/job. For each task the following items were identified:

- tools and equipment
- procedural knowledge
- safety knowledge
- concepts and skills of mathematics
- concepts and skills of science
- concepts and skills of communications.

The analysis data provided a basis for generating instructional materials, course outlines, student performance objectives, criterion measures, as well as identifying specific supporting skills and knowledge

in the academic subject areas. Figure 3 shows a sample task statement of the occupational analysis of the Auto Body Mechanic occupation (Strank and Speck, 1974).

Implications for Basic Skills Project

The uniqueness of the Occupational Analysis Approach is that detailed basic skills requirements for successful performance of a specific task are analyzed. In order to simplify the information presented in the task analyses C. Liu has developed a Basic Skills Distribution Chart for each occupation. The basic skills listed in the sample chart (Figure 4) were generated by analyzing the mathematics and communication cells of the task analyses illustrated in Figure 3. In Appendix B are listed those mathematics and communication skills and concepts which were used in the original occupational analyses resulting in the task analyses illustrated by Figure 3. Together the basic skills distribution charts in Appendix C and the list of skills and concepts in Appendix B will be invaluable in the generation of generic skills. They will be combined with the results of analyzing tests of basic skills (reported by Walker) and used to give vocational educators a tool to construct locally relevant definitions of basic skills.

Figure 3

SAMPLE TASK ANALYSIS FOR AUTO BODY MECHANICS *

<p>TOOLS, EQUIPMENT, MATERIALS, OBJECTS ACTED UPON</p>	<p>PERFORMANCE KNOWLEDGE</p>	<p>SAFETY - HAZARD</p>
<p>Standard tool kit Body and frame manuals Safety stands Front suspension tools Engine hoist and chain fall Air wrench Alignment rack Frame</p>	<p>Remove bumpers, front sheet metal and cooling system Remove body Remove engine and drive train Remove exhaust system and gas tank Remove wiring and brake lines Remove front suspension and steering parts Reinstall all parts in the reverse a order of removal Inspect electrical system Inspect cooling system Align front suspension Road test</p>	<p>Eye protection - eye injury Safety stand placement - auto falling Engine hoist and chain fall operated with care - personal injury Safety rules on compressed air for air wrench Gasoline inflammable - care taken in removal and storage of gas tank - fire</p>
<p>DECISIONS Whether to repair or replace</p>	<p>CUES Total cost</p>	<p>ERRORS High cost</p>
<p>SCIENCE</p>		<p>MATH - NUMBER SYSTEMS</p>
<p>Simple machines used to gain mechanical advantage (standard tool kit and engine hoist and chain fall) Centrifugal forces developed by bodies in rotation (air, wrench in rotation) Fluids under pressure (compressed air) Effects of friction on work processes and product quality (removal of bolt on parts) Behavioral Science (see index)</p>		<p>Linear measurement - tape measure Fractions Use of numbers (without calculations) Recording Coding; [wrenches] Measurement: geometric (alignment gauges) Angle Read and interpret graphs, charts, and tables (alignment charts)</p>
<p>COMMUNICATIONS</p>		
<p>PERFORMANCE MODES Reading Seeing Speaking</p>	<p>EXAMPLES Frame and body manuals Removal, replacement, and alignment of parts Questioning shop foreman</p>	<p>SKILLS/CONCEPTS Comprehension, detail/inference, speed/rate, informational record, recommendation record, description of mechanism, definition, terminology Visual analysis, memory, describing, logic, detail/inference, recognition of symbols, codes, emblems Terminology/general vocabulary, clarity of expression, logic</p>

Figure 4
SAMPLE BASIC SKILLS DISTRIBUTION CHART*

TASK STATEMENTS	MATH										COMMUNICATION																											
	Deduction	Fundamental Operations +, -, x, ÷	Use of numbers (without calculations) coding	Use of numbers recording	Rationals	Order of operations	Whole numbers-decimals	Measurement	Ratio and Proportion	Fractions	Read and interpret tables	Use of numbers	Analyze	Terminology/general vocabulary	Clarity of expression	Logic	Appropriate diction	Implying enunciation	Penmanship	Classification	Description	Terminology	Usage	Auditory discrimination	Discriminate facts from nonfacts	Recognize opinions	Logic	Comprehension	Recommendation reports	Detail/inferences	Information report	Description of mechanisms	Definition	Speed/rate	Terminology	Instructions		
A-1 Write estimates	✓	✓												✓	✓	✓	✓		✓	✓	✓	✓																
A-2 File estimates alphabetically			✓																																			
A-3 Verify insurance coverage				✓																																		
A-4 Order parts and materials	✓																																					
A-5 Schedule work			✓	✓	✓									✓	✓	✓	✓																					
A-6 Write repair orders and record parts and materials		✓	✓	✓	✓																																	
A-7 Record costs, payments, deposits		✓	✓																																			
A-8 Keep payroll records		✓	✓																																			
A-9 Order and maintain tools and equipment			✓																																			
A-10 Establish safety regulations																																						
A-11 Handle customer complaints																																						
B-1 Wash and dewax vehicle			✓																																			
B-2 Remove decorative features																																						
B-3 Ascertain type of original finish and type to be used	✓																																					
B-4 Inspect old surface for defects																																						
B-5 Featheredge broken surfaces			✓																																			
B-6 Mix and reduce refinishing materials	✓																																					
B-7 Treat bare metal																																						
B-8 Mask operations																																						
B-9 Apply primer surfacer and glazing putty																																						
B-10 Sand old finish, primer surfacer and glazing putty			✓																																			
B-11 Prepare for silk enamel refinishing																																						
B-12 Refinish with acrylic enamel																																						
B-13 Prepare for polyurethane enamel refinishing			✓																																			
B-14 Prepare for acrylic lacquer refinishing			✓	✓	✓																																	
B-15 Spot refinishing and touch up			✓	✓	✓																																	
B-16 Polish lacquer finishes			✓	✓	✓																																	
B-17 Applying striping and decals			✓	✓	✓																																	
B-18 Clean up and prepare for delivery																																						

*C. Liu based on data from Strank and Speck (1974)

The Related Concepts Approach

The Minneapolis Public Schools, with support from the Minnesota Department of Education and the Minnesota Instructional Materials Center has developed two related concept guides on mathematics and English (Department of Vocational-Technical Education, 1978)

The purposes of the guides are to:

1. Assist students in making wise selections of math or English courses in pursuit of their vocational goals.
2. Assist teachers to become aware of the math/English concepts needed by students in their vocational areas.
3. Provide examples for math/English instructors to use in teaching these related concepts.
4. Help facilitate individual student learning.
5. Interrelate the disciplines of math/English and vocational education.

The guides are designed to enable teachers to provide greater opportunity for students to satisfy their particular needs within the framework of the existing math/English curricula.

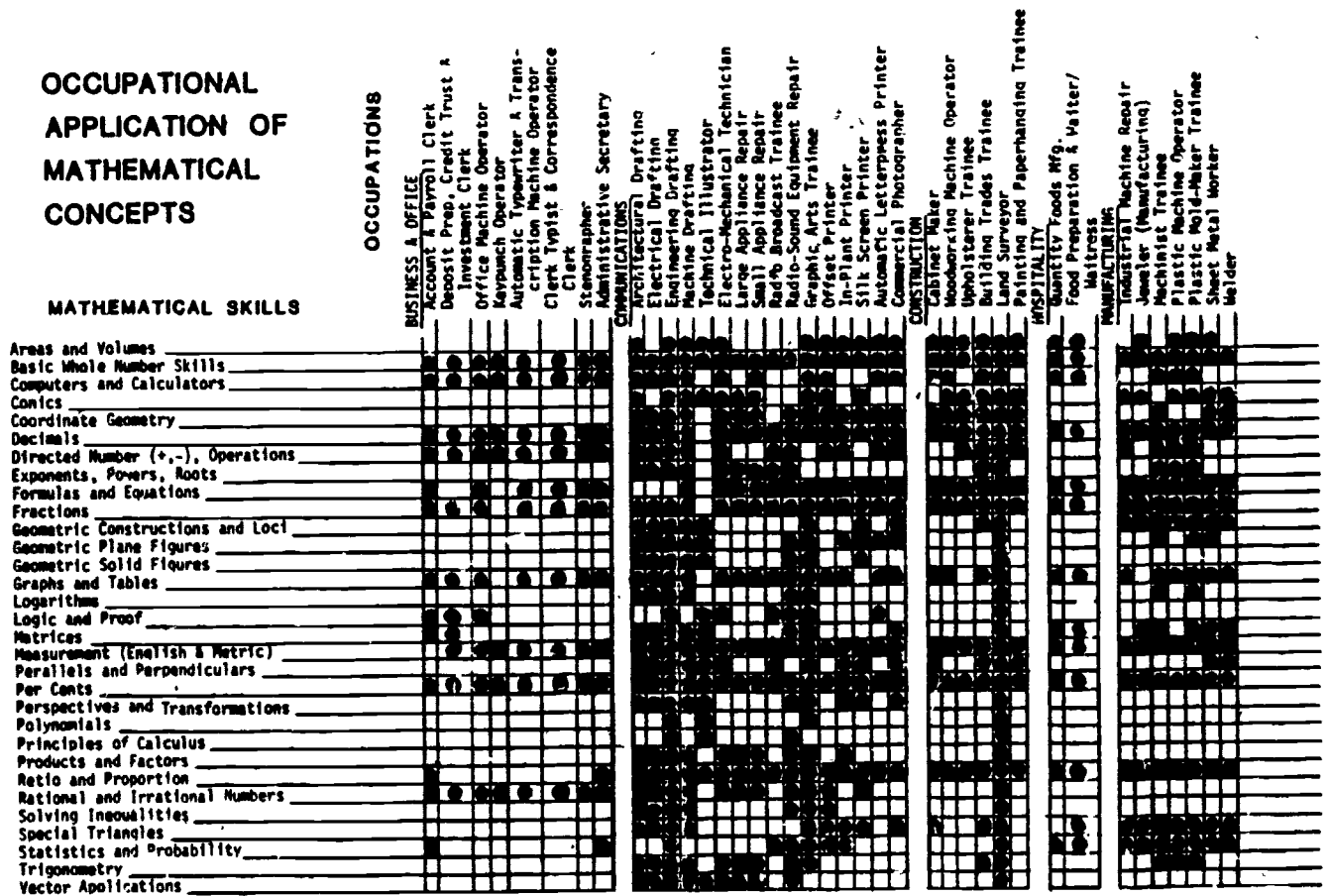
The Minneapolis project is a practical approach to combining specific skills of two disciplines to form an interrelated curriculum using the "Related Concepts Guide." The strategy provides students with opportunities to effect transfer and to apply concepts/skills learned in one subject to another. At the same time they experience an accurate, relevant, realistic and comprehensive understanding of an occupation. Math/English instructors can use the guides as vehicles for exercising their responsibility to relate their subject matter to the world of work their students now face or will encounter after leaving school. Counselors can use the materials as tools to inform students of the related math/English skills needed to succeed in life as well as in particular occupations.

Implications for Basic Skills Project

The related concepts approach attempts to improve or reinforce the learning of basic skills in regular math/English courses while our Basic Skills project is developing Resource and Teacher Guides to assist vocational instructors to design instructional activities capable of meeting the basic academic skills needs of their students. Appropriate segments of the Related Concepts Guide will also be of use to the vocational teacher to facilitate closer working relationships with other faculty members. The two projects are different in focus.

The Minneapolis math/English skills vs. occupations charts demonstrate some degree of similarity with the Canadian generic skills' charts, except that the Minneapolis charts are somewhat more detailed on both dimensions. A sample chart is shown in Figure 5. In addition, the Minneapolis related Concepts Guides provide examples of occupational applications of concepts (Figure 6). As a whole they can provide valuable references in developing our Resource and Teacher Guides.

Figure 5
 MATHEMATICS SKILLS VS. OCCUPATIONS*



*Department of Vocational-Technical Education (1978)

Figure 6

OCCUPATIONAL APPLICATIONS OF MATHEMATIC CONCEPTS*

Mathematics Supplemental Guide
For Related Concepts

Guide: Electricity I
#9614

<u>Math Concept Taught</u>	<u>Math Course Taught In</u>	<u>Occupational Application of Concept</u>	<u>Other Area of Application</u>
Read a scale	General Math	Read a VOM. See Appendix Problems 1,2	Science
Add, subtract, multiply, divide round whole numbers, fractions, decimals	General Math	Compute voltage on VOM scale, solving Ohm's Law, converting units. See Appendix Problems 2, 4, 7	Science
Understand metric prefixes, symbols, calculate in metric	General Math	Recognize units of power. Convert powers over. See Appendix Problems 3, 7, 10	Science (Physics)
Read a graph	General Math	Understand sine wave 4. Understand Alternators. See Appendix Problem 4.	Physics
Proportion	General Math Algebra Geometry	Magnetic attraction. See Appendix Problem 5.	Science
Use Percents	General Math	Calculate tolerance range of a system, understand output and efficiency. See Appendix Prob. 6.	Science, Soc. Studies, Economics
Use formulas by substituting values, solving formulas for other unknowns.	Algebra	Convert units, solve Ohm's Law problems involving amperes, volts, resistance and watts. See Appendix Problems 7, 8, 9, 10.	Science, Economics

*Department of Vocational-Technical Education (1978)

The Pennsylvania Survey

Long's Survey study (1973) determined which basic mathematics skills are necessary for success in various secondary vocational programs. It also determined which basic mathematics skills need most remedial attention by students entering secondary vocational programs.

Walker, of our project staff, identified important skills in mathematics through secondary analysis of the Pennsylvania Survey of vocational teachers (Long, 1973) and confirmed the skills' importance using a published analysis of the contents of tests (Hoepfner, 1978).

In the survey research, the respondents were 4300 vocational teachers at the secondary level in Pennsylvania, representing 60 programs within eight vocational areas. These teachers were given a listing of 66 basic skills in mathematics. They were instructed to check off the skills which are essential for their students' success in their vocational speciality.

In Walker's secondary analysis a skill was arbitrarily defined as important when $\geq 70\%$ of the ~~teachers in an area~~ checked it as being essential. It was defined as generic for a wide variety of occupations when the $\geq 70\%$ threshold was met in ≥ 4 of the 8 program areas. Using these arbitrary thresholds, this study found the set of 30 generic skills displayed in Figure 7. When the cutoff for numbers of program areas is lowered to three, the set increases by seven skills; when it is raised to five, it decreases by only three. These thresholds can be manipulated so that the set of skills is large enough to be useful to teachers and small enough to be manageable by project staff.

These results are confirmed by an analysis of the skills measured by standardized tests (Hoepfner, 1978). For this study the domain of mathematics was exhaustively divided into thirteen broad skill areas. Items on the seven most widely used tests of mathematics were reviewed and assigned to one of the thirteen areas. Data were reported in terms

of the proportion of items per test which measured each of the areas. The data for tests of grades four through eight were reviewed in the present search for generic skills.*

A skill area was defined as generally important when the median percentage of items per test measuring the skill was greater than 8%. This cutoff was a natural breaking point in the observed data. By that criterion, there were five general skills areas in mathematics. These five are marked with asterisks in the list of skill areas measured on four or more of the tests (See Figure 7). These results generally parallel and confirm those of the survey discussed earlier. Differences in the results of the two studies are due mostly to the fact that Long's survey aimed at a somewhat lower level of skills.

Implication for Basic Skills Project

By combining the Minneapolis Related Concepts charts, the Canadian Generic Skills charts, and Walker's analysis of Long's rank ordering of basic math skills tables we can derive a comprehensive occupationally related basic skills taxonomy. This taxonomy may suggest many basic skills instructional options.

*The seven tests used in Hoepfner's analysis were: The California Achievement Test, The Comprehensive Test of Basic Skills, The Cooperative Primary/STEP series, The Iowa Tests of Basic Skills, The Metropolitan Achievement Series, The SRA Achievement Series, and The Stanford Achievement Test.

Figure 7

GENERIC OCCUPATIONAL RELATED MATHEMATICS SKILLS

Name of Skills

Long (1973)

Hoepfner (1978)

The four basic operations of integers
 The four basic operations with fractions
 Reducing fractions to the lowest terms
 The four basic operations with decimals
 Changing decimals to common fractions
 Changing common fractions to decimals
 Reading, writing, decimals
 Rounding off decimals
 Multiplying and dividing integers and decimals by 10, 100...
 Meaning of %
 Finding % of a number
 Changing % to decimals
 Changing decimals to %
 Addition, subtraction, multiplication with mixed numbers
 Rounding numbers
 Reading large numbers
 Averages
 Liquid measures

Numbers and sets
 *Number systems and principles
 *Computation with whole numbers
 *Computation with fractions/decimals/percents
 *Word problems
 *Measurement
 Tables/graphs/statistics
 Business/consumer/vocational mathematics
 Geometric objects and relations
 Plane and solid geometry
 Algebra
 Advanced algebra

Reading and Language Arts Analysis

In the domains of reading and writing, no source has been found that is comparable to the Pennsylvania Survey study. The closest counterpart, a survey of over 400 vocational teachers in Florida (Redmann, 1979), is a rating of the importance in vocational education of 58 skills in teaching reading. However, the analysis of tests cited above (Hoepfner, 1978) also covered tests of reading.* This analysis resulted in categories which are so broad and so few in number that it was decided that a more revealing analysis was needed. Appropriate levels of the following five test batteries were used by Walker in this analysis:

- . Analysis of Skills (Reading and Language Arts) by Scholastic Testing Service;
- . Metropolitan Achievement Test (Reading and Language Instructional Tests) by Psychological Corporation;
- . National Assessment of Educational Progress by Educational Commission of the States;
- . Prescriptive Readings Inventory by CTB McGraw-Hill;
- . SCORE Criterion-Referenced Testing Services by Houghton-Mifflin.

These batteries were chosen to sample the major test publishers (Psychological Corporation, CTB McGraw-Hill, and Houghton-Mifflin), a smaller publisher of a comprehensive battery (Scholastic Testing Service), and a respected test developer which has no commercial biases (Education Commission of the States). The tests used were criterion-referenced, currently on the market, and designed for testing in the fourth to eighth grade range. Criterion-referenced tests were used because they identify the tested skills relatively clearly and because they reflect curriculum relatively well. In comparison, norm-referenced tests usually do not describe the tested skills in any detail, and they are designed to exclude skills that are "easy" (i.e., widely taught and learned).

* These skill areas were measured on four or more of the tests analyzed by Hoepfner.

To start the analysis of test materials, objectives for all of the tests were grouped under general headings such as punctuation, syntax, usage, literal comprehension, and the like. Then objectives were grouped into progressively more specific categories. Wherever objectives were cryptic, items for the tests were studied to determine actual skills measured. This step was necessary for 120 items of the Metropolitan on reading comprehension, and a large number of items on punctuation, capitalization, and usage on the Analysis of Skills.

Skills were identified as generic when at least three of the five test batteries covered them. The skills in Figure 8 represent the category headings for objectives covered in three to five test batteries.

Implications for the Basic Skills Project

One issue that needs to be dealt with in the project's Guides is how to address audiences whose basic skills needs differ markedly from generic skills. This issue is raised by the program level data in the Pennsylvania Study (Long, 1973), where several specific programs exhibit unusual patterns of essential basic skills. For example, the five most important mathematical skills for mill and cabinet making and for sheet metal work are not among the generic skills identified. Similarly, twelve of the 17 most essential skills for plumbing are not identified as generic. Although these exceptions are rare, they need to be recognized in the project's Guides. There may be similar instances in regard to reading. By cross-validating basic skills in relation to particular vocational areas it will eventually be possible to establish a list of generic skills and those skills associated only with particular programs.

Figure 8
GENERIC SKILLS IN READING AND LANGUAGE ARTS*

Reading

Phonic Analysis
Structural Analysis
Parts of Speech
Syntax
Literal Meaning of Words or Phrases
Literal Comprehension
Inferential Comprehension
Interpretive or Critical Comprehension
Reference Skills
 Using a dictionary
 Parts of a book
 Other sources

Writing

Spelling
Punctuation
Capitalization
Usage

*Based on Walker's analysis

The Human Resources Research Organization (HumRRO) Effort

HumRRO work in functional literacy has been sponsored primarily by funding from the Army, the Department of Defense, and the Air Force. Some work has been funded by the National Institute of Education. Dr. Thomas G. Sticht has been the leader of this research program since its inception at HumRRO's Western Division. Sticht (1975) reported that HumRRO's Initial Work Unit REALISTIC was followed by Work Units READNEED, LISTEN, and FLIT. The research activities expanded to encompass the study not only of the literacy demands of Army jobs, but also of methods for reducing these demands and for improving the reading skills of personnel through literacy training. All of HumRRO's research and development has focused on the study of literacy in relation to work.

According to Sticht (1975), two major factors have stimulated work on job-related literacy: (a) people want job-relevant skills; and (b) literacy skills are the most salient of the formally acquired skills demanded by various occupations.

Implications for Basic Skills Project

The FORCAST readability index for technical reading materials appears to be one of the formulas with the potential for use by vocational educators in assessing readability of technical publications and products brochures that are commonly used in vocational schools. Information about the correlations among the Flesch, Dale-Chall, and FORCAST formulas indicated that the simplified FORCAST formula produced a more accurate estimate of the reading difficulty of Army job reading materials.

Among other conclusions from years of work on functional literacy, Sticht (1975) stated (a) there appears to be little information regarding the demands for literacy skills in various occupational programs; and (b) reading skills for learning a job, as in vocational education courses, may differ from the skills needed to do a job. Considerations should be given to these factors in identifying instructional materials and developing our basic skill taxonomy.

Reading Power in the Content Areas (VRP)

Vocational Reading Power (VRP) is a staff development project designed to make content area teachers aware of the discrepancy between student reading abilities and the reading requirements of printed instructional materials (Butz and Gundabalan, 1978). The objectives of the VRP are:

1. To narrow the gap between student reading ability and the skill level required to read printed instructional materials.
2. To enrich the knowledge, attitudes, and skills of content area teachers.
3. To increase student learning of content areas.

VRP (Vocational Reading Power) development began in the Oakland Schools, Pontiac, Michigan in 1967. In 1974 the Joint Dissemination Review Panel in HEW approved it for replication by schools throughout the country. The project was originally validated for grades 11-12 vocational students from a broad range of ethnic and socio-economic backgrounds. Since that time, VRP has been successfully implemented in both vocational and non-vocational classes in grades 7 through post-secondary. The components of VRP are as follows:

1. Readability analysis of printed instructional materials.
2. The test component presents information on reading tests ranging from standardized, commercially developed and marketed tests to informal teacher developed tests.
3. Vocabulary development - the key element of the VRP program. The VRP materials provide many ideas on how instructors can formally teach the language specific to their course content area, as well as how to develop lists of "need-to-know" glossaries for other courses. VRP compiled thirty-two vocational-technical occupation/job glossaries.
4. Reading in the Content Area Modules (R.C.A.) - the VRP project has developed 15 instructional modules for staff development purposes. In addition, the project has developed

models, sample lessons, illustrations, reading guides, suggested practice exercises, and short articles to accompany the commercially developed materials selected for learning activities.

5. Instructional Materials System - the system was developed to provide teachers with information about, and access to, the wide variety of instructional resources available within their specific content area.

Implications for Basic Skills Project

The VRP project is the most highly developed reading program in the nation which deals with vocational as well as other content areas. Components of the VRP project are also essential elements of the Basic Skills project but the Basic Skills project extends itself to other areas of non-technical skills. Most of the VRP materials have been purchased by the project and will be reviewed for their possible inclusion in project guides. A project staff member has visited a VRP site in New York State to see VRP in action.

Summary of the Implications

Seven relevant research and development efforts on basic skills education and occupational education are identified in this chapter. These were selected from a vast amount of curricular and instructional materials available today. The Canadian generic communication and mathematics skills, derived from empirical studies, provide a broad perspective for the Basic Skills project. The extensive and detailed occupational analyses conducted by Ohio State and their further analysis by the Basic Skills project staff into distribution charts serve as extremely useful guides in developing instructional materials. The Minneapolis math/English skills vs. occupations charts provide examples of the occupational applications of concepts.

The Pennsylvania job-related mathematics skills survey can assist the project staff in finalizing the mathematical skills taxonomy since it

reports teachers' perceptions of skills importance. The series of HumRRO studies in functional literacy generated vast amounts of instructional material that can be used in our Resource and Teacher Guides. In addition, the simplified FORCAST readability analysis formula has great potential for use by vocational educators in assessing readability of technical publications and brochures that are common to vocational programs. The Vocational Reading Power project provides our project with an array of field tested instructional guides. It is evident that outcomes associated with the literature/material search described in this section will provide a firm basis for the production of Resource and Teacher Guides.

CHAPTER THREE

INSTRUCTIONAL MATERIALS

The final major task of the literature search was to identify instructional materials. The instructional materials identified fall into two categories. One category covers those texts which are significant and/or dominate the vocational commercial scene, the other category covers those basic skills materials relevant to vocational education. From among these materials, recommendations will be made to secondary level teachers to assist them in providing basic skills instruction to their students.

Procedures

Major steps were taken to assure the comprehensiveness of the literature search for instructional materials. These steps included the following:

1. The use of a full range of descriptors in the ERIC data base and CRIS data base searches.
2. The use of National Advisory Committee and Cornell Faculty Advisory Committee members and other experts to identify key relevant instructional materials for incorporating basic skills instruction into vocational curricula.
3. Search of relevant agency and professional organization bulletins, journals, monographs, etc., to identify relevant descriptive and research literature.
4. Search of final reports of known projects, such as project FLIT, project ABLE and JDRP approved projects.
5. Search of catalogues/lists from commercial publishers, R & D centers, curriculum networks and instructional materials laboratories for relevant instructional materials.
6. Telephone contacts (used extensively), personal interviews with vocational basic skills educators to ascertain current status and recent innovations on the infusion of basic skills instruction into vocational education programs.

The results of implementing these steps are discussed in the following sections of this report beginning with the commercially dominant texts.

Significant and/or Dominant Vocational Texts

Due to time and human resource limitations, the instructional materials data base only contains texts from major vocational subject publishers. Audio-visual as well as other types of materials are not included in this version of the list, since they do not have as wide a distribution as texts. The list only contains texts that are significant and/or dominant in their fields of specialization. "Significant" is defined as having at least 20% of the market for which a text is supposed to be used. "Dominant" is defined as having at least 50% of the market for which a text is supposed to be used.

The following set of procedures was followed in compiling the vocational instructional source data base presented in Appendix D.

1. Telephone survey of opinion leaders, especially prominent textbook writers and instructional material specialists in vocational education for information on what are the most widely used texts/references in their respective occupational instruction areas.
2. Survey of Editors-in-Chief and/or marketing managers of major vocational instructional textbook publishers for information regarding the books of their respective firms having a "significant" or "dominant" sales record in the field.
3. Telephone or written communication with major vocational instructional materials centers in the country for a list of the most used/sold curricular materials in each of the seven vocational areas.
4. Synthesis of the above information from various sources and compilation of an initial list of "significant" and/or "dominant" texts for each of the seven vocational areas.

It is recommended that the texts be selected from the list in a way that is compatible with the instructional programs that have been identified for their importance in terms of high secondary enrollment. To improve the validity of the list, it is further recommended that teachers be used to verify, add, or delete references based on their first-hand knowledge of currently used materials.

ERIC and CRIS Data Base Sources

Figure 9 lists the methods used to gather references relevant to our project from ERIC and CRIS data bases. The results of this effort may be found in Appendix E. The references cited are organized under two headings. The first heading covers those references related to multi-occupational areas. The second heading covers references related to specific occupation areas. Under this heading are listed titles related to such areas as Agriculture Education, Occupational Home Economics, and Trade and Industry.

The references identified through the ERIC and CRIS data base searches will be used to locate instructional and assessment materials and techniques which can be recommended to teachers. These references together with those found through the review of other sources of basic skills materials will be invaluable in the development of the project's Resource and Teacher Guides.

Basic Skills Materials

The objectives of this sub-task are to provide a data base for:

1. the identification of "how-to" examples for teaching basic skills to be used in the teacher guides.
2. the development of basic skills/vocational program matrices.

3. the development of a specialized job-related vocabulary list in each of the vocational areas.
4. the identification of testing materials that are built into vocationally related basic skills texts.
5. the identification of options of integrating instruction in basic skills into vocational programs.

Catalogues from major commercial publishers and instructional materials networks were searched in order to realize the above objectives. The list of references identified appears in Appendix F. The list will be updated as new sources are identified. The materials selected from the list will be those which are relevant to the instructional programs identified as the most important in terms of enrollment.

Implications

The list of significant and/or dominant texts available from commercial publishers provides a basis for the development of a series of specialized job-related vocabularies for different occupational areas. In addition, this list (Appendix D) and the basic skills materials list (Appendix F) can be combined to provide the project with comprehensive resources for the identification of essential basic skills and for the validation of readability analyses of printed vocational instructional materials. The development of basic skills/vocational program matrices may also be accomplished using the references listed. The ERIC, CRIS and basic skills materials searches will help us to identify occupationally relevant assessment instruments, instructional materials, and evaluation methods.

Taken together, the results of the Literature Search (Task E) form a firm foundation for the development of the project's Resource and Teacher Guides.

Figure 9

METHOD FOR SELECTING PROJECT RELEVANT REFERENCES
FROM ERIC AND CRIS DATA BASES

Span of Coverage: ERIC Data Base--up to December 1979

CRIS Data Base--1975 to December 1979

Descriptors used in the Search: Four sets of descriptors were used.

A. Level of Instruction--Tenth, Eleventh, Twelfth Grades

B. Vocational Areas--Agricultural Education

Business and Office Education

Distributive Education

Occupational Home-Economics Education

Health Occupations Education

Technical Education

Trade and Industrial Education

Vocational Education

C. Basic Skills-- Reading Improvement

Basic Skills, writing skills

Basic vocabulary, study skills

Language skills, vocabulary

Speech skills, listening

Verbal ability, comprehension

Arithmetic, communication skills

D. Type of Schools-- High Schools, secondary education

Senior high school secondary grades

Vocational high schools

Printouts: Separate printout for each of the seven vocational service areas and one additional printout for vocational education in general.

Selections: Part I--References related to multi-occupational areas

Part II--References related to specific occupational areas

(please see Appendix E)

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Strank, Edward J. and Speck, Samuel R. Analysis of the Auto Body Repair Occupation. Columbus, OH: Trade and Industrial Instructional Materials Laboratory, The Ohio State University, 1974. (This is one of an extensive series of booklets reporting analyses of many occupations.)

APPENDICES

Appendix A

ENROLLMENT OF VOCATIONAL EDUCATION
PROGRAMS AND PROJECTED ANNUAL

USOE CODE	Instructional Program Title	AVERAGE OPENINGS			1978-90 Projected Ann. Avg. Openings**	SEDI	GI
		Enrollment 1978*		Completions 1978*			
		Secondary	Total				
01.	Agriculture Total	715,272	1,006,542	181,014			
01.0100	Ag. Prod.	341,399	528,946	80,459		0.65	
01.0200	Ag. Supplies/Bus. Serv.	23,846	33,022	9,383			
01.0300	Ag. Mechanics	108,634	133,576	34,457	3,500 ¹	0.6	
01.0400	Ag. Products	8,974	12,680	3,481			
01.0500	Ag. Ornamental Horticult.	83,923	130,836	32,765		0.64	
01.0600	Ag. Resources	17,253	24,517	6,923	900 ²		
01.0700	Forestry	17,822	22,382	4,639	1,400		
01.9900	Other	113,421	120,583	8,907			
04.	Distributive Total	397,429	962,009	279,720			
04.0100	Advertisng. Serv.	5,836	17,760	4,243	10,750 ³		
04.0200	Apparel & Acces.	21,273	32,012	11,821		0.66	
04.0300	Automotive	7,010	9,050	3,923	18,900		
04.0400	Finance & Credit	3,206	48,745	10,419	33,500		
04.0500	Floristry	2,246	7,767	2,267	4,200		
04.0600	Food Distrib.	26,307	37,117	18,990			
04.0700	Food Services	34,493	57,277	21,661		0.60	
04.0800	General Merchand.	179,684	284,230	108,484	470,000	0.63 4.33	
04.0900	Hdwe., Bldg. Mtls., etc.	4,324	4,837	2,527			
04.1000	Home Furnishings	2,371	4,435	1,724			
04.1100	Hotel & Lodging	2,540	19,276	3,495	14,900		
04.1200	Industrial Mktg.	2,260	22,012	3,769	21,700		
04.1300	Insurance	773	16,773	2,875	40,250		
04.1400	International Trade	181	1,096	337			
04.1500	Personal Serv.	7,547	19,314	5,421			
04.1600	Petroleum	3,933	4,318	2,117	5,200		
04.1700	Real estate	4,287	194,365	37,855	50,000		
04.1800	Rec. & Tourism	4,451	26,860	6,418			
04.1900	Transportation	4,124	17,069	4,164	14,700		

USOE CODE	Instructional Program Title	Enrollment 1978		Completions 1978	1978-90 Projected		
		Secondary	Total		Ann. Avg. Openings	SEDI	GI
04.2000	Rat. Trade, Other	15,865	23,524	7,879			
04.3100	Wholesale, Trade, Other	3,088	4,500	1,692			
04.9900	Other	62,630	109,672	17,639			
07.	Health Total	131,907	758,808	202,061			
07.0101	Dental Assistant	8,085	21,724	8,013	11,000	0.37	1.37
07.0102	Dental Hygienist (Assoc.)	119	7,465	2,360	6,000		
07.0103	Dental Lb. Tech.	911	4,185	1,234	2,800		
07.0199	Other Dental	558	1,251	516			
07.0203	Med. Lab. Assist.	3,941	17,988	3,894	14,800		
07.0299	Other Med. Lab. Tech.	546	5,464	1,329			
07.0301	Nursing, Assoc. Degree	572	115,940	24,895	85,000		
07.0302	Prac. (Voc.) Nurs.	8,424	94,874	34,399	60,000		
07.0303	Nurs. Asst. (Aide)	34,650	117,495	42,325	94,000	0.30	2.22
07.0305	Surgical Tech.	212	3,895	1,381	2,600		
07.0399	Other Nursing	5,433	49,386	7,003			
07.0401	Occupa. Therapy	138	2,531	820	1,100		
07.0402	Physical Therapy	580	3,310	354	400		
07.0499	Other Rehab.	447	2,819	421			
07.0501	Radiologic Tech.	301	10,983	3,090	9,000		
07.0503	Nuclear Med. Tech.	13	343	88			
07.0599	Other Radiologic	19	317	51			
07.0600	Ophthalmic	124	2,758	577	3,800 ⁴		
07.0700	Environ. Health	330	4,049	230			
07.0800	Mental Health Tech.	504	14,837	2,307			
07.0903	Inhal. Therapy Tech.	343	14,008	3,168	5,000		
07.0904	Medical Assistant	11,841	31,973	10,288		0.37	
07.0906	Health Aide	10,541	15,699	5,217			
07.0907	Med. Emerg. Tech.	989	88,092	23,748			
07.0909	Mortuary Scien.	57	1,513	307	2,200		
07.9900	Other	42,229	125,909	23,046			

USOE CODE	Instructional Program Title	Enrollment 1978		Completions 1978	1978-90 Projected		
		Secondary	Total		Ann. Avg. Openings	SEDI	GI
09.01	Consumer & Hmkg. Total	2,795,949	3,659,441	0			
09.0101	Compreh. Hmkg.	1,295,177	1,434,941	0			
09.0102	Child Devel.	170,251	260,252	0			
09.0103	Clothing & Tex.	198,179	365,456	0			
09.0104	Consumer Ed.	103,171	185,805	0			
09.0106	Family Rel.	211,124	264,117	0			
09.0107	Food & Nutri	302,399	427,769	0			
09.0108	Home Mgt.	38,923	52,682	0			
09.0109	Housing & Home Furnishing	92,664	161,567	0			
09.0199	Other	384,061	506,852	0			
09.02	Occup. Home Ec. Total	252,566	459,590	112,680			
09.0201	Care & Guid. of Child.	64,442	153,478	36,487	45,000 ⁵	0.42	
09.0202	Cloth. Mgt., Prod., Serv.	41,791	70,807	17,767		0.68	
09.0203	Food Mgt., Prod., Serv.	102,526	151,134	41,578		0.70	
09.0204	Home Furn., Equip., Serv.	6,174	29,222	5,243			
09.0205	Inst. & Home Mgt.	7,930	17,751	4,686	2,000		
09.0299	Other	29,703	37,198	6,919			
14.	Office Occup. Total	1,934,722	3,312,475	728,189			
14.0100	Acctg. & Comptg.	307,126	588,971	119,569	286,500 ⁶	0.52	2.40
14.0201	Computer & Console Oper.	18,512	50,666	11,519	12,500		
14.0203	Programmers	22,489	83,479	11,165	9,200		
14.0299	Other Bus., Data Process.	29,495	84,015	22,915			
14.0300	Filing, Office Machines	551,883	719,267	174,592	40,000 ⁷	0.77	
14.0400	Info. Communic. Occup.	17,035	45,400	11,144	35,550 ⁸		
14.0500	Mtls., Support, Trans.,	2,711	4,198	991	45,000 ⁹		
14.0600	Personnel, Trg. & related	16,928	58,717	14,858	17,000 ¹⁰		
14.0700	Steno, Secy. & related	389,787	700,586	170,167	305,000	0.56	1.79
14.0800	Supervsy. & Adm. Mgt.	18,264	212,792	29,078	2,200 ¹¹		
14.0900	Typing & related	419,273	584,247	144,077	59,000	0.72	0.41
14.9900	Other	141,219	180,137	18,114	4,600 ¹²		

USOE CODE	Instructional Program Title	Enrollment 1978		Completions 1978	1978-90 Projected		
		Secondary	Total		Ann. Avg. Openings	SEDI	GI
16.	Technical Total	39,273	527,681	94,305			
16.0100	Science & Eng. Technicians				23,400		
16.0101	Aeronaut. Tech.	1,083	5,591	1,041			
16.0103	Architec. Tech.	3,228	30,660	4,910			
16.0104	Auto Tech.	1,101	14,041	2,354			
16.0105	Chemical Tech.	995	5,492	896			
16.0106	Civil Tech.	968	30,100	3,701			
16.0107	Electrical Tech.	4,120	25,032	2,607			
16.0108	Electronic Tech.	9,048	90,306	17,216	5,400	0.10	0.31
16.0109	Electro-mechnl. Tech.	342	4,298	971			
16.0110	Environ. Cntrl. Tech.	356	8,612	1,639			
16.0111	Industrl. Tech.	361	18,056	2,183			
16.0112	Instrumntn. Tech.	296	3,681	645			
16.0113	Mechanical Tech.	1,351	30,168	5,173			
16.0114	Metalurgical Tech.	84	1,529	524			
16.0117	Scientific Data Tech.	3,465	15,887	4,848			
16.0601	Commercial Pilot Trng.	136	8,874	1,325	3,800		
16.0602	Fire & Fire Safety Tech.	525	29,147	3,615			
16.0603	Forestry Tech.	138	3,292	543			
16.0604	Oceanographic Tech.	88	2,709	362			
16.0605	Police Science	2,665	105,457	18,511			
16.9901	Air Poll. Tech.	17	183	9			
16.9902	Water & Waste Water Tech.	48	7,254	551			
16.9900	Other	8,858	87,312	20,675			
17.	T & I Total	1,469,828	3,402,722	856,388			
17.0100	Air Conditioning	22,065	79,357	18,272	8,200		
17.0200	Appl. Repair	13,344	19,758	5,948	6,900		
17.0301	Body & Fndr.	49,879	93,339	29,401	9,800	0.53	0.33
17.0302	Auto Mech.	210,300	340,686	99,528	37,000	0.62	0.37
17.0399	Other Automotive	59,014	108,980	26,782			
17.0400	Aviation Occup.	9,293	36,814	6,459	4,200 ¹³		
17.0500	Blueprint Rdg.	1,387	16,856	2,892			
17.0600	Bus. Mch. Mnt.	3,962	1,511	1,217	4,200		
17.0700	Comrc'l. Art Occ.	20,854	52,966	10,975	4,150 ¹⁴		
17.0800	Comrc'l. Fishry. Occ.	-	7,108	1,135	450 ¹⁵		
17.0900	Comrc'l. Phtgy.	10,863	40,185	7,960	2,700		
17.1001	Carpentry	97,359	162,213	44,625	58,000	0.60	1.30
17.1002	Electricity	36,629	95,382	18,373	13,600		
17.1004	Masonry	26,055	44,723	11,891	8,000		
17.1007	Plmbg. & Pftng.	9,349	43,995	8,312	20,000		
17.1099	Other Constr./Mat.	13,278	130,991	32,133	72,100		

USOE CODE	Instructional Program Title	Enrollment 1978		Completions 1978	1978-90		
		Secondary	Total		Projected Ann. Avg. Openings	SEDI	GI
17.1100	Catal. Serv.	9,875	19,895	5,406	176,000		
17.1200	Diesel Mach.	7,448	25,859	7,303			
17.1300	Drftg. Occ.	97,151	152,327	33,294	11,000	0.64	0.33
17.1400	Elctrl. Occ.	30,065	118,022	24,349	16,550 ¹⁶		
17.1500	Eltrnc. Occ.	72,040	146,294	35,217	10,000 ¹⁷	0.49	
17.1600	Fabric Mnt. Serv.	1,679	2,865	701			
17.1700	Mgt. Development	1,521	76,014	18,650	69,000		
17.1900	Grphc. Arts Occ.	77,798	108,584	26,920	13,950 ¹⁸	0.72	
17.2000	Indstrl. Ato. Ergy.	312	582	114			
17.2100	Instr. Mnt. & Rep.	929	4,547	913			
17.2200	Maritime Occ.	2,472	9,096	1,103	1,000		
17.2302	Machine Shop	56,646	117,069	32,588	44,035	0.48	1.35
17.2303	Machine Tool Oper.	5,269	14,232	3,437			
17.2305	Sheet Metal	20,017	45,694	6,571	3,500		
17.2306	Welding & Cutng.	56,759	205,486	51,722	35,000	0.28	0.68
17.2307	Tool & Die Mkg.	806	8,475	2,396	10,400		
17.2399	Other Mekwrkg. Occ.	44,862	58,709	17,548	3,100		
17.2400	Mtlrgy. Occ.	1,257	4,213	400	35,000		
17.2601	Barbering	1,033	4,184	1,044	9,700		
17.2602	Cosmetology	64,613	97,947	27,215	28,500	0.66	1.05
17.2699	Other Prsnl. Serv.	44,597	7,608	2,118			
17.2700	Plastics Occup.	4,597	7,608	1,943			
17.2801	Firefighter Trng.	1,811	186,472	78,542	7,500		
17.2802	Law Enforcmt. Trng.	3,930	104,194	21,744	88,300		
17.2899	Other Pub. Serv.	4,980	66,991	7,346	8,000		
17.2900	Qty. Food Occ.	29,254	54,468	14,389	195,200 ¹⁹	0.54	13.57
17.3000	Refrigeration	8,973	2,243	2,260			
17.3100	Small Eng. Rep.	29,126	52,524	13,171			
17.3200	Stn. Engy. Src.	1,588	14,021	3,639	105,000		
17.3300	Textile Prod. & Fabric.	17,149	45,642	12,755			
17.3400	Leather Wrkg.	1,183	1,930	677	1,600 ²⁰		
17.3500	Upholstering	5,310	22,136	7,198	1,100		
17.3600	Woodworking Occ.	59,336	89,620	17,653		0.66	--
17.9900	Other	109,861	243,529	50,059			
99.	Special Programs Total	3,223,774	3,509,351	0			
99.0100	Grp. Guid. (Pre-Vocat.)	1,455,126	1,508,189	0			
99.0300	Remedial	48,858	101,904	0			
99.0400	Industrial Arts	1,479,121	1,492,790	0			
99.0600	Other N.E.C.	240,669	406,468	0			

* Summary Data - Vocational Education, Program Year 1978.

U. S. Department of Health, Education, and Welfare.

** Occupational Projections and Training Data, B-2058.

U. S. Department of Labor, 1980.

<u>FOOTNOTES</u>		<u>Annual Average</u>	
<u>USOE CODE</u>	<u>Occupation</u>	<u>Openings: Total</u>	
		<u>1978-90</u>	
¹ 01.0301	farm equipment mechanics	3,500	
² 01.0607		700	} sum = 900
01.0608	range managers	200	
³ 04.0100	advertising services	not available	
⁴ 07.0601	ophthalmic lab. technicians	2,600	} sum = 3,800
07.0603	optometric assistants	1,200	
⁵ 09.0201	private household workers		}
09.0202			
09.0203			
09.0205		hotel housekeepers	
⁶ 14.0102	bookkeeping workers	96,000	} sum = 286,500
14.0103	cashiers	119,000	
14.0104	office machine operators	9,700	
14.0105	bank tellers	17,000	
14.1103			
14.1900		-200	
14.0102	statistical clerks		
14.0104		45,000	
14.0303			
14.0399			} sum = 40,000
⁷ 14.0302	file clerks	16,500	
14.0303	statistical clerks	23,500	
⁸ 14.0401	telephone operators	50	} sum = 35,550
14.0403	postal clerks	2,000	
14.0406	receptionists	4,000	
14.0401	telegraphers, telephones, & tower operators	9,900	
14.0499	library technicians	12,600	

FOOTNOTES (continued)

<u>USOE CODE</u>	<u>Occupation</u>	<u>Annual Average Openings: Total 1978-90</u>	
⁹ 14.0503	shipping and receiving clerks	22,000	} sum = 45,000
14.0504	stock clerks	23,000	
¹⁰ 14.0602	personnel and labor relations workers	17,000	}
14.0603			
14.0699			
¹¹ 14.0899	credit managers	2,200	
¹² 14.9900	other	4,600	
04.0800	general merchandising		
¹³ 17.0403	air traffic controllers	700	} sum = 4,200
17.0401	airplane mechanics	3,500	
¹⁴ 17.0703	industrial designers	550	} sum = 4,150
17.0701	interior designers	3,600	
¹⁵ 17.0802	merchant marine officers	700	} sum = 450
17.0801	merchant marine sailors	-250	
¹⁶ 17.1400	maintenance electricians	15,500	} sum = 16,550
17.1402	signal department workers	1,050	
¹⁷ 17.1501	central officecraft occupations	3,900	} sum = 10,000
17.1503	television and radio technicians	6,100	
¹⁸ 17.1906	bookbinders and bindery-workers	2,600	} sum = 13,950
17.1901	compositors	3,900	
17.1902	lithographers	7,300	
17.1904	photoengravers	150	
¹⁹ 17.2902	cooks and chefs	86,000	} sum = 195,200
17.2903	meatcutters	5,200	
17.2904	food-counter workers	104,000	
²⁰ 17.3402	shoe repairers	1,600	

Appendix B

PART 1

MATHEMATICS SKILLS AND CONCEPTS

A. Number - Arabic numeral system

1. What is a number/numeral?
2. Place value/expansion/notation
3. Compare and contrast various base number systems with our decimal numeral system (Binary, Octal, etc.).

B. Set of Real numbers

Integers	Rails	Rationals
		Fractions and Decimal Fractions
		Proper
		Improper
		Integers
		signed numbers
		Whole numbers
		Counting numbers

C. Use of Numbers: (without calculation)

1. Counting
2. Comparison system
3. Ordering
4. Labeling
5. Coding-given a coding system, recognize and identify each unit involved by assigning necessary symbols, numerical or literal.
6. Rats
7. Visual approximation
8. Recording
3. Fundamental Operations (Calculations)
 1. Addition algorithms
 2. Subtraction algorithms
 3. Multiplication algorithms
 4. Division algorithms
 5. Order of operations
 6. Use of parentheses in simplifying arithmetic expressions.

Available

E. Basic Arithmetic Skills and Concepts

1. Reduction of fractions. (Example: $12/16 = 3/4$)
 2. Changing mixed numbers to improper fractions. (Example: $4 \frac{3}{4} = 19/4$)
 3. Changing percents to fractions and fractions to percents.
 4. Finding a percent of a number and what percent one number is of another.
 5. Changing fractions to decimal and decimal to fractions
 6. Ratio and proportion
- Estimation
7. Rounding off decimals and whole numbers (Example: $-.877 \approx -.88$ when rounding to three decimal places.)
 8. Approximation using scientific notation (Example: $3 \cdot 5 \times 10^2 = 350$)
 9. Coins and short method
 10. Rule of thumb (a peck's a pound, etc.)
 11. Property of comparison
 - a. equality/equivalence
 - b. inequality/greater than/less than
 12. Properties of the real number system
 - a. commutative (order)

From T. Hinds, Personal Communication, April 7, 1980. The skills in these two lists are those used in the original occupational analysis which resulted in The Ohio State University task analysis illustrated in Figure 1 of this report.

- b. associative (grouping)
- c. distributive (multiplication w.r.t. addition)
- d. identity of one (1)
- e. multiplication by zero (0)
- f. multiplication by zero
- g. transitive
- h. inverse/multiplicative and additive

F. Use of measuring devices and mechanical aids

1. Slide rule
2. Calculators
 - a. electronic
 - b. mechanical
3. Computers

G. Basic Measurement Skills and Concepts

1. "Measure sense"/role of "units."
2. Instruments: ruler/compass/protractor/clinometer/tape caliper/microscope/thermometer/barometer/tachometer and others.
3. Given an instrument of measure, determine precision and/or accuracy with respect to relative error, significant digits, and tolerance.
4. Metric and English measure and conversion.
5. Rats
6. Measurements: Geometric
 - a. linear (Example: inches, feet, yards, etc.)
 - b. area (Example: square meters)
 - c. volume (Example: cubic meters)
 - d. angle (Example: degrees, minutes, seconds, etc.)
7. Measurement: Non-geometric
 - a. time/calendar
 - b. money/interest
 - c. temperature
 - d. weight
 - e. liquid
 - f. dry
 - g. speed (Example: feet per minute, R.P.M. etc.)
8. Conversion from one standard unit to another (be specific)
9. Reading and interpreting tables, charts, and graphs
 - a. logs
 - b. trig. functions
 - c. scale drawings/floor plans/blueprints
 - d. maps
 - e. number line/coordinate graph (2 dimensional and 3 dimensional)
 - f. representational graphs (Example: scattergraph, bar, circle)

H. Basic Algebra Skills and Concepts

1. Use of variables
 - a. in formulas
 - b. in equation
 - c. in functions
 - d. for stating axioms and properties
 - e. as parameters
2. Expression of product in terms of its prime factors, numerical or non-numerical.
3. Manipulation formulas
Example: $D = RT \implies D/R = D/T = R$
4. Write as a formula equation a relationship given in words
5. Substitute given values in order to find the value of the required unknown.
6. Solve problems involving numerical algebraic expressions. (Example: $-12 + 7 = 6$ ($6-1$) = -40 .)
7. Solve problems involving literal algebraic expressions. (Example: $12 = 7X + (6X - 1) = 12 = X$.)
8. Use of exponents to indicate the power of a number. (Example: $4^2 = 16$)

9. Algebraic subtraction, identification and division of numerical and literal terms. (Example: $-4a$ subtracted from $+6a = 12a$)
 $-3c \times -4a = +12a$
 $-a^6 - -a^7 = -a^7$

10. Algebraic multiplication of two monomials and polynomials with exponents. (Example: $-1a^2 \times -7 ab^3 = 71 a^3 b^3$)
 $-3a^2 - 2 ab \times -2ab = -4a^3 b^2 + 4a^2 b^2 c$

11. Algebraic division of polynomials and monomials. (Example: $4a^3 b^4 \div 2 a^2 b^3$)

12. Solve simple algebraic and quadratic equations. (Example: $x - 5 = 12, x = 17$)
 $4a^2 = 16, x = \frac{16}{4} = 4$

13. Solve a set of simultaneous equations in two or more unknowns using substitution and elimination (Example: $+ , -$)

14. Determining and Use of matrices.

2. Basic Geometry Skills and Concepts

1. Recognize and identify basic geometry figures, plane and solid.
2. Knowledge of geometric relationships
 - a. symmetry
 - b. congruence
 - c. similarity
 - d. parallel
 - e. perpendicular
 - f. skew
3. Understanding and use of the Pythagorean theorem, based on the right triangle. (Example: $a^2 + b^2 = c^2$)
4. Determination of area and altitude of triangles
5. Determination of area, perimeter and diagonals of polygons with more than 4 sides.
6. Determination of area and circumference of circles.
7. Use of area or cords in determining facts about a circle or its parts.
8. Determination of the area of rings.
9. Determination of facts involving sectors of a circle.
10. Determination of area and perimeter of an ellipse.
11. Determination of facts involving lines tangent to circles.
12. Determination of area and volume of rectangular, cube and right triangular prisms.
13. Determination of area and volume of cylinders
14. Determination altitude, area and volume of a right circular cone.
15. Determination of lateral area, total area and volume of frustums of pyramids and cones.
16. Determination of the surface and volume of a sphere.
17. Determination of the volume of a ring.
18. Geometric constructions. (Examples: Perpendiculars to lines, bisecting angles, finding the center of an arc, etc.)

3. Basic Trigonometry Skills and Concepts

1. Use of trigonometric functions in solution of problems involving right triangles.
2. Use of trigonometric functions in solution of problems involving equilateral triangles.
3. Use of trigonometric functions in the solution of problems involving the oblique triangles.

4. Basic Probability Skills and Concepts

1. Determine probability of simple events
2. Use of probability in prediction of mass behavior vs. unpredictability of single events.

5. Basic Statistical Skills and Concepts

1. Representative sampling from population.
2. Measurement of central tendency via mean (average), median, standard deviation.

3. Techniques of statistical analysis and statistical inferences.

N. Logic

1. Symbolism (. etc.)
2. Deductive/Inductive
3. Implications/Converse/Inverse/Contrapositive
4. Arguments/Tests for validity
5. Proof
 - a. Direct
 - b. Indirect

Paragraph/true column

PART 2

COMMUNICATION SKILLS AND CONCEPTS

Performance

A. Speaking

B. Reading

C. Writing

D. Listening

E. Viewing

F. Touch

Knowledge of Concepts/Skills

1. Terminology/General Vocabulary
2. Appropriate Diction
3. Implying
4. Enumeration
5. Clarity of Expression
6. Persuasion and Sales Techniques
7. Denotative/Connotative Words
8. Logic
9. Gestures
10. Dress
11. Facial and Body Features
12. Voice
13. Gaze

1. Comprehension
2. Detail/Inference
3. Speed/Rate
4. Informational Reports
5. Recommendation Reports
6. Progress Reports
7. Physical Experiment Reports
8. Proposals
9. Description of Activities
10. Definition
11. Terminology

1. Punctuation
2. Spelling
3. Classification
4. Name Format
5. Description
6. Reports (see above for types)
7. Business Letter: (Format/Content)
8. Terminology/General Vocabulary
9. Appropriate Diction
10. Clarity of Expression
11. Persuasion and Sales Techniques
12. Denotative/Connotative Words
13. Logic
14. Gaze

1. Auditory Discrimination
2. Detection of Propaganda Devices
3. Discrimination Facts from Non-facts
4. Recognize Opinions
5. Concentration
6. Logic (Ordering of Thoughts and Ideas)
7. Word Definition
8. Note Taking
9. Voice Discrimination (Recognize proper and improper sounds; animal, human, machine)

1. Visual Analysis (Seeing the parts in relation of the whole)
2. Memory (Short & Long Term Retention)
3. Describing (Discrimination and Verbalization of Physical Characteristics)
4. Logic (Ordering of Thoughts and Perceptions)
5. Detail and Inference
6. Color Discrimination
7. Recognition of Symbols, Codes, Emblems

Appendix C

BASIC SKILLS DISTRIBUTION CHARTS

Occupations

Automotive Body Mechanic
Bank Teller
Bindery
Bookkeeper
Childcare/Nursery School Teacher Aide
Data Accountant
Drafting Occupations
Garden Center Employee
Lithographic Printing Occupations
Offset Press Operator
Terminal Clerk
Word Processor

BASIC SKILLS PROJECT

Automotive Body Mechanic

BASIC SKILLS DISTRIBUTION CHART

TASK STATEMENTS

TASK STATEMENTS	MATH										COMMUNICATION																									
	Deduction	Fundamental Operations +, -, x, ÷	Use of numbers (without calculations) coding	Use of numbers recording	Rationals	Order of operations	Whole numbers-decimals	Measurement	Ratio and Proportion	Fractions	Read and interpret tables	Use of numbers	Analyze	Terminology/general vocabulary	Clarity of expression	Logic	Appropriate diction	Implying enunciation	Penmanship	Classification	Description	Terminology	Usage	Auditory discrimination	Discriminate facts from nonfacts	Recognize opinions	Logic	Comprehension	Recommendation reports	Detail/inferences	Information report	Description of mechanisms	Definition	Speed/rate	Terminology	Instructions
A-1 Write estimates	✓	✓												✓	✓	✓	✓																			
A-2 File estimates alphabetically			✓																																	✓
A-3 Verify insurance coverage														✓	✓	✓	✓																			
A-4 Order parts and materials	✓													✓	✓	✓	✓																			
A-5 Schedule work			✓	✓										✓	✓	✓	✓																			
A-6 Write repair orders and record parts and materials		✓	✓	✓																✓	✓	✓	✓													
A-7 Record costs, payments, deposits		✓	✓											✓	✓	✓	✓																			✓
A-8 Keep payroll records		✓	✓											✓	✓	✓	✓																			
A-9 Order and maintain tools and equipment			✓											✓	✓	✓	✓																			
A-10 Establish safety regulations														✓	✓	✓	✓																			
A-11 Handle customer complaints														✓	✓	✓	✓																			
B-1 Wash and dewax vehicle			✓											✓	✓	✓	✓																			
B-2 Remove decorative features														✓	✓	✓	✓																			
B-3 Ascertain type of original finish and type to be used	✓													✓	✓	✓	✓																			✓
B-4 Inspect old surface for defects														✓	✓	✓	✓																			
B-5 Featheredge broken s' faces			✓											✓	✓	✓	✓																			
B-6 Mix and reduce refinishing materials	✓													✓	✓	✓	✓																			
B-7 Treat bare metal														✓	✓	✓	✓																			
B-8 Mask operations														✓	✓	✓	✓																			
B-9 Apply primer surfacer and glazing putty														✓	✓	✓	✓																			
B-10 Sand old finish, primer surfacer and glazing putty														✓	✓	✓	✓																			
B-11 Prepare for alkyd enamel refinishing			✓											✓	✓	✓	✓																			
B-12 Refinish with acrylic enamel														✓	✓	✓	✓																			
B-13 Prepare for polyurethane enamel refinishing			✓											✓	✓	✓	✓																			
B-14 Prepare for acrylic lacquer refinishing			✓											✓	✓	✓	✓																			
B-15 Spot refinishing and touch up			✓											✓	✓	✓	✓																			
B-16 Polish lacquer finishes			✓											✓	✓	✓	✓																			
B-17 Applying striping and decals			✓											✓	✓	✓	✓																			
B-18 Clean up and prepare for delivery														✓	✓	✓	✓																			

BASIC SKILLS PROJECT

Automotive Body Mechanic
Program - 17.0301

BASIC SKILLS DISTRIBUTION CHART

TASK STATEMENTS	MATH										COMMUNICATION																												
	Deduction	Fundamental Operations +, -, x, ÷	Use of numbers (without calculations) coding	Use of numbers recording	Rationals	Order of operations	Whole numbers-decimals	Measurement	Ratio and Proportion	Fractions	Read and interpret tables	Use of numbers	Analyze	Terminology/general vocabulary	Clarity of expression	Logic	Appropriate diction	Implying enunciation	Pennmanship	Classification	Description	Terminology	Usage	Auditory discrimination	Discriminate facts from nonfacts	Recognize opinions	Logic	Comprehension	Recommendation reports	Detail/inferences	Information report	Description of mechanisms	Definition	Speed/rate	Terminology	Instructions			
C-1 Determine direction of force, impact																																							
C-2 Determine hidden damage																																							
C-3 Rough out damaged panel																																							
C-4 Use plastic type fillers																																							
C-5 Use body lead fillers																																							
C-6 Set up oxy-acetylene welding equipment																																							
C-7 Form sheet metal patches																																							
C-8 Install patch panels																																							
C-9 Shrink metal																																							
D-1 Analyze cooling system																																							
D-2 Repair radiator, shroud, hoses																																							
D-3 Replace air conditioner condenser, lines																																							
D-4 Replace water pump, fan, belts																																							
E-1 Analyze extent of damage to frames																																							
E-2 Operate damage dozer and attachments																																							
E-3 Repair and align frame to manufacturer's specifications																																							
E-4 Replace frame assembly																																							
E-5 Replace front frame sections																																							
E-6 Replace frame horn or repair crossmember																																							
F-1 Replace outer quarter panel																																							
F-2 Replace rear quarter wheel housing																																							
F-3 Replace rocker panel																																							
F-4 Replace hood assembly																																							
F-5 Replace hood hinges																																							
F-6 Replace grill assembly																																							
F-7 Replace front fender, welded																																							
F-8 Replace front fender, bolted																																							
F-9 Replace inner fender panel																																							
F-10 Replace outer door panel																																							
F-11 Replace radiator support																																							
F-12 Replace windshield and rear glass with butyl tape system																																							
F-13 Replace windshield or back glass with rubber channel																																							

MATH

COMMUNICATION

SPEAKING

WRITING

LISTENING

READING

BASIC SKILLS PROJECT

Automotive Body Mechanic
Program - 17.0301

BASIC SKILLS DISTRIBUTION CHART

TASK STATEMENTS

TASK STATEMENTS	MATH								COMMUNICATION																														
	Deduction	Fundamental Operations +, -, x, ÷	Use of numbers (without calculations) coding	Use of numbers recording	Patterns	Order of operations	Whole numbers-decimals	Measurement	Ratio and Proportion	Fractions	Read and interpret tables	Use of numbers	Analyze	Terminology/general vocabulary	Clarity of expression	Logic	Appropriate diction	Implying enunciation	Permanence	Classification	Description	Terminology	Usage	Auditory discrimination	Discriminate facts from nonfacts	Recognize opinions	Logic	Comprehension	Recommendation reports	Detail/inferences	Information report	Description of mechanisms	Definition	Speed/rate	Terminology	Instructions			
F-14 Replace center pillar																																							
F-15 Replace cowl panels																																							
F-16 Replace gas tank	✓																																						
F-17 Replace front seat tracks																																							
F-18 Replace deck lid and hinges																																							
F-19 Replace rear upper body panel																																							
F-20 Replace lower rear body panel																																							
F-21 Replace exterior trim																																							
F-22 Replace and overhaul bumper assemblies																																							
F-23 Replace roof panel																																							
F-24 Replace door lock																																							
F-25 Replace door glass/vent assembly																																							
F-26 Replace door glass without vent																																							
F-27 Replace door and hinges																																							
G-1 Replace front suspension parts																																							
G-2 Replace steering parts																																							
G-3 Replace steering column																																							
G-4 Align front end																																							
H-1 Repair fiberglass panel, scratches, gouges and cracks																																							
H-2 Replace a fiberglass panel																																							
H-3 Make a fiberglass patch panel																																							
I-1 Replace, check storage battery																																							
I-2 Replace electrical units																																							
I-3 Repair or splice a broken wire	✓																																						
I-4 Replace wire harness, engine compartment																																							
I-5 Replace headlight bulb and adjust																																							
J-1 Replace headliner																																							
J-2 Replace seat trim																																							
J-3 Clean interior and remove stains																																							
K-1 Adjust hoods and front end sheet metal																																							
K-2 Adjust bumpers																																							
K-3 Adjust doors																																							
K-4 Adjust door glass																																							
K-5 Adjust deck, lid and hinges																																							



MATH

COMMUNICATIONS

LISTENING

READING

WRITING

SPEAKING

BASIC SKILLS PROJECT

Bank Teller

BASIC SKILLS DISTRIBUTION CHART

TASK STATEMENT

TASK STATEMENT	MATH											COMMUNICATIONS																	
	Positive Rationals	Comparison (> < Equivalency/Equiv.)	Guess and Check Method	Whole Numbers	Counting	Properties of Real Number System	+ - Algorithms	Coordinate System	Ordering	Indexing	Coding	Ratio	x + Algorithm	Order of Operations	Reduce Fractions	Recognize Type of Deposit	Recognize Amounts	Analyze Verbal Communication	Terminology	Analysis	Detail/Inference	General Vocabulary	Penmanship	Memo format	Terminology/General Vocabulary	Enunciation	Explaining	Analyze Verbal	
A-1 Verify cash	/	/	/																										
A-2 Obtain cash	/	/	/														/												
A-3 Prepare cage				/																									
A-4 Secure cash	/																												
B-1 Determine type of payment	/																	/											
B-2 Verify amount	/																												
B-3 Issue receipt and post transaction								/	/																				
C-1 Determine type of deposit																/						/	/	/					
C-2 Verify amount	/	/	/			/	/	/	/	/	/	/	/	/															
C-3 Post transaction and issue receipt	/	/	/					/	/													/	/						
D-1 Determine validity of draft																						/	/						
D-2 Identify bearer																						/	/						
D-3 Honor draft														/															
E-1 Issue money order	/	/	/	/	/	/	/	/	/	/	/	/	/	/												/	/	/	/
E-2 Issue cashier's check	/	/	/	/	/	/	/	/	/	/	/	/	/	/										/	/	/	/	/	/
E-3 Issue certified check	/	/	/	/	/	/	/	/	/	/	/	/	/	/										/	/	/	/	/	/
E-4 Issue traveler's check	/	/	/	/	/	/	/	/	/	/	/	/	/	/										/	/	/	/	/	/
F-1 Determine customer needs and prepare rental contract																		/						/					
F-2 Collect rental fees and issue receipt	/	/	/																										
F-3 Admit customer to safety deposit box																						/	/						
G-1 Close and open teller machine	/	/	/																			/	/						
G-2 Operate teller machine	/	/	/																										
H-1 Issue a U.S. government savings bond	/	/	/	/	/	/	/	/	/	/	/	/	/	/												/	/	/	/
H-2 Cash U.S. government savings bond	/	/	/	/	/	/	/	/	/	/	/	/	/	/											/	/	/	/	/
I-1 Determine type of account required																		/											
I-2 Prepare application form and issue savings passbook or checkbook																								/	/	/	/	/	/
J-1 Determine customer needs																								/	/	/	/	/	/
J-2 Prepare and issue certificate	/	/	/																										
J-3 Cash certificates	/	/	/																										

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MATH

COMMUNICATIONS

READING

WRITING

SPEAKING

LISTENING

BASIC SKILLS PROJECT

Bindery

BASIC SKILLS DISTRIBUTION CHART

TASK STATEMENT

TASK STATEMENT	MATH						COMMUNICATIONS																						
	Measurement of Time	Read, Interpret Charts & Graphs	Sequential Ordering	Ratio and Proportion	Fractions and Percent	+ - x ÷	Interpret printer's measuring sys.	Measure Speed, rpm	Terminology	Definition	Comprehension	Instruction and Numbers	Detailed Inferences	Penmanship	Spelling	Description	Terminology	General Vocabulary	Terminology & Clarity	Logic	General Vocabulary	Detailed Inferences	Noise Discrimination	Auditory Discrimination	Notetaking	Concentration	Opinion	Logic	Discriminate Facts From Non-Facts
A-1 Sort materials by priority	✓	✓	✓											✓	✓														
A-2 Sort materials by finishing operations	✓	✓	✓											✓	✓														
A-3 Set-up an inventory control system	✓	✓	✓											✓	✓														
B-1 Lubricate equipment		✓	✓						✓																				
B-2 Set-up folding equip. for parallel fold			✓	✓					✓	✓																			
B-3 Setup folding equip. for parallel and right angle fold			✓	✓					✓	✓																			
B-4 Set-up paper drill			✓	✓					✓	✓																			
B-5 Set-up stitcher for side and saddle stitches			✓	✓					✓	✓																			
B-6 Set-up cutting and trimming machines			✓	✓					✓	✓																			
B-7 Set-up hand and semi-automatic bindery machines			✓	✓					✓	✓																			
C-1 Operate folder parallel fold				✓	✓				✓	✓																			
C-2 Operate folder parallel and right angle			✓	✓					✓	✓																			
C-3 Operate paper drill			✓	✓					✓	✓																			
C-4 Operate stitcher side and saddle			✓	✓					✓	✓																			
C-5 Operate cutting and trimming equipment			✓	✓					✓	✓																			
C-6 Operate hand and semi-automatic bindery machines			✓	✓					✓	✓																			
D-1 Cut, collate and pad by hand			✓	✓					✓	✓																			
D-2 Wrap and package			✓	✓					✓	✓																			
E-1 Inspect and lubricate machines	✓	✓							✓	✓				✓	✓														
E-2 Clean and adjust bindery equipment	✓	✓							✓	✓				✓	✓														

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BASIC SKILLS PROJECT

Bookkeeper

BASIC SKILLS DISTRIBUTION CHART

TASK STATEMENTS

TASK STATEMENTS	MATH											COMMUNICATIONS																	
	+	-	Conv. Mixed Numbers to Improper Fract.	Convert $\frac{x}{y}$ / Fractions	Numerical Manipulation	Rates, Percent	Sequential Ordering	Transposition Errors	Area, Volume	Rounding	Measures	Ratio, proportion	Read and Interpret charts, tables, graphs	+ - x \div of Rational Numbers	Comparison	Coding	Metric	Algebraic Expressions	Comprehension	Process Report	Progress Report	Logic	Discriminate Facts	Concentration	Pennmanship	Spelling	Vocabulary (General and technical)	Clarity of Expression	
A-1 Prepare payroll register	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
A-2 Prepare payroll checks	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
A-3 Summarize payroll register	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
B-1 Inspect money orders and checks	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
B-2 Prepare deposit slips	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
B-3 Process cash and trade discounts	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
B-4 Summarize daily cash receipts	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
B-5 Post subsidiary receivable ledger	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
C-1 Verify source documents	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
C-2 Check invoices for customer credit	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
C-3 Prepare customer invoices	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
C-4 Summarize daily sales	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
C-5 Post accounts receivable subsidiary ledger	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
C-6 Research customer complaints	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
C-7 Credit accounts for returns and allowances	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
C-8 Age accounts	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
C-9 Prepare statements of customer account	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
D-1 Maintain cash control	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
D-2 Prepare bank reconciliation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
E-1 Log all purchase orders	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
E-2 Maintain raw materials inventory records	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
E-3 Update inventory records	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F-1 Determine propriety of invoice	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F-2 Prepare voucher	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
F-3 Issue debit memorandums	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
G-1 Verify approved invoices	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
G-2 Prepare check	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
H-1 Post all journal entries to general ledger	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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MATH

COMMUNICATIONS

BASIC SKILLS PROJECT

Childcare/Nursery School Teacher

BASIC SKILLS DISTRIBUTION CHART

TASK STATEMENTS

TASK STATEMENTS	MATH													COMMUNICATIONS																																														
	Time	Counting	Sequencing, Ordering	Use of Numbers	Calculating	Reading	Measurements	Calendar	Matching	Relationship of Sizes	Fractions	Geometric Shapes	Stacking	Classification	Sorting	Weight	Volume	Design	Logic	Cutting	Economic Principles	Inventory	One to One	Percentages	Listening	Concentration	Writing, Records	Spelling	Written Messages	Verbal, Speaking	Viewing, Visual	Reading	Reviewing	Touching	Discrimination	Describing	Modeling	Body Language	Comprehension	Penmanship	Terminology	Size	Shape	Texture	Questionink	Brainstorming	Guidance Techniques	Color												
A-1 Use telephone and take messages	/																								/																																			
A-2 Keep application record	/																									/																																		
A-3 Keep health record	/																									/																																		
A-4 Keep attendance record	/																									/																																		
A-5 Keep financial record	/																									/																																		
A-6 Perform library duties	/																									/																																		
A-7 Assist with inventory	/																									/																																		
A-8 Introduce parent to center & its prog.	/																								/																																			
A-9 Establish continuing relationship	/																								/																																			
A-10 Participate in parent conference	/																								/																																			
A-11 Contact parents in emergency or illness	/																								/																																			
A-12 Write communications to parents	/																								/																																			
A-13 Follow personnel policies of center	/																								/																																			
B-1 Clean and maintain interior building surfaces	/																								/																																			
B-2 Clean and maintain supplies and equip.	/																								/																																			
B-3 Maintain pets	/																								/																																			
C-1 Assist in planning goals for the year	/																								/																																			
C-2 Assist in planning daily schedule	/																								/																																			
C-3 Assist in planning daily activities	/																								/																																			
C-4 Assist in performing planned activities for children with special needs	/																								/																																			
C-5 Assist in evaluation	/																								/																																			
C-6 Plan and prepare room displays	/																								/																																			
D-1 Conduct blocks and transportation toys activity	/																								/																																			
D-2 Conduct sand and water play activity	/																								/																																			
D-3 Conduct woodworking activity	/																								/																																			
D-4 Conduct housekeeping	/																								/																																			
D-5 Conduct listening center activity	/																								/																																			
D-6 Conduct manipulative toy area	/																								/																																			

MATH

COMMUNICATIONS

BASIC SKILLS PROJECT

Childcare/Nursery School Teacher

BASIC SKILLS DISTRIBUTION CHART

TASK STATEMENTS

	Time	Counting	Sequencing, Ordering	Use of Numbers	Calculating	Reading	Measurements	Calendar	Matching	Relationship of Sizes	Fractions	Geometric Shapes	Stacking	Classification	Sorting	Weight	Geometry principles	Volume	Design	Logic	Cutting	Economic Principles	Inventory	One to One	Percentages	Listening	Concentration	Writing, records	Spelling	Written messages	Verbal, Speaking	Viewing, Visual	Reading	Reviewing	Touching	Discrimination	Describing	Modeling	Body Language	Comprehension	Pennmanship	Terminology	Size	Shape	Texture	Questioning	Brainstorming	Guidance Techniques	Color					
D-7	Conduct free art activity																																																					
D-8	Conduct nature/science activity																																																					
D-9	Conduct large muscle activity																																																					
D-10	Present art activities																																																					
D-11	Present games and physical activities																																																					
D-12	Present health/safety activities																																																					
D-13	Present language arts activities																																																					
D-14	Present literature activities																																																					
D-15	Present pre-math activities																																																					
D-16	Present musical activities																																																					
D-17	Present science activities																																																					
D-18	Present social studies activities																																																					
D-19	Supervise activities for special occasions																																																					
E-1	Assist children with arrival																																																					
E-2	Assist children with departure																																																					
E-3	Assist with health care of children																																																					
E-4	Care or emotionally upset child																																																					
E-5	Supervise toilet activities																																																					
E-6	Supervise snack time																																																					
E-7	Supervise children's rest																																																					

BASIC SKILLS PROJECT

Drafting Occupations

BASIC SKILLS DISTRIBUTION CHART

TASK STATEMENTS

TASK STATEMENTS	Symbols and Coding	Linear Measure	Sequential Ordering	Parallel Lines	Geometric Construction	Ratio/Proportion	$+ - \times \div$	Time	Numbers	Basic Math	Metric Conversion	Areas	Space Relationships	Volume	Fractions	Geometry	Cost Estimates	Metrics	Tolerancing	Reading	Listening	Interpreting	Visual, viewing	Spelling	Touch	Writing	Speaking	Comprehension	Tool Recognition	Trade Vocabulary and Jargon	Actions
A-1a Prepare original to make tracing	✓																														
A-1b Do line work	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
A-2a Select reproduction method		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
A-3a Prepare blueprint machine for operation		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
A-3b Operate blueprint machine		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
A-4a Trim and bind prints		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
A-5a Store drawings		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
A-5b Distribute prints		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
B-1a Determine required space and location		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
B-1b Stock and maintain inventory		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
B-2a Determine types of maintenance to perform		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
B-2b Clean and lubricate tools and equipment		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
B-2c Repair and adjust tools and equipment		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
B-3a Install and adjust drafting machine		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
B-3b Install and adjust parallel bar		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
B-3c Install drawing board covers		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
B-3d Adjust posture chair		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
C-1a Select sketch type and sketch size		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
C-2a Select media		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
C-3a Draw sketch		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
C-4b Dimension and note sketch		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
D-1a Determine column headings		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
D-2a Select location of materials list		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
D-2b Draw and letter materials list		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
D-3a Placement of keys and legends		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
E-1a Select scale and sheet size		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
E-2a Select media		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
E-3a Locate start and finish points		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
E-4a Prepare to draw		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
E-4b Draw block diagram		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
E-4c letter blocks		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

BASIC SKILLS PROJECT

Drafting Occupations

BASIC SKILLS DISTRIBUTION CHART

TASK STATEMENTS

TASK STATEMENTS	Symbols and Coding	Linear Measure	Sequential Ordering	Parallel Lines	Geometric Construction	Ratio/Proportion	+ - x ÷	Time	Numbers	Basic Math	Metric Conversion	Areas	Space Relationships	Volume	Fractions	Geometry	Cost Estimates	Metrics	Tolerancing	Reading	Listening	Interpreting	Visual, viewing	Spelling	Touch	Writing	Speaking	Comprehension	Tool Recognition	Trade Vocabulary and Jargon	Actions			
E-4d Letter marginal information		✓											✓																					
E-5a Place direction of flow arrows		✓											✓																					
F-1a Select type of drawing to use										✓	✓										✓	✓	✓	✓										
F-2a Select drawing size										✓	✓										✓	✓	✓	✓										
F-3a Select media																					✓	✓	✓	✓										
F-4a Select appropriate symbols																					✓	✓	✓	✓										
F-4b Draw symbols and symbol connections	✓		✓	✓	✓																✓	✓	✓	✓										
F-5a Dimension drawing																																		
F-5b Place notes and marginal information																																		
G-1a Determine part scale and sheet size		✓	✓	✓	✓	✓	✓																											
G-2a Select media																					✓	✓	✓	✓										
G-3a Square and secure media to board																																		
G-3b Construct orthographic views																																		
G-3c locate reference points and develop outline		✓	✓	✓	✓	✓	✓			✓			✓																					
G-4a Square and secure media to board																																		
G-4b Outline components in proper relationship																																		
H-1a Select method of drawing fastener																																		
H-2a Determine part scale and sheet size		✓	✓	✓	✓	✓	✓																											
H-3a Determine drawing method or representation		✓	✓	✓	✓	✓	✓																											
H-4a lay out fastener		✓	✓	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓	✓	✓															
H-4b Draw fastener		✓	✓	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓	✓	✓															
H-4c label and dimension fasteners		✓	✓	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓	✓	✓															
H-4d Clean drawing and submit to checking		✓	✓	✓	✓	✓	✓																											
H-5a Layout Fasteners		✓	✓	✓	✓	✓	✓																											
H-5b Draw fastener		✓	✓	✓	✓	✓	✓																											
H-5c label fastener		✓	✓	✓	✓	✓	✓																											
H-5d Clean drawing and submit for checking		✓	✓	✓	✓	✓	✓																											
I-1a Select method of drawing detail																																		
I-2a Determine part scale and sheet size		✓	✓	✓	✓	✓	✓																											
I-3a Select media																																		
I-4a Draw multiview details		✓	✓	✓	✓	✓	✓																											
I-4b Draw pictorial details		✓	✓	✓	✓	✓	✓																											

BASIC SKILLS PROJECT

Drafting Occupations

BASIC SKILLS DISTRIBUTION CHART

TASK STATEMENTS

TASK STATEMENTS	Symbols and Coding	Linear Measure	Sequential Ordering	Parallel Lines	Geometric Construction	Ratio/Proportion	$\frac{+}{-} \frac{x}{\div}$	Time	Numbers	Basic Math	Metric Conversion	Areas	Space Relationships	Volume	Fractions	Geometry	Cost Estimates	Metrics	Tolerancing	Reading	Listening	Interpreting	Visual, viewing	Spelling	Touch	Writing	Speaking	Comprehension	Tool Recognition	Trade Vocabulary and Jargon	Actions					
I-5a Locate proper area for information																																				
I-5b Letter marginal information																																				
J-1a Select type of assembly																																				
J-2a Determine part scale and sheet size																																				
J-3a Select media																																				
J-4a Draw multiview assemblies																																				
J-4b Draw pictorial assemblies																																				
J-5a Determine need of additional views or sub-assembly																																				
J-5b Draw required views or assemblies																																				
J-6a Determine part code and code drawing																																				
J-7a Select type of shading																																				
J-7b Shade drawing																																				
K-1a Supervise group																																				
K-2a Assign work to checkers																																				
K-2b Maintain accurate records																																				
K-3a Check work completed by group																																				
K-4a Submit reports to coordinator																																				

BASIC SKILLS PROJECT

Garden Center Employee

BASIC SKILLS DISTRIBUTION CHART

TASK STATEMENT

MATH

COMMUNICATIONS

	Dry Measures	Area/Volume Determination	Liquid Measures	Ratio and Proportion	Linear Measures	Temperature Measures	Monetary Systems	Counting	+ - of whole numbers	x ÷ of whole numbers	Simple Machines	Reduce Fractions	+ - Fractions	Time and Speed	Weight	Circumference	Arcs, Chords	Read & Interp. Charts, Tables, Graphs	Metric	Sequential Ordering	Precision/Accuracy	% of Number	Comprehension (reading)	Verbal Orders	Read Written Work-Orders	Recommendation Writing	Inductive Reasoning	Vocabulary	Terminology	Interpret Verbal Statements	Persuasion	Dictation	Emotional Appeal	Determine Audience Level	Denotative-Connotative Words	Write Clearly	Poise	Enunciation	Written Orders	Prepare Charts, Graphs, Signs, Displ.		
A-1	Water plants	✓	✓	✓																																						
A-2	Reel in plants	✓	✓	✓																																						
A-3	Mulch plants	✓	✓	✓																																						
A-4	Prepare potting mixture				✓																																					
A-5	Pot plants		✓																																							
A-6	Prune plants					✓																																				
A-7	Re-ball and burlap plants	✓	✓	✓																																						
A-8	Fertilize plants	✓	✓	✓	✓																																					
A-9	Control plant pests	✓	✓	✓	✓																																					
A-10	Store seasonal plants	✓	✓	✓																																						
A-11	Care of sales work, storage, and delivery areas																																									
B-1	Interpret customer needs							✓	✓																																	
B-2	Make the sale							✓	✓																																	
B-3	Fill out sales slip								✓	✓																																
B-4	Operate cash register								✓	✓																																
B-5	Use of telephone							✓																																		
B-6	Operate credit systems of payment								✓	✓																																
C-1	Assemble allied products									✓																																
C-2	Service allied products	✓	✓	✓					✓	✓																																
C-3	Demonstrate allied products	✓	✓	✓	✓				✓	✓																																
C-4	Store allied products									✓																																
D-1	Take inventory								✓	✓																																
D-2	Receive inventory (incoming merchandise)								✓	✓																																
D-3	Price inventory								✓	✓																																
E-1	Use tools and equipment	✓		✓																																						
E-2	Inspect, maintain and repair tools and equipment			✓																																						
E-3	Store tools and equipment																																									
F-1	Handle and deliver merchandise		✓																																							
F-2	Stock, label and display merchandise								✓	✓																																

BASIC SKILLS PROJECT

Lithographic Printing Occupations

BASIC SKILLS DISTRIBUTION CHART

TASK STATEMENTS

MATH

COMMUNICATIONS

TASK STATEMENTS		Printers Measure and Conversion	Interpret Charts, Tables, Graphs	Coding	+ - x ÷	Cost Factors	Ratio and Proportion	Measure	Fractions and %	Conversion	Ordering	Metric	Rounding	Geometry	Basic Math	Math shortcuts	Job ticket	Samples	Instructions/trade jargon	Equipment capability	Schedule	Customer/job specifications	Layout	Policy	Write legible instructions	Oral Communications	Operating Manual	Proofreading marks	Maintenance Manual	Reading	Writing
A-1a	Sort materials																														
A-2a	Select type, paper, ink and production meth.	✓	✓	✓	✓	✓												✓	✓	✓	✓	✓									
A-2b	Determine sequence and expedite																														
A-3a	Mark camera copy	✓	✓	✓														✓	✓	✓	✓	✓									
A-3b	Mark composition copy	✓	✓	✓														✓	✓	✓	✓	✓									
A-4a	Prepare sketches	✓	✓	✓														✓	✓	✓	✓	✓									
A-4b	Prepare comprehensive layout	✓	✓	✓	✓	✓												✓	✓	✓	✓	✓									
A-5a	Edit proof	✓	✓	✓														✓	✓	✓	✓	✓									
A-6a	Prepare single and multiple sheet dummies	✓	✓	✓														✓	✓	✓	✓	✓									
A-7a	Sort materials																														
A-7b	File art work and maintain records				✓																										
B-1a	Sort material	✓	✓	✓																											
B-1b	Fit and mark composition copy	✓	✓	✓																											
B-1c	Distribute materials																														
B-2a	Set-up "strike On" composing machine	✓	✓	✓																											
B-2b	Set-up "photo" composing machine	✓	✓	✓	✓																										
B-3a	Operate "strike-on" machine	✓	✓	✓	✓																										
B-3b	Operate "photo" machine	✓	✓	✓	✓																										
B-4a	Check final copy for acceptability	✓	✓	✓																											
B-4b	Correct final copy for machine errors	✓	✓	✓																											
B-5a	Lubricate the composing machine				✓																										
B-5b	Clean lint, dust, grease and corrosion from machine																														
B-5c	Adjust machine and perform minor repairs				✓																										
C-1a	Verify presence of requested copy																														
C-1b	Mark and distribute copy																														
C-2a	Construct layout sheet dimensions	✓	✓	✓																											
C-2b	Mark for proper proportions	✓	✓	✓	✓																										
C-3a	Position window and cut to size	✓	✓	✓																											
C-3b	Block out window	✓	✓	✓																											
C-4a	Attach the copy elements																														

BASIC SKILLS PROJECT

Lithographic Printing Occupations

BASIC SKILLS DISTRIBUTION CHART

TASK STATEMENTS

MATH

COMMUNICATIONS

	Printers Measure and Conversion	Interpret Charts, Tables, Graphs	Coding	+ - x =	Cost Factors	Ratio and Proportion	Measure	Fractions and %	Conversion	Ordering	Metric	Rounding	Geometry	Basic Math	Math shortcuts	Job ticket	Samples	Instructions/trade jargon	Equipment capability	Schedule	Customer/job specifications	Layout	Policy	Write legible instructions	Oral Communications	Operating Manual	Proofreading marks	Maintenance Manual	Reading	Writing
C-5a	Inspect paste-up	✓	✓																											
C-5b	Make corrections to paste-up	✓	✓																											
D-1a	Sort and distribute materials																													
D-2a	Check for completeness, specification requirements and clarity	✓	✓																											
D-3a	Proof and mark materials																													
D-4a	Organize, mark and distribute materials																													
E-1a	Sort copy																													
E-1b	Sort and make line copy	✓	✓																											
E-1c	Sort and make half-tone copy	✓	✓																											
E-1d	Mark camera sequence	✓	✓																											
E-2a	Mix chemicals		✓																											
E-2b	Prepare sink, check safe and inspection lights and verify presence of tools and supp.	✓	✓																											
E-3a	Set camera controls	✓	✓																											
E-4a	Load and expose film and print material	✓	✓																											
E-4b	Process exposed film or print material	✓	✓																											
E-5a	Load and expose film and/or print material	✓	✓																											
E-6a	Inspect, clean and repair illumination system																													
E-6b	Inspect, clean and repair mechanical compon.																													
E-6c	Inspect and clean automatic film processor and drier																													
F-1a	Sort materials																													
F-1b	Mark masking sequence																													
F-2a	Repair masking sheet	✓	✓																											
F-2b	Impose and tape negatives	✓	✓																											
F-3a	Open windows	✓	✓																											
F-3b	Opaque negatives	✓	✓																											
F-4a	Clean and inspect tools	✓	✓																											
F-4b	Sharpen tools	✓	✓																											
G-1a	Sort materials	✓	✓																											

BASIC SKILLS PROJECT

Lithographic Printing Occupations

BASIC SKILLS DISTRIBUTION CHART

TASK STATEMENTS

TASK STATEMENTS		Printers Measure and Conversion	Interpret Charts, Tables, Graphs	Coding	+ - x -	Cost Factors	Ratio and Proportion	Measure	Fractions and %	Conversion	Ordering	Metric	Rounding	Geometry	Basic Math	Math Shortcuts	Job Ticket	Samples	Instructions/trade jargon	Equipment capability	Schedule	Customer/job specifications	Layout	Policy	Write legible instructions	Oral Communications	Operating Manual	Proofreading marks	Maintenance Manual	Reading	Writing
G-1b	Inspect flats and distribute materials	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
G-2a	Select plate and determine exposure time	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
G-2b	Burn plate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
G-3a	Apply chemicals, inspect and store plate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
G-3b	Prepare processor	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
G-3c	Process plates	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
G-4a	Select proof material and determine exposure time	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
G-4b	Burn proof	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
G-5a	Apply chemicals	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
G-5b	Mount and route proofs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
G-6a	Inspect, clean and repair illumination system	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
G-6b	Inspect, clean, lubricate and repair platemaker air systems	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
G-6c	Inspect, clean, adjust and service developing equipment	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
H-1a	Sort and inspect materials	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
H-1b	Distribute materials	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
H-2a	Lubricate press	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
H-2b	Turn press over	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
H-2c	Check vacuum system	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
H-2d	Inspect and pack blanket	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
H-2e	Inspect and pack impression cylinder	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
H-2f	Inspect and pack plate cylinder	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
H-2g	Check and set dampener rollers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
H-2h	Check and set ink rollers	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
H-2i	Mix solution and fill dampener fountain	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
H-3a	Install plate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
H-3b	Set feed system	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
H-3c	Set delivery system	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															
H-3d	Ink press	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓															

BASIC SKILLS PROJECT

Lithographic Printing Occupations

BASIC SKILLS DISTRIBUTION CHART

TASK STATEMENTS

		Printers Measure and Conversion	Interpret Charts, Tables, Graphs	Coding	+ - x ÷	Cost Factors	Ratio and Proportion	Measure	Fractions and %	Conversion	Ordering	Metric	Rounding	Geometry	Basic Math	Math shortcuts	Job ticket	Samples	Instructions/trade jargon	Equipment capability	Schedule	Customer/job specifications	Layout	Policy	Write legible instructions	Oral Communications	Operating Manual	Proofreading Marks	Maintenance Manual	Reading	Writing		
H-3f	Print test sheets	✓																															
H-4a	Load paper	✓																															
H-4b	Run press	✓																															
H-5a	Clean press using clean-up attachment																																
H-5b	Clean press by hand																																
H-6b	Inspect, repair and adjust press systems	✓																															
H-6a	Lubricate press																																
I-1a	Sort materials by priority			✓																													
I-1b	Sort materials by finishing operations			✓																													
I-2a	Lubricate machines			✓																													
I-2b	Set up bindery equipment			✓																													
I-3a	Operate cutting equipment			✓																													
I-3b	Operate folders, perforators and scorers			✓																													
I-3c	Operate jogger, stitcher and binder			✓																													
I-3d	Operate gatherers			✓																													
I-4a	Cut, collate and pad by hand			✓																													
I-4b	Wrap and package			✓																													
I-5a	Lubricate machines			✓																													
I-5b	Check, adjust and clean dust, lint and grease from machines			✓																													
I-5c	Inspect and clean pumps and motors			✓																													
		49%	31%	9%	32%	1%	29%	14%	19%	3%	22%	1%	16%	1%	1%	6%	5%	9%	1%	5%	7%	2%	2%	2%	1%	3%	7%	6%	4%	2%	8%		

MATH

COMMUNICATIONS

BASIC SKILLS PROJECT

Offset Press Operator

BASIC SKILLS DISTRIBUTION CHART

TASK STATEMENTS

TASK STATEMENTS	MATH					READING			SPEAKING			WRITING			LISTENING													
	+ - x ÷ whole num., fract., decimals	Rounding off whole num. and decimals	Find. % values and related numbers	Ratios and proportions	Meas. length, picas, points, convert.	Read and interpret charts and graphs	+ -	Sequential ordering	Axioms of basic math	Measurement of time	Meas. of speed, vacuum and RPM	Comprehension	Instruction and numbers	Terminology	General vocabulary/terminology	Clarity of expression	Logic	Usage	Penmanship	Spelling	Description	Terminology	Accuracy	Discriminate facts	Logic (ordering of thought)	Concentration	Note taking	Performance/auditory analysis
A-1 Sort material	✓	✓	✓	✓	✓	✓					✓	✓							✓	✓				✓	✓			
A-2 Inspect and distribute material	✓	✓	✓	✓	✓	✓					✓	✓							✓	✓				✓	✓			
B-1 Lubricate a press	✓	✓	✓	✓	✓	✓					✓	✓							✓	✓				✓	✓			
B-2 Perform feed system inspection	✓	✓	✓	✓	✓	✓					✓	✓							✓	✓				✓	✓			
B-3 Inspect cylinders	✓	✓	✓	✓	✓	✓					✓	✓							✓	✓				✓	✓			
B-4 Inspect ink train	✓	✓	✓	✓	✓	✓					✓	✓							✓	✓				✓	✓			
B-5 Inspect dampening system	✓	✓	✓	✓	✓	✓					✓	✓							✓	✓				✓	✓			
C-1 Install Plate	✓	✓	✓	✓	✓	✓					✓	✓							✓	✓				✓	✓			
C-2 Set feed system	✓	✓	✓	✓	✓	✓					✓	✓							✓	✓				✓	✓			
C-3 Set delivery system	✓	✓	✓	✓	✓	✓					✓	✓							✓	✓				✓	✓			
C-4 Ink press	✓	✓	✓	✓	✓	✓					✓	✓							✓	✓				✓	✓			
C-5 Set dampening system	✓	✓	✓	✓	✓	✓					✓	✓							✓	✓				✓	✓			
C-6 Print test sheets	✓	✓	✓	✓	✓	✓					✓	✓							✓	✓				✓	✓			
C-7 Operate offset press	✓	✓	✓	✓	✓	✓					✓	✓							✓	✓				✓	✓			
D-1 Clean offset press ink train	✓	✓	✓	✓	✓	✓					✓	✓							✓	✓				✓	✓			
D-2 Maintain offset presses and make minor repairs	✓	✓	✓	✓	✓	✓					✓	✓							✓	✓				✓	✓			
	81%	31%	19%	42%	88%	88%	13%	75%	6%	81%	19%	13%	13%	88%	81%	13%	13%	13%	13%	100%	94%	13%	88%	13%	13%	13%	13%	69%

BASIC SKILLS PROJECT

Terminal Clerk

BASIC SKILLS DISTRIBUTION CHART

TASK ASSIGNMENT

Task	Whole Numbers	Counting	Indexing	Coding	Recording	Reading Maps and Schedules	Adding	Estimation (Guess & Check Method)	Read and Inter. Tables, Charts, Graphs	Decimals, Fractions	+ - x -	Use of Computing Device	Number Recognition	Non-Geometric Measurement	Calendar	Classification	Comprehension	Detail/Inference	Informational Reports	Terminology	Definition	Concentration	Memo Format	Classification	Terminology	Information Reports	Pennmanship	Description	Typing	Clarity	Terminology	Clarity	Persuasion and Sales Techniques	Dictation	Enunciation	Word Definition	Concentration	Recognize Opinions	Notetaking	Discriminate Facts										
A-1 Determine destination and appl. tariff	/	/	/	/	/	/	/									/	/	/	/	/	/																													
A-2 Determine rate base for shipment	/	/	/	/	/												/	/	/	/	/	/																												
A-3 Classify each item of shipment to determine freight classification	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/						
A-4 Determine proper rate	/	/	/	/	/	/	/										/	/	/	/	/	/																												
A-5 Calculate final freight bill	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/						
A-6 Maintain tariff file in current condition	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/					
B-1 Collect billing date	/	/	/	/	/	/	/										/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/					
B-2 Type freight bill	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/				
B-3 Distribute copies of freight bill	/	/	/	/	/	/	/										/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/				
B-4 Prepare freight bill for mailing	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/			
C-1 Receive customers' requests	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/			
C-2 Contact points of origin and intermediate points	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/			
C-3 Contact destination point and intermediate points	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/			
C-4 Expedite freight	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/		
C-5 Advise customer of freight progress	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/		
C-6 Keep records of unsettled tracing req.	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/		
D-1 Check freight on hand	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/		
D-2 Read incoming freight bills to determine overage or shortage	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/		
D-3 Recount incoming merchandise to compare with statement	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/		
D-4 Type overage and shortage reports	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	
D-5 Maintain files of unsettled overages and shortages	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	
D-6 Ship overage material to proper destin.	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	
D-7 Handling freight shortages	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	
E-1 Inspect incoming material for proper packaging and container damage	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	
E-2 Type and distribute damage reports	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
E-3 Maintain file of unsettled damage cases	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	
E-4 Receive customer complaints about damaged freight	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/

72

MATH

COMMUNICATIONS

READING

WRITING

SPEAKING

LISTENING

BASIC SKILLS PROJECT

Terminal Clerk

BASIC SKILLS DISTRIBUTION CHART

TASK ASSIGNMENT

	Whole Numbers	Counting	Indexing	Coding	Recording	Reading Maps and Schedules	Adding	Estimation (Guess & Check Method)	Read and Inter. Tables, Charts, Graphs	Decimals, Fractions	+ - x ÷	Use of Computing Device	Number Recognition	Non-Geometric Measurement	Calendar	Classification	Comprehension	Detail/Inference	Informational Reports	Terminology	Definition	Concentration	Memo Format	Classification	Terminology	Information Reports	Penmanship	Description	Typing	Clarity	Terminology	Clarity	Persuasion and Sales Techniques	Dict'ion	Enunciation	Word Definition	Concentration	Recognize Opinions	Notetaking	Discriminate	sts				
E-5	Take appropriate salvage or repair action	✓	✓		✓			✓		✓			✓																																
F-1	Receive money collections from drivers or dispatcher	✓	✓	✓	✓							✓	✓	✓				✓	✓	✓																									
F-2	File cashier copies of freight bills of inbound shipments			✓																																									
F-3	Make out bank deposit	✓	✓		✓					✓	✓	✓	✓	✓																															
F-4	Maintain file of customer A/R on current basis	✓	✓	✓						✓	✓	✓	✓	✓																															
F-5	Determine and handle past due accounts	✓	✓	✓	✓					✓	✓	✓	✓	✓																															
G-1	Maintain file of freight bills of outgoing shipments	✓	✓	✓	✓								✓	✓																															
G-2	Maintain file, by shipper, or original bills of lading			✓											✓																														
H-1	Answer and transfer all incoming calls to proper destination	✓			✓																																								
		89%	39%	39%	29%	42%	6%	3%	17%	3%	19%	19%	17%	69%	28%	3%	6%	81%	56%	75%	67%	8%	3%	39%	19%	42%	28%	14%	19%	8%	3%	25%	19%	11%	6%	3%	6%	6%	14%	28%	22%				

MATH

COMMUNICATIONS

LISTENING

READING

WRITING

SPEAKING

BASIC SKILLS PROJECT

Word Processor

BASIC SKILLS DISTRIBUTION CHART

TASK STATEMENT

TASK STATEMENT		+ - Algorithm	Positive Whole Numbers	Positive Rationals	Ordering	Coding	Time/Calendar	Counting	Distributive Algorithm	Coordinate System	x \pm Algorithm	Indexing	Measurement	Recording	Order of Operations	Mixed Numbers to Fractions	% of Numbers	Money	Fractions to/from Decimals	Rounding	Ratio	Calculators	Notetaking	Opinions	Facts From Non-Facts	Auditory Discrimination	Concentration	Logic	Word Definition	Noise Discrimination	Detail	Speed/Rate	Comprehension	Detail/Inference	Information Reports	Progress Reports	Definition	Terminology	Description of Mechanism	Information Recommendation	Memo Format	Clarity	Classification	Description	Terminology	Logic	Usage	Spelling	Penmanship	Terminology	Usage	Diction	Clarity	Logic	Enunciation					
E-5	Recommend changes and improvements to the sys. for better utilization of equipment.	✓				✓																																																						
F-1	Compose a docu. on magnetic media	✓				✓										✓																																												
F-2	Proofread/edit while mechanically correcting errors on machine utilizing magnetic media	✓							✓																																																			
F-3	Playback document in final copy				✓				✓																																																			
F-4	Burst, sign, fold and attach related materials				✓																																																							
F-5	Distribute finished product								✓																																																			
F-6	Follow and establish dictation proced. when appl.				✓				✓																																																			
G-1	Determine type of format	✓	✓	✓	✓		✓																																																					
G-2	Compose docu. to be formatted	✓	✓	✓	✓		✓																																																					
G-3	Utilize coding appl. to format	✓	✓	✓	✓		✓																																																					
G-4	Keyboard document	✓	✓	✓	✓		✓																																																					
G-5	Playback final copy	✓	✓	✓	✓		✓																																																					
H-1	Self-log a task data sheet	✓	✓	✓	✓		✓																																																					
H-2	Record a work count	✓	✓	✓	✓		✓							✓																																														
H-3	Maintain strict time schedule on all work produced	✓	✓	✓	✓		✓								✓																																													
I-1	Supervise all typing and clerical support	✓	✓	✓	✓		✓																	✓																																				
I-2	Schedule, control, report and maint. quality stand.	✓	✓	✓	✓		✓																	✓																																				
I-3	Maintain integrity on all confidential material being produced	✓	✓	✓	✓		✓																	✓																																				

MATH

COMMUNICATIONS

LISTENING

READING

WRITING

SPEAKING

BASIC SKILLS PROJECT

Word Processor

BASIC SKILLS DISTRIBUTION CHART

TASK STATEMENT

TASK STATEMENT	+ - Algorithm	Positive Whole Numbers	Positive Rationals	Ordering	Coding	Time/Calendar	Counting	Distributive Algorithm	Coordinate System	x ÷ Algorithm	Indexing	Measurement	Recording	Order of Operations	Mixed Numbers to Fractions	% of Numbers	Money	Fractions to Form Decimals	Rounding	Ratio	Calculators	Notetaking	Opinions	Facts From Non-Facts	Auditory Discrimination	Concentration	Logic	Word Definition	Noise Discrimination	Detail	Speed/Rate	Comprehension	Detail/Inference	Information Reports	Progress Reports	Definition	Terminology	Description of Mechanism	Information Recommendation	Memo Format	Clarity	Classification	Description	Terminology	Logic	Usage	Spelling	Penmanship	Terminology	Usage	Diction	Clarity	Logic	Enunciation			
I-4. Administer salaries and appraise performances	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓																																				
I-5. Establish and maint. training and cross training schedules	✓	✓	✓	✓	✓	✓	✓	✓		✓					✓	✓	✓	✓		✓	✓								✓						✓							✓															
I-6. Coordinate all funct. activity with other affected areas	✓	✓	✓	✓	✓	✓	✓		✓					✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓																															
I-7. Review and analyze new and rev. proced. and implement																																																									
I-8. Motivate employees																																																									
J-1. Route and distri. articles of mutual interest	✓			✓	✓	✓	✓		✓					✓				✓				✓							✓																												
J-2. Prep. and secure advances and compl. nec. exp. reports	✓	✓	✓																			✓																																			
I-3. Keep records and place orders for all equip. & suppl	✓				✓	✓	✓		✓									✓																																							
	74%	50%	48%	59%	57%	52%	61%	13%	41%	9%	11%	7%	17%	11%	11%	15%	17%	7%	15%	9%	9%	7%	7%	7%	11%	17%	13%	11%	11%	9%	15%	54%	37%	54%	7%	15%	12%	26%	46%	41%	15%	30%	24%	48%	20%	11%	4%	4%	13%	9%	2%						

76

91

Appendix D

SIGNIFICANT AND/OR DOMINANT COMMERCIALY AVAILABLE VOCATIONAL INSTRUCTIONAL TEXTS

Agricultural Education

Agriculture Production

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Agricultural Resources

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Home Furnishings

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Fisk and Mietus. Applied Business Law. Cincinnati: South-Western, 1977.

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Appendix E

ERIC AND CRIS SEARCHES
FOR BASIC SKILLS PROJECT

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