

# ANALYSIS OF WORKFORCE SKILLS SETS

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## Executive Summary

Based on a comprehensive analysis of industry employment in the Sacramento region, 15 industries demonstrate the greatest potential for economic development in the region. These industries include:

1. Administrative, Support, and Waste Services
2. Ambulatory Health Care Services
3. Computer and Peripheral Equipment Manufacturing
4. Computer Systems Design and Related Services
5. Construction of Buildings
6. Educational Services
7. Heavy and Civil Engineering Construction
8. Information
9. Insurance Carriers and Related
10. Non-depository Credit Intermediation
11. Retail Trade
12. Semiconductor and Electronic Component Manufacturing
13. Social Assistance
14. Specialty Trade Contractors
15. State and Local Government

All 15 industries showed relatively high performance across a number of economic indicators such as growth, composition, shift in composition, specialization, change in specialization, and projected employment. Additionally, major employers within these industry sectors are fairly optimistic about future economic trends and expectations within their respective industries in the Sacramento region.

These 15 emerging industry sectors house over 350 low-skilled and close to 50 moderate-skilled occupations that are projected to either maintain current employment levels or see increases by 2010. Within the key industry sectors, major employers articulated a clear need for low-skilled labor, representing over 40 percent of all occupations, followed by moderate-skilled occupations which encompass approximately 30 percent of the occupations in their firms and respective industries. Differing from statewide staffing patterns, many local employers place some specific occupations in higher or lower training levels; however, the Sacramento region's economic development potentials will require a labor force that will benefit from Workforce Investment Act programs and other workforce training and development services. The nearly 400 low- and moderate-skilled occupations demonstrate key examples of the emerging workforce demand in the Sacramento region which will require replacement and employment growth labor force support. Many of these occupations are employed by a large number of industries including those that provide the greatest economic development potentials, as well as other support and established sectors in the Sacramento region.

## EXECUTIVE SUMMARY

Workers within the occupations that are part of the staffing patterns of the 15 emerging industries in the Sacramento region articulate an overall knowledge and skill demand that places the following as the most important for successful job performance:

- Reading Comprehension
- Active Listening
- Speaking
- Writing
- Mathematics
- English Language
- Clerical
- Computer and Electronics
- Customer and Personal Service

Major employers in the emerging industries also stressed a similar overall set of knowledge and skills, but highlighted the need for “soft skills” that they view as becoming more important than previous work experience or related training. Employers emphasized that they would like to see employees with better interpersonal and work ethic skills, more responsible attitude towards their jobs, better problem solving and critical thinking skills, and stronger organizational skills. This set of knowledge and skills represent the overall workforce training needs in the Sacramento region that are directly related to the industries with the greatest economic development potential and are transferable across a wide range of occupations and industries. Workforce training and development services aimed at low- and moderate-skilled employees should encompass these fundamental skills in order to create a successful labor force that is able to meet the emerging needs of employers in the Sacramento region.

Further, major employers provided recommendations for specific workforce training aspects for moderate- and low-skilled occupations. At the moderate skill level, employers emphasized programs related to nursing and medical assistance, electrical construction, engineering, electronics, and computer assistance. In addition, they highlighted training for a number of occupations including Foremen, Plumbers, HVAC Technicians and Installers, Building Inspectors, and Plant Operators. For low-skilled occupations, major employers stressed the need for general laborer and pre-apprenticeship programs for non-college-bound high school students and training for custodial or support personnel.

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## **Introduction**

### **Workforce Investment Act**

The federal Workforce Investment Act (WIA) provides a mechanism for local areas to provide a wide range of workforce development services to promote employment growth, job retention, employee placement, workforce skills development, and increased earnings potential. These services are intended to serve adults, laid-off workers, and youths and also to improve the quality of the local labor force. While the WIA requires local areas to provide a specific set of workforce development services, local areas may also design programs and provide services that reflect the area's unique needs and economic composition.

In California, 50 Local Workforce Investment Areas (LWIAs) and related Workforce Investment Boards (WIBs) administer WIA services. The core of the Sacramento region is served by the Sacramento Employment and Training Agency (SETA) and the related Sacramento Works, Inc., which provide services to job seekers, youth, employers, and the overall local community. SETA and Sacramento Works operate a system of One-Stop Career Centers throughout Sacramento. The Career Centers provide WIA services, employment training, and programs that connect employers and job seekers. Many of these programs are intended to assist job seekers develop the skills that are needed by the region's employers and critical or emerging local industries.

### **Sacramento's Workforce**

The Sacramento region is undergoing a rapid change in its industry structure, occupational composition, and, consequently, the optimum employee skills required to support its future economic development.

In the past, there has been only a moderate level of connection between the region's economic development goals (the types of firms and industries being sought to enhance economic growth) and the workforce and educational planning processes (both those of public agencies and educational institutions). As a result, unplanned and unrecognized workforce demands frequently generated ad-hoc special programs designed to resolve issues created when industries faced extreme problems in securing specific occupational skills.

### **Changing Workforce Planning Environment**

Workforce planning processes have traditionally relied on the analysis of supply and demand within specific occupational categories. Some of these occupational categories are closely linked to specific industry sectors while others are not. In recent years, the relationships in this type of analysis have become more uncertain, as rapid shifts in the

## INTRODUCTION

occupational structure, not previously encountered, have become common. As this occurs, the response time for workforce training is becoming longer than the rate of change in occupational requirements. There are several reasons for this rapid change in the elasticity or volatility of demand for specific occupational categories:

1. The Sacramento region's economy is in a state of rapid restructuring. Shifts underway include changes from manufacturing and goods distribution to a more services-based economy; a rising importance of the information technology sector; and a high reliance on construction and related services.
2. Business processes are changing within industries, producing a shift in the occupational categories used to create specific goods and services. One of the most prevalent trends is the substitution of digital processing and technology for processes that were formally more labor intensive. As a result, the mix of occupational categories within specific industries is significantly changing.
3. Simultaneously, qualified employees have become more mobile between occupational categories, as many of the basic occupational skills can be used in a variety of occupations.
4. Industries are becoming more dependent on and linked to each other—a concept which is part of the economic cluster concept. This is demonstrated in the economic multiplier concept. This concept relates to the effect observed when an increase in a primary economic sector creates large increases in employment in other linked sectors. These linked sectors do not immediately appear related, but they supply essential goods and services to the primary sector. As a result, there is a demand for employees in occupations that include not just those within the primary industry, but also the industries that are diffused through a number of linked sectors.
5. Finally, within specific occupational categories, the levels and ranges of skills and training required are increasing. One such shift is occurring in the move from manual skills to digital technology skills. Further, changes in required skills are evident in the slow increase in the quality or level of general education desired by employers—even at the high school graduate level for the many entry-level positions.

### **Economic Development Versus Workforce Training**

There are several areas of disconnect between economic development and workforce planning. While there are many highly successful industry-specific or occupation-specific training programs designed to fill the immediate needs of specific new industries, there is a lack of long-range integration in the two processes. An appropriate response to the economic changes in the Sacramento region may be to shift to a more fundamental approach focused on skill sets, rather than occupational or industry classifications. Because of the rapid changes in industry and occupational categories, the increasing mobility of skilled employees, and the linkages between industry sectors, the traditional analysis of occupational supply and demand is becoming harder to perform and less likely to accurately create long-range projections.

### **Fundamental Skills Concept**

The relevant underlying asset from both the economic development and workforce development points of view is the broad education and training knowledge base of the workforce. The knowledge base can be established for a wide range of skill levels even when it cannot be linked to specific occupations. It is evident that this knowledge base is increasingly portable between industry sectors and occupational categories; therefore, the change of focus would benefit a wide range of occupations and industries.

This approach links the economic development and workforce development processes in a way that meets the needs of both approaches. The linkage could potentially translate into a workforce that can adapt quickly to unpredicted changes in economic or occupational trends, avoid occupational obsolescence, and stimulate the ability of the Sacramento region to accommodate innovation—all of which are key economic development objectives.

### **Analysis of Workforce Skills Sets**

In order to help guide WIA services and programs focused on assisting job seekers develop skills that are necessary for the region's critical and emerging industries, SETA engaged the Sacramento Regional Research Institute (SRRI) to provide an analysis of workforce skills sets addressing economic development and workforce training perspectives. The objective of the project is to close the gap in the understanding and predictive ability to link the industry structure, occupational categories, and employee skills requirements in a way that will effectively align the economic development planning practices with the workforce training and educational planning processes.

The project encompasses two main sections leading to an understanding of workforce skill sets—a statistical analysis of the relationship between industry structure, occupational categories, training requirements, and knowledge and skill sets; and interviews with major employers in the Sacramento region eliciting views of the future workforce skill requirements and training needs.

## Economic and Occupational Analysis

SRRI analyzed the structural linkages between three sets of variables—industry, occupation, and occupational knowledge and skill sets. The goal of this piece of analysis was to produce a macro-level conception of skill sets depicting the workforce training needs for employers in emerging industries in the Sacramento region.

### Research Methodology

#### Economic Analysis

SRRI analyzed Sacramento's labor market using a number of factors to evaluate the economic conditions and emerging industries that will potentially play a large role in driving Sacramento's future economy. Due to the existing economic and demographic linkages, SRRI based its analysis on the Sacramento Consolidated Metropolitan Statistical Area (CMSA), which includes El Dorado, Placer, Sacramento, and Yolo Counties.

In order to identify the key growth industries, SRRI developed a methodology that takes into account multiple economic factors in assessing specific industry sectors and economic clusters. The methodology used a number of measures of economic performance to create an index for selecting sectors to be included in the analysis. The economic factors that were evaluated in this analysis included:

- *Growth.* This measure takes into account employment growth rates between 1992 and 2002.
- *Composition.* Composition measures the specific industry's share of Sacramento's total employment, demonstrating relative importance of each sector.
- *Shift in Composition.* This calculation examines percentage point changes in composition between 1992 and 2002, and identifies trends in economic restructuring which are already underway.
- *Specialization.* Specialization indicates the degree to which the Sacramento CMSA is specializing in some activities in a way different from the rest of the state, and is measured by the relative size of an industry in Sacramento compared to the statewide average. A measure of specialization above 100 percent indicates that Sacramento has a greater percentage of total employment in the industry sector compared to California, while a value less than 100 percent indicates that Sacramento has a below-average amount of the industry.
- *Change in Specialization.* This measure calculates the percent changes in specialization between 1992 and 2002.
- *Projected Employment.* Three factors were also taken into account based on the Employment Development Department's (EDD) 2006 employment projections—projected growth, future composition, and shift in future composition.



For each of the specific economic factors (listed above), a performance measure was developed using norm-referenced assessment, which measured the industry sector's performance relative to all other industries (over 100 other industry sectors are in the Sacramento CMSA) and was based on an adjusted normal probability curve. The index was calculated using a methodology that assigned a standard number based on the industry's distribution on the probability curve, and a final norm-referenced assessment was made based on overall average performance across all economic factors. The combined performance on the final index created a standardized conceptualization of overall performance. Using the index scores as an indicator for the importance and potential of an industry in the Sacramento CMSA, SRRI selected the following 15 industries:

1. Administrative, Support, and Waste Services
2. Ambulatory Health Care Services
3. Computer and Peripheral Equipment Manufacturing
4. Computer Systems Design and Related Services
5. Construction of Buildings
6. Educational Services
7. Heavy and Civil Engineering Construction
8. Information
9. Insurance Carriers and Related
10. Non-depository Credit Intermediation
11. Retail Trade
12. Semiconductor and Electronic Component Manufacturing
13. Social Assistance
14. Specialty Trade Contractors
15. State and Local Government

Each of the industries is discussed in further detail later in this section, and information is presented related to their performance on the individual economic factors.

### **Occupational Analysis**

Utilizing the California Employment Development Department's (EDD) Staffing Patterns, SRRI compiled a list of occupations for each of the 15 selected industries. EDD's Staffing Patterns are a list of the occupations employed within a particular industry on a statewide basis, and although there will be some regional differences depending upon the specific businesses present, the distribution of occupations within an industry, or industries within an occupation, EDD believes that their staffing patterns should be similar for other levels of geography including the Sacramento CMSA. Additionally, the economic analysis specifically analyzed the Sacramento CMSA and industries were selected based on this local view, and using a statewide conceptualization of occupational composition provides more holistic occupational analysis.

The Staffing Patterns information also contains training level data as well as projected employment for each occupation on a statewide basis. Using these two elements as filtering points, SRRI reduced the list of occupations for each of the selected industries to best fit Sacramento Works, Inc. and the Sacramento Employment and Training Agency's (SETA) role in workforce development and primary services. Based on an understanding of the Workforce Investment Act, as well as the local Workforce Investment Board's and SETA's role in the development of the Sacramento Region's labor force, SRRI elected to cut occupations with associated primary training level requirements above the following Bureau of Labor Statistics' (BLS) education and training classifications:

- *Short-Term On-The-Job-Training.* This category includes occupations in which workers can develop skills needed after a short demonstration or up to one month of on-the-job experience and instruction.
- *Moderate-Term On-The-Job-Training.* Workers in this classification can develop average job performance after one to 12 months of combined on-the-job experience and information training.
- *Long-Term On-The-Job-Training.* Occupations in this category require more than 12 months of on-the-job training or combined work experience and formal classroom instruction for workers to develop the skills needed for average job performance.
- *Work Experience.* This category includes occupations that require skills obtained through work experience in a related occupation.
- *Post-Secondary Vocational Education.* This classification defines occupations that require the completion of vocational school training.
- *Associate Degree.* This category includes occupations that require the completion of at least two years of full-time academic study beyond high school.

The BLS education and training classifications reflect the manner in which most workers become proficient in the specific occupations as well as the preferences of most employers. While there are many ways to qualify for a specific occupation and obtain employment, the BLS classification reflects the primary training level required for each occupation. In order to help Sacramento Works and SETA focus its various activities, SRRI grouped the six training levels into two overall categories—low skilled (short-term on-the-job training, moderate-term on-the-job training, long-term on-the-job training, and work experience) and moderate skilled (post-secondary vocational education and associate degree). These two groupings were used to evaluate all aspects within the occupational analysis and data is broken down in most cases by these two elements, along with information on the combined grouping.

Additionally, based on information contained in EDD's Staffing Patterns, SRRI eliminated occupations that have negative projected 2000 to 2010 employment growth. Those occupations that have relatively small or no projected employment growth were retained since those occupations will still need to be maintained or filled in the future.

After identifying and filtering the grouping of occupations within the 15 selected Sacramento CMSA industries, SRRI gathered and analyzed data related to the knowledge

and skills associated with the occupations. SRRI used O\*Net's database of occupations to obtain information for this piece of the analysis. This database provides rating scales of various elements within a large number of occupations (specifically, the importance index of knowledge and skills was used in this analysis), and is produced based on a survey of workers within each occupation throughout the United States. After gathering information for all occupations that met the training level and employment growth requirements, an average knowledge and skills importance ranking was calculated for each of the individual selected industries, as well as a combined base of knowledge and skills for the group of emerging industries in the Sacramento CMSA. Using this grouping of occupations and the corresponding knowledge and skills rankings, SRRI evaluated and produced a listing of the key knowledge and skills categories depicting Sacramento's labor force training needs.

### **Economic Analysis**

Figure 1 demonstrates the selected industries' performance on the specific economic factors used in the overall performance index. It is important to note that the overall performance, as well as the performance on each individual factor, is based on a relative comparison to the performance of all other industry sectors in the Sacramento CMSA. Thus, while some individual factors may not appear to demonstrate high performance, these industry sectors had some of the highest combined index performance compared to all other sectors in the economy.

FIGURE 1  
ECONOMIC FACTORS FOR THE 15 SELECTED INDUSTRIES

<i>Selected Industry</i>	<i>Employment</i>	<i>Composition</i>	<i>Shift in</i>	<i>Specialization</i>	<i>Change in</i>
	<i>Growth</i>		<i>Composition</i>		<i>Specialization</i>
	<i>1992-2002</i>	<i>2002</i>	<i>1992-2002</i>	<i>2002</i>	<i>1992-2002</i>
Admin., Support, & Waste Svcs.	83.04%	5.02%	1.32%	78.84%	4.67%
Ambulatory Health Care Svcs.	28.65%	2.94%	-0.10%	87.58%	-6.80%
Computer & Periph. Equipment Mfg.	37.50%	0.52%	0.02%	109.82%	38.76%
Computer Systems Design Svcs.	165.38%	0.82%	0.41%	70.58%	10.72%
Construction of Buildings	68.12%	1.38%	0.29%	116.04%	0.63%
Educational Svcs.	82.69%	1.13%	0.31%	68.40%	15.93%
Heavy & Civil Eng. Construction	24.44%	0.67%	-0.04%	111.98%	-5.30%
Information	41.10%	2.74%	0.16%	81.73%	-1.80%
Insurance Carriers	32.89%	2.36%	0.00%	172.61%	17.56%
Non-deposit. Credit Intermed.	119.05%	0.55%	0.22%	107.53%	26.03%
Retail Trade	26.54%	11.02%	-0.55%	103.39%	-2.08%
Semiconductor & Elec. Comp. Mfg.	128.00%	0.68%	0.28%	80.70%	89.23%
Social Assistance	62.69%	1.30%	0.24%	102.71%	-1.76%
Specialty Trade Contractors	137.20%	4.63%	2.04%	135.70%	26.12%
State & Local Government	35.71%	25.58%	0.55%	173.17%	-3.20%

Sacramento Regional Research Institute, October 2003  
Data Source: Employment Development Department, Labor Market Information

Every selected industry demonstrated relatively strong employment growth between 1992 and 2002, led by the Computer Systems Design Services and Specialty Trade Contractors industries. State & Local Government is a major sector in the Sacramento CMSA and encompassed over 25 percent of the total employment in 2002. While the composition numbers have a wide range, this is due to the fact that some industries are broad while others are somewhat specialized—as expected, the broad sectors (such as Retail Trade and State & Local Government) encompass a greater percentage of total employment compared to the specialized sectors (for example, Semiconductor & Electronic Components Manufacturing and Non-depository Credit Intermediation). The shift in composition shows that a few sectors have lost some proportion of total employment (although on a relatively low basis) while others have gained. Both the Specialty Trade Contractors and Administrative, Support, & Waste Services industries have gained the largest proportion of total employment of the selected industries with an increase of two and one percents, respectively. The specialization analysis shows that many of the selected industries are highly specialized, such as Specialty Trade Contractors (136 percent) and State & Local Government (173 percent), while others are underspecialized (contain smaller proportion of total employment compared to California), for example Educational Services and Computer Systems Design Services (68 and 71 percents, respectively). Some of the underspecialized sectors have seen growth in specialization since 1992, indicating a growing importance and pointing to the economic role they may play in the future. The change in specialization demonstrates that most of the industries losing specialization had high degrees of specialization in 2002 despite the decrease in the degree of specialization. Additionally, the majority of the selected sectors are gaining

degrees of specialization. Semiconductors & Electronic Components Manufacturing saw a large gain in specialization of 89 percent, followed by Computer and Peripheral Equipment Manufacturing at 39 percent—both high-tech manufacturing industries. Overall, the selected 15 industry sectors had some of the highest combined performance on these economic factors compared to the other 100 tracked industries in the Sacramento CMSA.

It is also important to gain a general understanding of each of the 15 selected industry sectors. Figure 2 provides a brief description of each industry.

## ECONOMIC AND OCCUPATIONAL ANALYSIS

**FIGURE 2**  
**DESCRIPTIONS OF THE 15 SELECTED INDUSTRIES**

<i>Selected Industry</i>	<i>Description</i>
Admin., Support, & Waste Svcs.	Support activities for the everyday operations of businesses and organizations including office administration, security services, personnel placement, clerical services, and waste disposal.
Ambulatory Health Care Svcs.	Health care services related to ambulatory patients typically confined to outpatient services.
Computer & Periph. Equipment Mfg.	Manufacturing of computers, computer peripherals, communications equipment, components, and related electronic equipment using processes that are highly technical and specialized and fundamentally different from the manufacturing processes of other machinery and equipment.
Computer Systems Design Svcs.	Providing knowledge and expertise related to information technology focusing on software design and testing, software support services, planning and design of computer systems, hardware integration and set-up, and computer system and network management.
Construction of Buildings	Construction of residential and non-residential buildings including fabrication and construction, alterations, and maintenance and repair services.
Educational Svcs.	Instruction and training provided by specialized educational establishments related to a variety of subjects, academic and non-academic programs, individualized training, and workforce development activities.
Heavy & Civil Eng. Construction	Construction of complete engineering projects not typically related to buildings such as transportation, public works, and physical infrastructure projects.
Information	Produce and distribute actual information and data the means of transmitting information including activities related to publishing, broadcasting, Internet services, and telecommunications.
Insurance Carriers	Provide underwriting, sale of insurance policies, and employee-benefit services.
Non-deposit. Credit Intermed.	Extending credit or lending funds raised by credit market borrowing, debt instruments, or third party borrowing from other financial intermediaries.
Retail Trade	Selling merchandise and corresponding services to the public through point-of-sale locations or non-store activities.
Semiconductor & Elec. Comp. Mfg.	Manufacturing of semiconductors and other components specifically for electronic applications.
Social Assistance	Social assistance services to clients such as families, the elderly, or youths.
Specialty Trade Contractors	Perform specific specialized activities involved in a distinct portion of building construction projects or similar activities.
State & Local Government	Variety of public administration functions at the state and local levels.

Sacramento Regional Research Institute, October 2003  
Data Source: US Census Bureau, NAICS Industry Structure

The primary services provided by these 15 industries all play an important role in the Sacramento CMSA's maturing economy and are supported by the government operations in the area as well as the general business and population growth, both of which require a response from the majority of the selected industries.

## Occupational Analysis

### Occupations

Due to the industry linkages, transferable skills, and the necessity for a set of basic activities in nearly all industries in the economy, a large number of occupations are part of the occupational structure of multiple industries. For instance, occupations such as Payroll & Timekeeping Clerks (low skill occupation) and Data Entry Keyers (moderate skill occupation) are present in the staffing patterns for the majority of industries in California and within the 15 selected industries. All filtered occupations, broken down by low and moderate skill, within the selected industries are listed in Appendix A of this report along with the average projected growth (specifically within the selected industries, rather than growth for the overall occupation which could be part of other industries that were not selected for this analysis), the BLS training level, and the specific related industries.

There are over 420 occupations within the 15 selected industries that are within Sacramento Works' and SETA's service and training level and have positive (or inactive) projected employment growth. Of the 420 occupations, 366 are specifically within the low skill category and 55 are included in the moderate skill classification. Projected growth rates for these occupations within the 15 selected industries throughout the state range from close to 3 percent to 200 percent, with many projected to maintain similar employment numbers in 2010 as were seen in 2000 (demonstrating the need to maintain statewide employment levels by continually filling open positions). This information shows that at the low skill training level, Sacramento Works and SETA has a wide range of occupations for which they can tailor their workforce services. Additionally, there are quite a few moderate skill occupations that Sacramento Works and SETA can address along with the large number of low skill occupations within the Sacramento CMSA.

Figure 3 provides a listing of the top five occupations within the 15 selected industries based on the projected statewide employment growth rate within the group of selected industries, and Figure 4 demonstrates similar information based on absolute statewide projected growth. All of the top five occupations in both figures are housed within more than one of the occupational patterns for the 15 selected industries, illustrating the breadth of industries that a person could enter utilizing one of the specific occupations or the knowledge and skills related to that occupation.

FIGURE 3  
TOP FIVE LOW AND MODERATE SKILL OCCUPATIONS  
WITHIN THE 15 SELECTED INDUSTRIES  
(BASED ON STATEWIDE PROJECTED GROWTH RATE)

<i>Occupation</i>	<i>Training Level</i>	<i>Employment Growth 2000-2010</i>
<u>Low Skill</u>		
Real Estate Brokers	WE	200.0%
Extruding, Forming, Pressing, and Compacting Machine Setters, Operators, and Tenders	MTOJT	150.0%
Occupational Therapist Assistants	MTOJT	125.0%
Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	MTOJT	100.0%
Hotel, Motel, and Resort Desk Clerks	STOJT	100.0%
<u>Moderate Skill</u>		
Avionics Technicians	PSVE	200.0%
Geological and Petroleum Technicians	AD	100.0%
Chemical Technicians	AD	100.0%
Surgical Technologists	PSVE	73.7%
Medical Records and Health Information Technicians	AD	63.6%

Sacramento Regional Research Institute, October 2003

Data Source: Employment Development Department, Labor Market Information

Note: Training Level refers to: AD=Associate Degree; PSVE=Postsecondary Vocational Education; WE=Work Experience; STOJT=Short-term on-the-job training; MTOJT=Moderate-term on-the-job training; LTOJT=Long-term on-the-job training.



FIGURE 4  
TOP FIVE LOW AND MODERATE SKILL OCCUPATIONS  
WITHIN THE 15 SELECTED INDUSTRIES  
(BASED ON STATEWIDE PROJECTED ABSOLUTE GROWTH)

<i>Occupation</i>	<i>Training Level</i>	<i>Employment Growth 2000-2010</i>
<u>Low Skill</u>		
Security Guards	STOJT	99,300
Retail Salespersons	STOJT	96,400
Office Clerks, General	STOJT	75,400
Customer Service Representatives	STOJT	74,900
Cashiers	STOJT	70,900
<u>Moderate Skill</u>		
Executive Secretaries and Administrative Assistants	PSVE	38,800
Registered Nurses	AD	28,000
Secretaries, Except Legal, Medical, and Executive	PSVE	12,000
Licensed Practical and Licensed Vocational Nurses	PSVE	10,200
Dental Hygienists	AD	9,400

Sacramento Regional Research Institute, October 2003

Data Source: Employment Development Department, Labor Market Information

Note: Training Level refers to: AD=Associate Degree; PSVE=Postsecondary Vocational Education; WE=Work Experience; STOJT=Short-term on-the-job training; MTOJT=Moderate-term on-the-job training; LTOJT=Long-term on-the-job training.

## Knowledge and Skills

An understanding of the importance of various knowledge and skills associated with specific occupations and industries is vital in planning and developing services for job seekers and employers in the Sacramento CMSA, especially for activities related to workforce training and career assessment. Figure 5 lists the average importance rankings for the knowledge and skills categories associated with the low and moderate skill workforce within all 15 selected industries.

## ECONOMIC AND OCCUPATIONAL ANALYSIS

**FIGURE 5**  
**OVERALL KNOWLEDGE AND SKILLS**  
**ALL OCCUPATIONS WITHIN THE 15 SELECTED INDUSTRIES**

<i>Knowledge Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>	<i>Skills Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>
Mathematics	43.9	47.1	45.5	Reading Comprehension	51.9	67.2	59.6
English Language	40.9	48.8	44.8	Active Listening	49.8	58.1	53.9
Clerical	38.6	49.7	44.2	Speaking	49.0	54.8	51.9
Computers and Electronics	26.7	56.3	41.5	Writing	43.6	55.3	49.5
Customer and Personal Service	34.2	26.3	30.2	Mathematics	46.8	52.2	49.5
Mechanical	32.2	24.2	28.2	Monitoring	39.7	49.4	44.5
Administration and Management	21.5	29.8	25.7	Coordination	37.2	51.5	44.3
Engineering and Technology	19.1	29.2	24.2	Critical Thinking	34.3	50.2	42.3
Telecommunications	20.0	24.2	22.1	Complex Problem Solving	35.2	48.7	42.0
Communications and Media	21.6	21.8	21.7	Operation and Control	39.3	44.2	41.8
Economics and Accounting	23.1	16.8	20.0	Judgment and Decision Making	36.6	45.9	41.3
Public Safety and Security	20.0	17.6	18.8	Equipment Selection	37.7	43.3	40.5
Design	12.1	25.5	18.8	Quality Control Analysis	32.1	41.3	36.7
Education and Training	17.0	19.4	18.2	Active Learning	28.1	45.0	36.6
Production and Processing	22.3	13.8	18.1	Time Management	29.0	41.6	35.3
Physics	14.5	20.3	17.4	Social Perceptiveness	31.4	34.5	33.0
Law and Government	16.1	18.6	17.4	Service Orientation	30.7	33.7	32.2
Psychology	14.5	19.1	16.8	Systems Evaluation	26.6	33.3	29.9
Chemistry	12.5	15.5	14.0	Operation Monitoring	25.6	33.1	29.3
Transportation	17.3	9.8	13.5	Learning Strategies	23.0	33.7	28.3
Building and Construction	15.9	9.0	12.5	Operations Analysis	21.1	33.7	27.4
Medicine and Dentistry	5.2	19.6	12.4	Systems Analysis	21.9	32.0	26.9
Personnel and Human Resources	13.5	10.9	12.2	Management of Material Resources	24.2	29.4	26.8
Biology	4.7	16.1	10.4	Science	14.6	37.3	25.9
Geography	11.2	8.4	9.8	Troubleshooting	22.2	25.4	23.8
Sales and Marketing	14.3	5.2	9.8	Equipment Maintenance	23.7	19.7	21.7
Therapy and Counseling	5.4	12.0	8.7	Technology Design	15.8	27.3	21.6
Sociology and Anthropology	6.4	7.7	7.1	Instructing	20.1	22.8	21.5
Fine Arts	3.6	3.7	3.7	Installation	19.4	22.1	20.8
Philosophy and Theology	1.7	2.6	2.2	Repairing	19.8	18.1	18.9
Foreign Language	2.3	1.7	2.0	Persuasion	16.0	20.2	18.1
Food Production	2.7	1.3	2.0	Negotiation	15.1	17.9	16.5
History and Archeology	1.5	2.2	1.9	Management of Financial Resources	15.9	17.0	16.4
				Management of Personnel Resources	14.8	17.6	16.2
				Programming	3.3	11.0	7.1

Sacramento Regional Research Institute, October 2003

Data Source: O\*Net

Note: Importance rankings are based on a standardized scale of 1-100.

This information demonstrates that on an overall basis, workers within the filtered occupations in the emerging industries rank Mathematics, English Language, Clerical, Computer and Electronics, and Customer and Personal Service as the most important knowledge categories necessary to perform their jobs competently. O\*Net defines these knowledge categories in the following manner:

- Mathematics—knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.
- English Language—knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

- Clerical—knowledge of administrative and clerical procedures and systems such as word processing, managing files and records, stenography and transcription, designing forms, and other office procedures and terminology.
- Computer and Electronics—knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.
- Customer and Personal Service—knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.

Additionally, employees within the 15 selected industries feel that Reading Comprehension, Active Listening, Speaking, Writing, and Mathematics are the most important skills to carry out their job functions. The O\*Net definitions for these five skills are as follow:

- Reading Comprehension—understanding written sentences and paragraphs in work related documents.
- Active Listening—understanding the implications of new information for both current and future problem-solving and decision-making.
- Speaking—talking to others to convey information effectively.
- Writing—communicating effectively in writing as appropriate for the needs of the audience.
- Mathematics—using mathematics to solve problems.

The grouping of the top knowledge and skills reveals a set of general requirements for the emerging workforce in the Sacramento CMSA and could be used as a set of competencies that all service and programs geared at low- and moderate-skilled occupational and workforce training should address. These sets of knowledge and skills can be used and transferred between a large number of occupations and industries that are important to the Sacramento CMSA.

Appendix B of this report contains data for the knowledge and skills importance rankings of each of the selected industries along with detailed descriptions of all knowledge and skills categories. While the above information pointed to a set of general competencies for the emerging Sacramento CMSA workforce, the top knowledge and skills categories for each of the selected industries can be used in planning and developing training and career development programs that focus on the low- and moderate-skilled workforce within the specific industries.

## Major Employer Interviews

SRRI conducted interviews with major employers in the Sacramento region within industries having major potential for economic development in order to elicit general and detailed views of current and probable future workforce employment and skill demands.

### Interview Methodology

SRRI conducted interviews with major employers within the 15 emerging industry sectors in the Sacramento CMSA in order to assess the current and potential future workforce needs. The interviews were also aimed at identifying the key industries' occupational patterns in terms of level of skill, knowledge, and training level in order to provide an additional view of the present and future occupational structure, examined in detail in the Economic and Occupational Analysis section of this report. Additionally, the survey was designed to obtain information characterizing firms in terms of workforce structure and growth expectations in order to assess potential effects on the occupational trends and labor force demands in the Sacramento CMSA, not observed in other analyses.

A sample list of organizations and firms was developed using a wide range of databases. The sample list included the major employers for each of the 15 emerging industry sectors in the Sacramento CMSA. In addition, eight large companies outside of the 15 industries were added to the list due to their predominance and large role in the Sacramento economy. These companies represent some of the most important labor demand drivers in the Sacramento region, and their viewpoints are imperative to understanding workforce needs.

The final sample list consisted of over 280 firms, which was narrowed to an interview list of 158 companies representing the largest employers. SRRI contacted 145 out of the 158 firms and organizations on the list (over 90 percent). Most of the companies were unusually difficult to schedule interviews with and were contacted numerous times throughout this piece of the project. SRRI was able to obtain responses in person and by telephone from 27 (18 percent of the short list) companies' executive including presidents, chief executives, and human resources directors. Interviewing top executives was aimed at ensuring a high degree of participant competence, a "big picture" vision of the company's and industry's future, and solid understandings of occupational trends and labor force demand issues. The 27 surveyed participants were very helpful, accommodating and aware of the importance of the study for ensuring that local educational organizations have the knowledge of the region's current economic and workforce needs and potential educational demand.

SRRI ensured that the respondents included at least one representative from each of the 15 selected industries. In most cases, there were two or three participants for each of the 15 industry sectors. Figure 6 illustrates the employment breakdown among participants in the 15 selected industries in the Sacramento CMSA. The responding companies' employment numbers ranged from 62 to over 7,000. The total employment of

## MAJOR EMPLOYER INTERVIEWS

participating companies was estimated at over 40,000, which accounts for nearly eight percent of the total employment within the 15 selected industries in the Sacramento CMSA, providing a useful sample for evaluating the region's workforce and training needs.

**FIGURE 6**  
**EMPLOYMENT BREAKDOWN AMONG RESPONDENTS**

<i>Industry</i>	<i>Survey Respondent Employment</i>	<i>Percent of Total</i>
Ambulatory Health Care Svcs.	8,000	19.8%
State & Local Government	7,708	19.1%
Semiconductor & Elec. Comp. + Computer & Periph. Equipment Mfg.	6,975	17.3%
Other Regional Major Employers	3,300	8.2%
Information	2,800	6.9%
Retail Trade	2,725	6.7%
Heavy & Civil Engineering Construction	2,554	6.3%
Specialty Trade Contractors	2,289	5.7%
Computer Systems Design Svcs.	1,400	3.5%
Insurance Carriers	950	2.4%
Non-depository Credit Intermediation	750	1.9%
Construction of Buildings	400	1.0%
Educational Services	260	0.6%
Admin., Support, & Waste Services	225	0.6%
Social Assistance	62	0.2%
Total	40,398	-

Sacramento Regional Research Institute, December 2003  
Data Source: Company Interviews

Throughout the analysis, SRRI has focused on occupations within the training levels that best fit SETA's and Sacramento Works' role in workforce development and primary services. These training levels encompass two general categories based on groupings of formal Bureau of Labor Statistics definitions—low skilled (short-term on-the-job training, moderate-term on-the-job training, long-term on-the-job training, and work experience) and moderate skilled (post-secondary vocational education and associate degree). Interviews were structured to provide a view of overall workforce employment and skill demand along with specific breakdowns for low skilled and moderate skilled responses. Analysis of the responses was also broken down into these two levels in order to help SETA and Sacramento Works focus their activities. It is important to note that on occasion employers inconsistently categorized certain occupations within the low and moderate skill levels. In these cases, different employers placed similar occupations within dissimilar training levels or considered the training requirements in their company to be different than the general occupational requirements seen throughout the state.

## **Interview Results**

### **Occupational Pattern**

The average occupational pattern among the respondents from the 15 leading industry sectors reflects a breakdown of occupations within the following skill levels:

- Low-skilled—42 percent
- Moderate-skilled—34 percent
- High-skilled—24 percent

Low-skilled occupations are the most predominant among the responding companies followed by moderate- and high-skilled. This average pattern reflects the trend across the emerging industries, but the occupational patterns vary significantly between individual industry sectors. For example, more labor intensive industries such as Construction of Buildings, Heavy & Civil Engineering Construction, Administrative, Support & Waste Services, and Retail Trade are characterized by predominantly low-skilled occupations, while moderate-skilled occupations constitute a major share in the State & Local Government, Insurance Carriers & Related, Non-depository Credit Intermediation, Ambulatory Health Care Services, and Social Assistance sectors. Some sectors, like Information, Educational Services, Semiconductor & Electronic Component Manufacturing, and Computer & Peripheral Equipment Manufacturing consist of mainly high-skilled occupations. Nevertheless, the average pattern is a useful tool for assessing the occupational structure and the size of SETA's and Sacramento Works' target labor force within the major industries in the Sacramento CMSA. Based on the information obtained in the interviews, which shows low- and moderate-skilled occupations at a combined 76 percent of the total workforce (42 and 34 percents, respectively), the workforce training provided by SETA and Sacramento Works services over 391,000 jobs within the 15 major industry sectors in the area. This number accounts for over half (53 percent) of the area's employment and represents a major labor force segment.

### **Economic Trends and Expectations**

Overall, the respondents were fairly optimistic about the local economy in the future. Forty-eight percent expressed positive expectations of growth within their respective industries in the near future, while 33 percent said they were skeptical about any visible growth, and 17 percent were reluctant to comment either positively or negatively. Positive growth expectations mainly came from representatives in the Construction of Buildings, Heavy & Civil Engineering Construction, Administrative, Support & Waste Services, Retail Trade, and Information sectors as well as other major employers in the Sacramento region. Representatives from Educational Services, State & Local Government, Social Assistance, Non-depository Credit Intermediation, and Computer & Peripheral Equipment Manufacturing, had primarily mixed responses in regards to economic expectations. Skeptical responses came from Insurance Carriers & Related and

Computer Systems Design & Related Services. Most interviewees explained that their doubts about future growth were determined by the general economic uncertainty locally, statewide, and nationwide.

Respondents were more positive about expected growth within their respective businesses (versus the overall industry sector). Sixty-three percent mentioned their plans to increase workforce in the next 5 to 10 years, while 44 percent said they had plans to expand their products and services and 33 percent plan to increase square footage.

The information on economic trends and expectations also confirms the economic analysis discussed earlier in this report and the selection of the emerging industry sectors. Overall, firms and organizations from the 15 selected industries provided a positive outlook on the economic future, and the responses demonstrated that some industries may have a more certain potential for future growth, and therefore, a higher future workforce demand.

### **Occupational Growth Potential and Expected Occupational Demand**

The growing local workforce demand is strongly affected by employers' optimistic economic expectations and some of their urgent needs to replace the increasing number of retiring and turnover personnel. As discussed above, 63 percent of surveyed companies have plans to increase their employment numbers, and several of them, at a robust rate of five to 10 percent a year within the next decade. The majority of survey respondents expect higher growth and demand in low-skilled occupations compared to moderate-skilled occupations. The most optimistic expectations about interviewed companies' growth came from representatives of Specialty Trade Contractors, Construction of Buildings, Heavy & Civil Engineering Construction, Administrative, Support & Waste Services, Retail Trade, Information, and Ambulatory Health Care Services. Some representatives from Educational Services, Social Assistance, and Non-depository Credit Intermediation also expressed intentions to increase employment in the next several years.

#### **Low-Skilled Occupational Demand**

According to respondents, low-skilled occupations constitute a major occupational segment (42 percent on average) within the region's 15 emerging industries, which makes demand for low-skilled occupations an important regional need. Figure 7 lists predominant low-skilled occupations named by survey respondents. The list demonstrates the prevalence of clerical and administrative support positions across the industry spectrum. Other important low-skilled occupations mentioned by respondents from different industry sectors included Call Center Representative, Account & Sales Clerks, Drivers & Delivery Workers, and Equipment Operators. Some of the more frequently mentioned industry-specific occupations included Laborers, Electricians, Storage Yard Workers, and Field Constructors within the Construction of Buildings



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sector, and Custodial and Maintenance Workers within the State & Local Government and Administrative, Support & Waste Services sectors.

**FIGURE 7**  
**PREDOMINANT LOW-SKILLED OCCUPATIONS BY INDUSTRY**

<i>Industry</i>	<i>Predominant Low-Skilled Occupations</i>
Admin., Support, & Waste Svcs.	Clerical Support Staff, Call Center Reps, Receptionists, Apprentices, Electricians, Window Washers, Custodial and Utility Workers
Ambulatory Health Care Svcs.	Clerical Support Staff, Receptionists, File Clerks, Housekeeping
Computer & Periph. Equipment Mfg.	Semi-Fab Operator, Lot Tracer
Computer Systems Design Svcs.	Machine Operators, Administrative and Clerical Support Staff, Secretaries, Accounting
Construction of Buildings	Yard Work, Clerical Staff
Educational Services	Clerical and Office Support Staff, Daily Operations Managers
Heavy & Civil Eng. Construction	Equipment Operators, Production Workers, Laborers, Drivers (Class A), Warehouse/ Yard Delivery, Clerical & Administrative Support Staff
Information	Telesales/ Call Center Reps, Customer Care/Help Desk Technicians, Clerical Staff, Retail, Packaging, Drivers
Insurance Carriers	Member Service Representatives, Call Center Reps, Administrative & Clerical Support Staff
Non-deposit. Credit Intermed.	Loan Officers, Accountants, Collections, Call Center Reps, Clerical Support Staff, Administrative Assistants, Rural Development Specialists
Retail Trade	Courtesy Clerks, Cashiers, Sales Reps, Meat Cutters, Loss Prevention/ Inventory Support Personnel
Semiconductor & Elec. Comp. Mfg.	Semi-Fab Operator, Assembler Technician, Lot Tracer
Social Assistance	Rural Development Specialists, Administrative Assistants, Loan Officers, Accountants
Specialty Trade Contractors	Laborers, Electricians, Field Constructors, Telemarketers/Sales Support, Clerical Personnel
State & Local Government	Clerical Personnel, Account Clerks, Administrative Clerk, Secretaries, Special Program Leader, Recreation Aid, Youth Aid, Engineering Aid, Bus Driver, Maintenance, Equipment Service Worker

Sacramento Regional Research Institute, December 2003  
Data Source: Company Interviews

Interview results also show that major employers expect the demand for low-skilled occupations to be stronger, compared to the moderate-skilled occupational demand for two primary reasons. First, the most confident expectations of employment expansion and economic growth came overwhelmingly from industries that rely predominantly on low-skilled occupations, such as Construction of Buildings, Heavy & Civil Engineering Construction, Administrative, Support & Waste Services, and Retail Trade. Second, 60 percent of all respondents commented that they expect more growth to occur within the low-skilled occupational segment compared to the moderate-skilled one. Several companies, mostly within labor intensive industry sectors, pointed out that an average hiring pattern would require from five to 20 low-skilled workers per each new moderate skilled employee. This pattern does not apply to industries that rely on moderate- and high-skilled occupations, like Educational Services, Social Assistance, Insurance Carriers



and electronics manufacturing-related sectors. While the overall demand for low-skilled positions is expected to be strong, several occupations within this segment were stressed as particularly high potential growth occupations. These include Laborers, Electricians, Sales/Order Processing Clerks, Field Installers, Equipment Operators, Production & Storage Yard Workers, Clerical Assistants, Maintenance & Custodial Workers, Machine Operators, Customer Service Representatives, Assemblers, Retail Clerks, Nursing Assistants, and Medical Support personnel. The majority of these occupations were classified as low skill and above average projected growth in the analysis discussed in the previous section of this report (Economic and Occupational Analysis).

Another factor that contributes to a higher demand for low-skilled occupations is a large turnover rate that is particularly characteristic of these positions. Almost 70 percent of the interviewed employers commented that they experienced at least some turnover problems within their low-skilled occupational segment. Major reasons for high turnover mentioned by respondents included a lack of work ethics and responsibility, limited company loyalty, employees' willingness to leave for higher paying low-skilled jobs, and minimal patience for handling often demanding, long-hour schedules. Low-skilled occupational training programs offered by SETA and Sacramento Works can address some of these concerns, especially those related to work ethic and responsibility. Occupations described as the most affected by high turnover include Electricians, Telemarketers/Call Center Representatives, Laborers, Drivers, Custodial Personnel, Equipment Operators and Field Installers. Some employers mentioned a growing replacement need for retiring personnel among call center occupations. However, overall, contrary to the moderate-skilled occupations, employers did not consider retirement as a major factor affecting their demand for low-skilled occupations.

#### Moderate-Skilled Occupational Demand

Moderate-skilled occupations represent another important segment of the regional occupational structure and, on average, account for 34 percent of the labor force within the 15 key analyzed industry sectors. While the demand for low-skilled occupations appears to dominate, regional employers' need for moderate-skilled employees is also significant. Figure 8 lists the most predominant moderate-skilled occupations in the 15 leading industries in the region as described by the survey participants. The list illustrates the predominance of payroll and accounting-related occupations, as well as administrative, clerical, technical and customer support, and supervisory/management occupations. Apart from these universal occupations present throughout the industry spectrum, the listing gives examples of important industry-specific occupations. Examples of these include Supervisors, Foremen, Journeyman and Civil Engineering Technicians for the Heavy & Civil Engineering Construction sector; Electronics and Engineering Technicians for electronics manufacturing-related sectors; and Nurses and Medical Assistance Technicians for Ambulatory Health Care Services.

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**FIGURE 8**  
**PREDOMINANT MODERATE-SKILLED OCCUPATIONS BY INDUSTRY**

<i>Industry</i>	<i>Predominant Moderate-Skilled Occupations</i>
Admin., Support, & Waste Svcs.	Clerical, Customer Service Reps, Supervisory, Quality Assurance Specialists
Ambulatory Health Care Svcs.	Nurses, Lab Assistants, Radiological Technicians, Pharmacy Technicians
Computer & Periph. Equipment Mfg.	Engineering/Electronics Technicians, Administrative/Support Technicians, Technical Assistance Reps.
Computer Systems Design Svcs.	No moderate-skilled positions mentioned
Construction of Buildings	Carpenters, Cement Masons
Educational Services	Accountants (Payroll), Program Managers, Financial Assistants
Heavy & Civil Eng. Construction	Foremen, First-Line Supervisors, Civil Engineering Technicians, Payroll, Property Managers, Clerical/ Administrative Staff, Supervisory/Managers
Information	Marketing and Sales Reps., IT Designers, Program Analysts, Accounting & Human Resources Staff, Purchasing Agents, Circulation Managers
Insurance Carriers	Underwriters, Examiners, Claim Adjusters
Non-deposit. Credit Intermed.	Mortgage Specialists, Accounting, Information Technology, Administrative, and Human Resources Staff, Financial Aid Professionals
Retail Trade	Supervisory/Management Positions
Semiconductor & Elec. Comp. Mfg.	Test Technicians, Electronics & Engineering Technician, Administrative/Support Technicians
Social Assistance	Payroll, Supervisory Staff
Specialty Trade Contractors	Journeyman Technicians, Foremen, Accounting/Payroll Staff, Service Technicians, Administrative Support Personnel, Apprentices
State & Local Government	Police Officers, Firefighters, Firefighter-Paramedics, Engineering, Administrative and Accounting Technicians, Management Analysts, Personnel Analysts

Sacramento Regional Research Institute, December 2003

Data Source: Company Interviews

The presence of clerical, administrative, and accounting support positions in both the moderate-skilled and low-skilled occupations listings is explained by employers' inconsistent categorization of these occupations as well as by different educational and training requirements and the level of duties attached to these occupations in different companies and industries.

As discussed in the previous section, surveyed employers in most of the 15 industry sectors, with the exception of electronics manufacturing-related sectors, Educational Services, Social Assistance, and Insurance Carriers, generally noticed that growth in moderate-skilled occupations is less aggressive than in the low-skilled occupations. Therefore, the respondents expect moderate growth among most moderate-skilled occupations with the exception of a few that are expected to grow at a faster rate. The occupations, with the highest expected growth include Foremen, Service Technicians, Plumbers, Property Managers, Police Officers, Firefighters, Engineering Technicians, Building Inspectors, Information Services Technicians, retail supervisory positions, computer/technical assistance personnel, Nurses, and Pharmacy & Imaging Technicians. The economic and demographic analysis discussed in the previous section of this report found that, statewide, most employers consider the majority of these occupations as low-

skilled, but all were projected to have above average employment growth. This information shows that the local and specific company occupational demand may require a higher training level at this point. These demands may change as Sacramento's economy adjusts to reflect a statewide structure; however, it may also show a difference in the occupational demand that must be addressed within the Sacramento CMSA.

Apart from employment growth, other factors that affect workforce demand for moderate-skilled occupations include turnover and retired workforce replacement needs. All of the interviewed employers stated that there is very limited turnover in most moderate-skilled occupations due to a more specialized nature of these occupations and higher competition in the labor market. Replacement needs, however, were mentioned as a serious concern by several employers in the State & Local Government, Ambulatory Health Care Services, Educational Services, Retail, and Construction of Buildings industries. Some of the interviewed companies, mostly among government and health care employers, are facing up to 50 percent workforce replacement needs as their "baby boomer" employees retire within the next decade. This is a significant factor that will also contribute to the growing workforce demand in the moderate-skilled occupational segment in the future.

## **Underserved Occupational Demand**

### Underserved Low-Skilled Occupations

Overall, employers commented that there is a decent supply of low-skilled employees in the Sacramento region. Most problems appear to be associated with the retention rather than availability of low-skilled personnel (as discussed above). Very few low-skilled occupations were characterized by employers as hard to fill. Typically, employers experience difficulty with finding low-skilled personnel with specific training or qualifications. Some examples of these hard-to-fill occupations include Bus Drivers, Bindery Operators, and Semi-Fab Operators. Several respondents also commented that they experienced problems filling call center/telemarketing positions with professionals demonstrating adequate communication and customer service skills. Addressing these skill and qualification concerns is necessary in workforce training programs for low-skilled occupations.

### Underserved Moderate-Skilled Occupations

Interviewees also expressed an overall satisfaction with the existing supply and quality of moderate-skilled labor force. However, some employers articulated a concern with quality and supply, and mentioned difficulty in meeting their demand for certain moderate-skilled occupations due to a shortage of qualified workforce in the region. Some examples of these positions include Foremen, Journeyman Plumbers, and HVAC (Heating, Ventilation, and Air Conditioning) Installation and Service Technicians. These

positions are difficult to fill due to insufficient supply of labor force with necessary vocational certification. Government employers have difficulty filling Building Inspectors and Plant Operators occupations due to a similar lack of certified job candidates. Insufficient local supply of professionally trained or certified workforce also underlies difficulties in filling Video Technicians and Application Analysts in the Information sector, Mortgage professionals, Casualty Adjusters and Legal Assistants in the Insurance Carriers sector, Nurses in Ambulatory Health Care Services, and Electronics Technicians in electronics manufacturing-related sectors. Employers in Ambulatory Health Care Services emphasized a marked shortage of Nurses in the area, stating that the statewide as well as regional supply of nurses needs to double to meet the growing demand for this occupation. Interview respondents in electronics manufacturing-related sectors mentioned a regional shortage of Electronics Technicians, a problem that forces some employers to outsource qualified electronics specialists. As with the low-skilled occupations, moderate-skilled workforce training programs should address these problems and concerns related to underserved occupations.

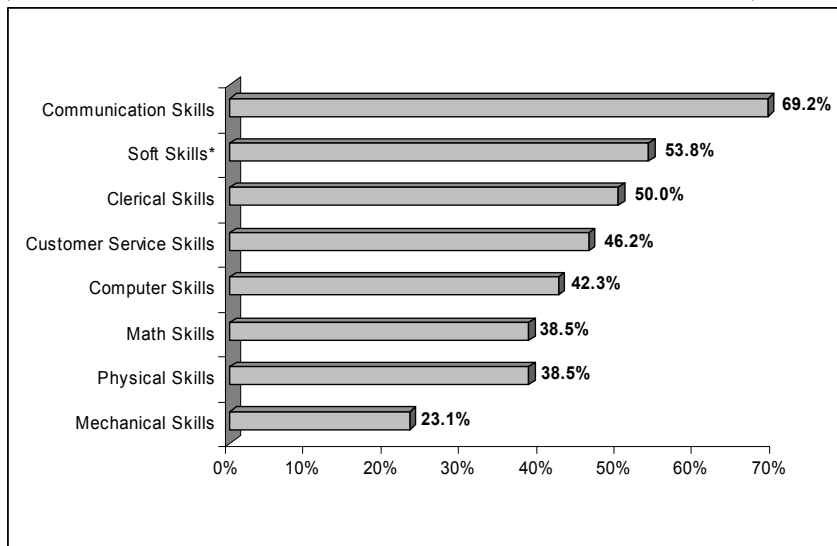
### **Skills and Knowledge Demand**

Given the diversity of industries represented among survey participants, respondents mentioned a broad variety of skills and knowledge requirements for both low-skilled and moderate-skilled occupations. However, certain knowledge and skills sets in both occupational categories were consistently emphasized as highly demanded by the interviewed employers. Most employers commented that communication is a skill that needs to be better developed and is critical for occupations at all training levels. Additionally, critical thinking, analytical skills, customer service, leadership, self-direction, interpersonal, and bilingual skills were emphasized by many employers for occupations within both the low- and moderate-skilled categories.

#### **Low-Skilled Occupations**

Figure 9 illustrates the most frequently mentioned skills and knowledge categories within the low-skilled occupational segment. Communication skills were emphasized by the majority of respondents (almost 70 percent). Employers stressed the importance of written and verbal communication for most low-skilled occupations and commented that, in many instances, these skills are poorly developed and hard to meet. This agrees with SRRI's analysis in the Economic and Demographic Analysis section of this report that demonstrated an overall need for reading comprehension, active listening, speaking, and writing skills.

**FIGURE 9**  
**SKILLS AND KNOWLEDGE DEMANDED MOST BY**  
**INTERVIEWED EMPLOYERS**  
**(PERCENT OF RESPONDENTS, LOW-SKILLED OCCUPATIONS)**



Sacramento Regional Research Institute, December 2003

Data Source: Company Interviews

\*Note: Soft Skills reflects respondents' conceptualization of interpersonal skills, work ethics, and responsibility.

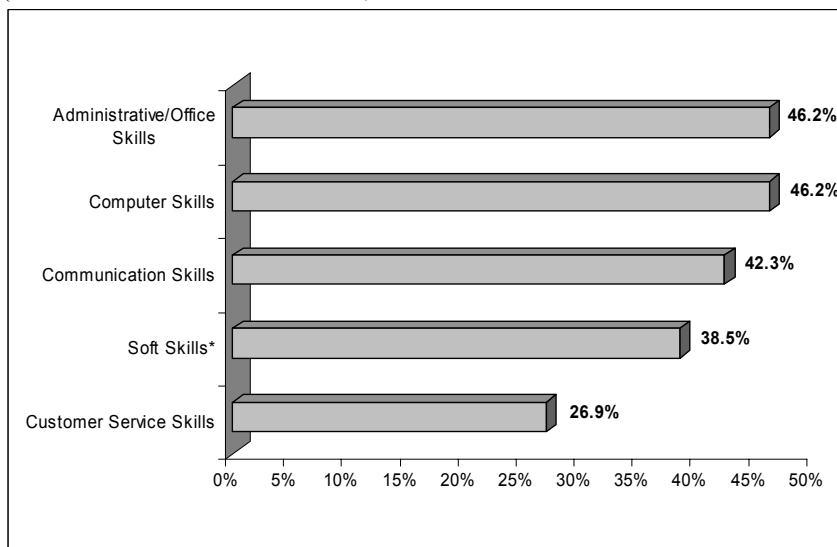
The importance of the so-called “soft skills” was emphasized among the knowledge and skills in high demand for low-skilled occupations. Employers stressed that they would like to see employees with better interpersonal and work ethic skills, more responsible attitude towards their jobs, better problem solving and critical thinking skills, and stronger organizational skills. Many employers mentioned that “soft skills” are becoming a more important hiring criterion, often taking precedence over vocational training and previous work experience. Aspects of “soft skills” competencies appear to demonstrate a necessary component for all low-skilled workforce training services.

Other skills frequently mentioned by the respondents include clerical, customer service, and computer skills. Respondents stated that adequate clerical and customer service skills are often hard to find and are in high demand because of their universal applicability across all industries. According to employers, computer skills are also becoming increasingly important even for the low-skilled occupational segment as basic computer utilization becomes a requirement for many low-skilled occupations. SRRI found that most of these attributes were ranked within the top five knowledge categories for the overall workforce which includes clerical, computer, and customer and personal service competencies.

### Moderate-Skilled Occupations

Figure 10 lists the most frequently mentioned knowledge and skills requirements for moderate-skilled occupations. As the figure illustrates, moderate-skilled occupations share many of the same knowledge and skills requirements as the low-skilled occupations. Computer and administrative/office skills were stressed by over 46 percent of the interviewed companies. Similar to low-skilled occupations, numerous respondents pointed out that computer skills are becoming increasingly important for moderate-skilled occupations as work places become overwhelmingly computerized and utilize more technology and automation. The respondents also frequently emphasized the importance of written and verbal communication, “soft skills,” and customer service skills. Other qualifications mentioned include supervisory and management capabilities, math skills, and general knowledge of finance and business operations. These statements also agree with SRRI’s findings related to the overall workforce knowledge and skills requirements within the emerging industries in the Sacramento CMSA. The findings placed mathematics, English language, clerical, computer, and customer and personal service knowledges and reading comprehension, active listening, speaking, writing, and mathematics skills in the top five of each respective list. Bilingual skills were mentioned in the interviews primarily by employers from the Social Assistance, Non-depository Credit Intermediation, and Specialty Trade Contractors sectors as an important skill for effective communication and customer service.

**FIGURE 10**  
**SKILLS AND KNOWLEDGE DEMANDED MOST BY**  
**INTERVIEWED EMPLOYERS**  
**(PERCENT OF RESPONDENTS, MODERATE-SKILLED OCCUPATIONS)**



Sacramento Regional Research Institute, December 2003

Data Source: Company Interviews

\*Note: Soft Skills reflects respondents’ conceptualization of interpersonal skills, work ethics, and responsibility.

Like the low-skilled occupations, “soft skills” are becoming increasingly significant for moderate-skilled jobs, compared to professional skills and education. According to many interviewed companies, it is easier to teach professional skills than train the right attitude. The list of most frequently mentioned soft skills includes interpersonal skills, good work ethic and honesty, flexibility, adaptability to change, positive attitude, organizational skills, attention to detail and multi-tasking, critical thinking, decision making, analytical, and problem solving skills. Many companies often find it harder to satisfy the demand for these skills rather than to meet professional and educational requirements. In particular, good work ethic, interpersonal, critical thinking, analytical and problem solving skills are considered the hardest ones to meet and represent areas of concern for many of the interviewed survey participants.

While most interviewed employers require Associate Degrees, vocational training, or certifications for moderate-skilled positions, work experience was mentioned as another important hiring criterion that is often allowed to replace educational credentials. Employers in highly specialized industry sectors like Social Assistance, Insurance Carriers, Information, and Non-depository Credit Intermediation often place more importance on experience rather than education and consider this a strong developing trend in their respective industries.

### **Training Program Demands and Preferences**

#### Low-Skilled Occupation Training

While the majority of interviewed employers prefer their low-skilled personnel to have high school education, it is not a requirement for most low-skilled positions. Only 34 percent of respondents require high school degrees for some of their low-skilled occupations, mostly for technical or administrative and customer service positions. Some employers foresee high school degree requirements to become more rigorous in the next five to 10 years as employers seek to improve the quality and professionalism of their low-skilled labor force.

Stressing a strong need for better developed soft skills, employers commented on the importance of programs that focus on general principles of business and professional etiquette and work ethic practices, organizational skills and responsibility, and other disciplinary and attitude issues. According to many respondents, important professional skills that need to receive more attention from local educational and vocational training organizations include clerical and office skills, basic computer skills, customer service training, and communication and critical thinking skills. Some construction-related employers commented on the importance of more pre-apprenticeship and general laborer training programs for non-college-bound high school students.



### Moderate-Skilled Occupation Training

The majority of interviewed respondents expressed an overall satisfaction with the current educational offerings for the moderate-skilled occupations. Based on their occupational demand and knowledge and skills requirements, the interviewed employers emphasized the importance of programs in administration, business, and management as well as basic computer, customer service, and communication skills training. Interviewees also emphasized the significance of programs designed to develop and communicate the importance of “soft skills” including interpersonal, work ethic, critical thinking, organizational, and problem solving skills. Teaching the moderate-skilled workforce these fundamental skills that are indispensable in any industry is considered to be a vital part of the current and future training demand.

Other important industry-specific educational needs mentioned by some employers include developing new or expanding existing programs in nursing and medical services, engineering, electronics, electrical construction, and other construction-related vocational training. According to one survey respondent, a potential local demand of 2,000 electrical construction specialists in the next two to three years necessitates a creation of local supply. A program similar to AA/AS in Electrical Construction offered by LA Trade Tech was suggested as a possible solution to the problem of insufficient supply and outsourcing of electrical construction majors. As discussed earlier, other construction-related occupations that are hard to fill, due to an insufficient local supply, include Foremen, Journeyman Plumbers, HVAC Installation & Service Technicians, and Building Inspectors. Programs that train Engineering Technicians were also mentioned as an urgent growing need by several construction-related companies. Insufficient supply of nurses, radiological, pharmaceutical, and other medical technicians was emphasized as another underserved educational need in the area. Finally, basic training in electronics was also stressed as part of educational needs that require more focus on the part of regional professional and vocational training organizations.

### **Overview of the Low- and Moderate-Skilled Occupational Segments**

Low- and moderate-skilled occupations account for the majority (over 76 percent) of the region’s occupational structure within the 15 emerging industry sectors. Based on the interview results, sectors in which low- and moderate-skilled occupations represent major, or at least significant, shares include Administrative, Support & Waste Services, Ambulatory Health Care Services, Construction of Buildings, Heavy & Civil Engineering Construction, Insurance Carriers, Non-depository Credit Intermediation, Retail Trade, Social Assistance, Specialty Trade Contractors, and State & Local Government.

Overall, survey responses demonstrated a prevalence of clerical, administrative support, customer service, and accounting and payroll assistance occupations within the low- and moderate-skilled occupational segments. While employers typically expressed an overall satisfaction with the supply and qualifications of the low- and moderate-skilled labor force, some responses revealed an underserved occupational demand due to a lack of



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locally provided training, high turnover rate, or retiree replacement needs. Eighty percent of the interviewed employers expect at least some growth (ranging from modest to strong) among low- and moderate-skilled occupations. Positions with the highest expected growth in both training categories are listed in Figure 11. SRRI found that most of these occupations are projected to have above average positive employment growth statewide, demonstrating the local applicability of these findings and the need for adequate workforce training.

**FIGURE 11**  
**LOW- AND MODERATE-SKILLED OCCUPATIONS**  
**WITH HIGHEST EXPECTED GROWTH**

<i>Industry</i>	<i>Occupations with Highest Expected Growth</i>
Admin., Support, & Waste Svcs.	Custodial and Maintenance Workers, Call Center Reps.
Ambulatory Health Care Svcs.	Nurses, Nursing and Medical Assistants
Computer & Periph. Equipment Mfg.	Assemblers, Electronics Technicians
Heavy & Civil Eng. Construction	Laborers, Equipment Operators, Storage Yard Workers, Property Managers
Information	Customer Services Reps, installation Technicians, Information Technology Support Personnel
Insurance Carriers	Customer Service Reps.
Non-deposit. Credit Intermed.	Call Center & Customer Service Reps., Mortgage Specialists
Retail Trade	Retail Clerks, Sales Clerks
Semiconductor & Elec. Comp. Mfg.	Assemblers, Technicians
Specialty Trade Contractors	Laborers, Electricians, Equipment Operators, Installers, Foremen, Plumbers, Service Technicians
State & Local Government	Laborers, Maintenance Workers, Policemen, Firefighters, Engineering Technicians

Sacramento Regional Research Institute, December 2003  
Data Source: Company Interviews

While skills and knowledge categories demanded by major employers vary depending on specific industry, there was a strong consensus among the overwhelming majority of respondents in regards to several skill categories considered vital for high professional performance. These categories include communication skills, customer service skills, “soft skills,” administrative/clerical skills, and computer skills. Regardless of the professional skill level, communication and customer service skills were mentioned as critical for successful performance and compliance with job requirements. “Soft skills” were described as increasingly important and often lacking in both low- and moderate-skilled occupations, especially related to interpersonal skills, critical thinking and analytical skills, work ethic, and problem solving. Respondents often considered “soft skills” more important than educational and professional credentials. Interviewed employers also commented on the growing importance of computer skills and sometimes inadequate level of general office and clerical/administrative skills that create problems with filling certain clerical, administrative and payroll assistance positions.

Respondents’ overall assessment of growth expectations, occupational needs, and skills and knowledge demands translates into several important requirements for the existing training and educational programs for low- and moderate-skilled positions in the

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Sacramento CMSA. The interview results stress the importance of the following programs:

All levels of professional training:

- Programs aimed at developing and improving “soft skills,” focusing particularly on interpersonal skills, critical thinking, problem solving, work ethic, and organizational skills
- Programs or courses that develop oral and written communication as well as customer service skills
- Training aimed at improving professional behavior, teaching general business etiquette, and developing an understanding of general business practices, procedures and operations
- Programs or courses that develop clerical and basic office skills, including computer skills, filing, and office organization skills

Moderate-skilled occupations:

- Programs related to nursing and medical assistance, electrical construction, engineering, electronics, and computer assistance
- Training for the Foremen, Plumbers, HVAC Technicians and Installers, Building Inspectors, and Plant Operators occupations

Low-skilled occupations:

- General laborer and pre-apprenticeship programs for non-college-bound high school students, and training for custodial or support personnel

## Appendix A—Occupations

### Occupations by Training Level for the 15 Selected Industries

Legend for Training Level in Figures:

AD=Associate Degree  
PSVE=Postsecondary Vocational Education  
WE=Work Experience  
STOJT=Short-Term On-the-Job Training  
MTOJT=Moderate-Term On-the-Job Training  
LTOJT=Long-Term On-the-Job Training

Legend for Industry in Figures:

1=Specialty Trade Contractors  
2=State and Local Government  
3=Administrative, Support, and Waste Services  
4=Insurance Carriers and Related  
5=Semiconductor and Electronic Component Manufacturing  
6=Non-depository Credit Intermediation  
7=Construction of Buildings  
8=Computer and Peripheral Equipment Manufacturing  
9=Computer Systems Design and Related Services  
10=Retail Trade  
11=Information  
12=Educational Services  
13=Ambulatory Health Care Services  
14=Social Assistance  
15=Heavy and Civil Engineering Construction

## APPENDIX A

**FIGURE A1**  
**MODERATE SKILL OCCUPATIONS IN SELECTED INDUSTRIES**

<i>Occupation</i>	<i>Industry</i>	<i>Training Level</i>	<i>Employment 2000</i>	<i>Projected Employment 2010</i>	<i>Average Occupation Growth Across Selected Industries 2000-2010</i>
Avionics Technicians	3,13	PSVE	100	300	200.0%
Geological and Petroleum Technicians	3,7,11,12,15	AD	500	1,000	100.0%
Chemical Technicians	3,5	AD	100	200	100.0%
Surgical Technologists	2,3,13	PSVE	1,900	3,300	73.7%
Medical Records and Health Information Technicians	2,3,4,7,12,13,14,15	AD	8,800	14,400	63.6%
Diagnostic Medical Sonographers	2,13	AD	800	1,300	62.5%
Environmental Engineering Technicians	2,3,7,12,15	AD	1,100	1,700	54.5%
Psychiatric Technicians	2,13,14	AD	600	900	50.0%
Nuclear Medicine Technologists	13	AD	200	300	50.0%
Electrical and Electronics Installers and Repairers, Transportation Equipment	2,3,10	PSVE	600	900	50.0%
Dental Hygienists	3,13	AD	18,800	28,200	50.0%
Paralegals and Legal Assistants	2,3,4,6,7,9,11,12,15	AD	6,200	9,200	48.4%
Licensed Practical and Licensed Vocational Nurses	2,3,4,7,12,13,14,15	PSVE	22,300	32,500	45.7%
Radiologic Technologists and Technicians	2,3,4,7,12,13,15	AD	7,800	11,100	42.3%
Respiratory Therapists	3,7,12,13,15	AD	1,200	1,700	41.7%
Registered Nurses	2,3,4,7,9,11,12,13,14,15	AD	67,700	95,700	41.4%
Legal & Related Workers, All Other	2,3,4,5,8,9,11,12	AD	7,300	10,000	37.0%
Medical and Clinical Laboratory Technicians	2,3,7,12,13,15	AD	7,800	10,600	35.9%
Medical Transcriptionists	2,3,11,13	PSVE	7,000	9,500	35.7%
Emergency Medical Technicians and Paramedics	2,3,7,12,13,15	PSVE	9,800	13,100	33.7%
Forest and Conservation Technicians	2	AD	300	400	33.3%
Cardiovascular Technologists and Technicians	2,13	AD	900	1,200	33.3%
Legal Secretaries	2,3,4,6,7,11,12,15	PSVE	5,900	7,700	30.5%
Electrical and Electronics Repairers, Commercial and Industrial Equipment	1,2,3,5,7,8,10,11,12,15	PSVE	5,400	7,000	29.6%
Drafters, Engineering, and Mapping Technicians, All Other	1,2,3,5,7,8,9,10,11,12,15	AD	9,000	11,600	28.9%
Welders, Cutters, Solderers, and Brazers	1,2,3,5,7,10,11,12,15	PSVE	15,800	20,200	27.8%
Surveying and Mapping Technicians	2,3,7,11,12,15	PSVE	1,500	1,900	26.7%
Real Estate Sales Agents	2,4,7,15	PSVE	1,500	1,900	26.7%
Library, Museum, Training, & Education Workers, All Other	2,3,7,12,13,14,15	AD	10,400	13,100	26.0%
Medical Secretaries	2,3,7,12,13,15	PSVE	34,900	43,800	25.5%
Mechanical Engineering Technicians	1,3,5,8,10,11	AD	2,400	3,000	25.0%
Executive Secretaries and Administrative Assistants	1,2,3,4,5,6,7,9,10,11,12,13,14,15	PSVE	163,100	201,900	23.8%
Electrical and Electronic Engineering Technicians	1,2,3,5,7,9,10,11,12,15	AD	25,800	31,800	23.3%
Life, Physical, and Social Science Technicians, All Other	2,3,5,7,8,12,13,15	AD	10,300	12,600	22.3%
Mechanical Drafters	3,5,8	PSVE	500	600	20.0%
Electronic Equipment Installers and Repairers, Motor Vehicles	1,10	PSVE	3,100	3,700	19.4%
Travel Agents	3	PSVE	15,400	18,100	17.5%
Forensic Science Technicians	2	AD	600	700	16.7%
Court Reporters	2,3	PSVE	1,800	2,100	16.7%
Agricultural and Food Science Technicians	2,10	AD	1,200	1,400	16.7%
Industrial Engineering Technicians	5,8,9,11	AD	3,100	3,600	16.1%
Telecommunications Equipment Installers and Repairers, Except Line Installers	1,2,3,7,9,10,11,15	PSVE	2,600	3,000	15.4%
Electronic Home Entertainment Equipment Installers and Repairers	1,3,10,11	PSVE	700	800	14.3%
Electrical and Electronics Drafters	1,2,3,5,8,11	PSVE	2,800	3,200	14.3%
Data Entry Keyers	3,4,5,6,7,9,10,11,12,13,14,15	PSVE	41,200	46,300	12.4%
Secretaries, Except Legal, Medical, and Executive	1,3,4,5,6,7,8,9,10,11,12,13,14,15	PSVE	98,100	110,100	12.2%
Environmental Science and Protection Technicians, Including Health	2,3,7,12,15	AD	1,900	2,100	10.5%
Civil Engineering Technicians	3,7,11,12,15	AD	1,200	1,300	8.3%
Broadcast Technicians	3,11	PSVE	4,800	5,200	8.3%
Architectural and Civil Drafters	1,2,3,7,12,15	PSVE	2,600	2,700	3.8%
Veterinary Technologists and Technicians	3	AD	100	100	0.0%
Respiratory Therapy Technicians	13	AD	100	100	0.0%
Law Clerks	2	AD	1,100	1,100	0.0%
Dietetic Technicians	12	AD	100	100	0.0%
Biological Technicians	3	AD	100	100	0.0%

Sacramento Regional Research Institute, October 2003

Data Source: Employment Development Department, Labor Market Information

## APPENDIX A

**FIGURE A2**  
**LOW SKILL OCCUPATIONS IN SELECTED INDUSTRIES**

<i>Occupation</i>	<i>Industry</i>	<i>Training Level</i>	<i>Employment 2000</i>	<i>Projected Employment 2010</i>	<i>Average Occupation Growth Across Selected Industries 2000-2010</i>
Real Estate Brokers	11,15	WE	100	300	200.0%
Extruding, Forming, Pressing, and Compacting Machine Setters, Operators, and Tenders	3,10	MTOJT	200	500	150.0%
Occupational Therapist Assistants	2,13	MTOJT	400	900	125.0%
Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	5,8	MTOJT	300	600	100.0%
Purchasing Agents and Buyers, Farm Products	2,5,8,10	WE	300	600	100.0%
Occupational Therapist Aides	13	MTOJT	200	400	100.0%
Hotel, Motel, and Resort Desk Clerks	3,7,12,15	STOJT	400	800	100.0%
Food Cooking Machine Operators and Tenders	10	MTOJT	100	200	100.0%
Farmworkers, Farm and Ranch Animals	3	STOJT	0	100	100.0%
Crushing, Grinding, and Polishing Machine Setters, Operators, and Tenders	3,15	MTOJT	100	200	100.0%
Bailiffs	2	STOJT	100	200	100.0%
Aircraft Cargo Handling Supervisors	3,10	WE	200	400	100.0%
Agricultural Equipment Operators	10	STOJT	100	200	100.0%
Desktop Publishers	3,7,9,11,12,15	LTOJT	2,700	4,800	77.8%
Physical Therapist Aides	13,14	MTOJT	2,200	3,800	72.7%
Social and Human Service Assistants	2,3,7,12,13,14,15	MTOJT	13,900	24,000	72.7%
Electrical Power-Line Installers and Repairers	7,11,15	LTOJT	1,400	2,400	71.4%
Physical Therapist Assistants	3,13	MTOJT	2,300	3,900	69.6%
Textile Bleaching and Dyeing Machine Operators and Tenders	3	MTOJT	600	1,000	66.7%
Personal and Home Care Aides	13,14,15	STOJT	14,900	24,400	63.8%
Home Health Aides	2,3,13,14	STOJT	15,700	24,800	58.0%
Pharmacy Technicians	2,3,4,10,13	MTOJT	11,100	17,500	57.7%
Coin, Vending, and Amusement Machine Servicers and Repairers	1,3,12	LTOJT	900	1,400	55.6%
Plant and System Operators, All Other	2,9,11	LTOJT	2,200	3,400	54.5%
Cabinetmakers and Bench Carpenters	1,3,6,7,10	LTOJT	2,500	3,800	52.0%
Medical Assistants	2,3,4,7,11,12,13,14,14	MTOJT	51,000	77,100	51.2%
Dental Assistants	2,3,4,13	MTOJT	40,100	60,300	50.4%
Stonemasons	1,7	LTOJT	600	900	50.0%
Medical Equipment Preparers	13	MTOJT	600	900	50.0%
Heat Treating Equipment Setters, Operators, and Tenders, Metal and Plastic	5	MTOJT	200	300	50.0%
Forging Machine Setters, Operators, and Tenders, Metal and Plastic	3	MTOJT	400	600	50.0%
Chemical Equipment Operators and Tenders	5	MTOJT	200	300	50.0%
Child Care Workers	2,3,12,13,14	STOJT	25,500	38,100	49.4%
Musicians and Singers	3,11,12	LTOJT	16,400	24,400	48.8%
Electrical & Electronic Equipment Mechs, Installers & Repairers, All Other	1,3,7,9,10,11,12,15	LTOJT	2,100	3,100	47.6%
Fitness Trainers and Aerobics Instructors	3,12	MTOJT	39,600	58,200	47.0%
Recreational Vehicle Service Technicians	1,3,10	LTOJT	900	1,300	44.4%
Earth Drillers, Except Oil and Gas	1,3,7,15	MTOJT	1,600	2,300	43.8%
Weighers, Measurers, Checkers, and Samplers, Recordkeeping	3,5,8,9,10,11	STOJT	3,600	5,100	41.7%
Office and Administrative Support Workers, All Other	2,3,5,7,8,10,11,12,13,14,15	STOJT	2,900	4,100	41.4%
Extruding and Drawing Machine Setters, Operators, and Tenders, Metal and Plastic	3,11	MTOJT	2,200	3,100	40.9%
Correctional Officers and Jailers	2	LTOJT	27,200	38,000	39.7%
Healthcare Support Workers, All Other	2,3,4,7,12,13,14,15	MTOJT	18,400	25,700	39.7%
Nursing Aides, Orderlies, and Attendants	2,3,4,7,12,13,14,15	STOJT	15,400	21,500	39.6%
Helpers, Construction Trades, All Other	1,2,3,7,12,15	STOJT	3,800	5,300	39.5%
Securities, Commodities, and Financial Services Sales Agents	3,4,6,7,12,15	LTOJT	7,900	11,000	39.2%
Vocational Education Teachers Postsecondary	2,3,7,9,10,11,12,14,15	WE	17,600	24,500	39.2%
Metal Workers and Plastic Workers, All Other	3,5,10	MTOJT	2,300	3,200	39.1%
Customer Service Representatives	All Industries	STOJT	194,000	268,900	38.6%
First-Line Supervisors/Managers of Correctional Officers	2,3,7,12,15	WE	5,700	7,900	38.6%
Medical Equipment Repairers	1,3,13	LTOJT	1,300	1,800	38.5%
Sales and Related Workers, All Other	1 to 15	MTOJT	72,700	100,500	38.2%
Amusement and Recreation Attendants	2,3,12,15	STOJT	33,400	46,100	38.0%
Farmworkers and Laborers, Crop, Nursery, and Greenhouse	3,10	STOJT	2,400	3,300	37.5%
Self-Enrichment Education Teachers	3,7,10,11,12,14,15	WE	20,300	27,900	37.4%
Building & Grounds Cleaning & Maintenance Workers, All Other	1,2,3,10,12,13,14,15	STOJT	6,500	8,900	36.9%
Insulation Workers	1,3,7	MTOJT	3,800	5,200	36.8%
Terrazzo Workers and Finishers	1,3,7	LTOJT	1,100	1,500	36.4%
Furniture Finishers	6,10	LTOJT	1,100	1,500	36.4%
Correspondence Clerks	3,4,9,10,11,13	STOJT	1,100	1,500	36.4%
Human Resources Assistants, Except Payroll and Timekeeping	All Industries	STOJT	14,700	20,000	36.1%
Security Guards	2,3,5,7,10,11,12,13,14,15	STOJT	277,400	376,700	35.8%

## APPENDIX A

**FIGURE A2—CONTINUED**  
**LOW SKILL OCCUPATIONS IN SELECTED INDUSTRIES**

<i>Occupation</i>	<i>Industry</i>	<i>Training Level</i>	<i>Employment 2000</i>	<i>Projected Employment 2010</i>	<i>Average Occupation Growth Across Selected Industries 2000-2010</i>
Reservation and Transportation Ticket Agents and Travel Clerks	3,11,12,13	STOJT	5,600	7,600	35.7%
Pharmacy Aides	2,10,13	MTOJT	5,900	8,000	35.6%
Millwrights	1,3,7,15	LTOJT	2,000	2,700	35.0%
Sheet Metal Workers	1,2,3,5,7,12,15	MTOJT	15,500	20,900	34.8%
Computer, Automated Teller, and Office Machine Repairers	1,3,5,6,9,10,11,12	LTOJT	23,900	32,200	34.7%
Production Workers, All Other	2,3,5,9,10,11,14	MTOJT	19,400	26,100	34.5%
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	1,2,3,7,10,12,15	LTOJT	11,500	15,400	33.9%
Transportation Inspectors	2,3,10	WE	600	800	33.3%
Statistical Assistants	2,3,9,11,13	MTOJT	600	800	33.3%
Sewers, Hand	3	MTOJT	300	400	33.3%
Rail Yard Engineers, Dinkey Operators, and Hostlers	3	WE	300	400	33.3%
Petroleum Pump System Operators, Refinery Operators, and Gaugers	15	LTOJT	300	400	33.3%
Paperhangers	1,15	MTOJT	600	800	33.3%
Mechanical Door Repairers	1	LTOJT	300	400	33.3%
Material Moving Workers, All Other	2,3,9,10,11,12,14	STOJT	4,800	6,400	33.3%
Hoist and Winch Operators	3	MTOJT	600	800	33.3%
Grinding and Polishing Workers, Hand	1,3,5	STOJT	300	400	33.3%
Food Servers, Nonrestaurant	2,3,12,14	STOJT	600	800	33.3%
Floor Layers, Except Carpet, Wood, and Hard Tiles	1,10	MTOJT	2,100	2,800	33.3%
Cutters and Trimmers, Hand	1,3,7	STOJT	300	400	33.3%
Landscaping and Groundskeeping Workers	1,2,3,7,10,11,12,13,14,15	STOJT	50,400	67,100	33.1%
Interviewers, Except Eligibility and Loan	2,3,4,7,11,12,13,14,15	STOJT	12,400	16,500	33.1%
Pest Control Workers	2,3	MTOJT	11,500	15,300	33.0%
Receptionists and Information Clerks	All Industries	STOJT	107,000	142,300	33.0%
Hazardous Materials Removal Workers	1,2,3,7,12,15	LTOJT	11,000	14,600	32.7%
Cooks, Short Order	3,10,12	STOJT	4,600	6,100	32.6%
Structural Metal Fabricators and Fitters	1,3,5,7,15	MTOJT	4,300	5,700	32.6%
First-Line Supervisors/Managers of Transportation and Material-Moving Machine and Vehicle Operators	2,3,7,9,10,11,12,13,14,15	WE	8,600	11,400	32.6%
Massage Therapists	3,12,13	MTOJT	4,000	5,300	32.5%
Financial, Information, & Record Clerks, All Other	2,3,4,5,6,7,8,9,10,11,12,13,14,15	STOJT	19,700	26,100	32.5%
Home Appliance Repairers	1,3,10	LTOJT	3,400	4,500	32.4%
Excavating and Loading Machine and Dragline Operators	1,3,7,12,15	MTOJT	3,100	4,100	32.3%
Counter and Rental Clerks	1,3,7,10,11,12,15	STOJT	35,100	46,300	31.9%
Molding, Coremaking, and Casting Machine Setters, Operators, and Tenders, Metal and Plastic	3,5,11	MTOJT	2,200	2,900	31.8%
Construction Trades & Related Workers, All Other	1,2,3,7,10,11,12,14,15	MTOJT	12,000	15,800	31.7%
Textile Cutting Machine Setters, Operators, and Tenders	3,11	MTOJT	1,900	2,500	31.6%
Camera Operators, Television, Video, and Motion Picture	3,11	MTOJT	9,300	12,200	31.2%
First-Line Supervisors/Managers of Personal Service Workers	2,3,10,11,12,13,14	WE	7,100	9,300	31.0%
Cost Estimators	1,3,4,5,6,7,9,10,11,12,15	WE	21,700	28,400	30.9%
Coaches and Scouts	3,12,14	LTOJT	6,200	8,100	30.6%
Assemblers and Fabricators, All Other	1,3,5,7,10,11,14	WE	23,500	30,700	30.6%
Adult Literacy, Remedial Education, and GED Teachers and Instructors	2,3,12,14	WE	9,200	12,000	30.4%
Insurance Claims and Policy Processing Clerks	3,4,6,7,12,13,15	MTOJT	3,300	4,300	30.3%
Bakers	10	MTOJT	10,300	13,400	30.1%
Photographic Process Workers	3,10,11	LTOJT	1,000	1,300	30.0%
Library Technicians	2,11,12	STOJT	13,000	16,900	30.0%
Glaziers	1,3,7,10,12	LTOJT	12,100	15,700	29.8%
Electricians	1,2,3,5,7,9,10,11,12,15	LTOJT	60,500	78,300	29.4%
Police and Sheriff's Patrol Officers	2,12	LTOJT	61,800	79,900	29.3%
Transportation Workers, All Other	2,3,10,12	MTOJT	2,400	3,100	29.2%
Elevator Installers and Repairers	1,2,3,7	LTOJT	7,300	9,400	28.8%
Woodworking Machine Setters, Operators, and Tenders, Except Sawing	10	MTOJT	700	900	28.6%
Rolling Machine Setters, Operators, and Tenders, Metal and Plastic	3	MTOJT	700	900	28.6%
Proofreaders and Copy Markers	3,7,11,12,15	STOJT	1,400	1,800	28.6%
Motor Vehicle Operators, All Other	2,3,7,10,11,12,13,14,15	STOJT	9,100	11,700	28.6%
Installation, Maintenance, and Repair Workers, All Other	1,2,3,5,7,1,11,12,15	LTOJT	10,500	13,500	28.6%
Floor Sanders and Finishers	1	MTOJT	700	900	28.6%
Athletic Trainers	3,12	LTOJT	700	900	28.6%
Drywall and Ceiling Tile Installers	1,3,7,10,15	MTOJT	27,000	34,700	28.5%
Inspectors, Testers, Sorters, Samplers, and Weighers	1,2,3,6,7,9,10,11,12,15	WE	17,200	22,100	28.5%
Bill and Account Collectors	1,2,3,4,6,9,10,11,12,13,14,15	STOJT	34,800	44,700	28.4%
Library Assistants, Clerical	2,11,12	STOJT	7,400	9,500	28.4%

# APPENDIX A

**FIGURE A2—CONTINUED**  
**LOW SKILL OCCUPATIONS IN SELECTED INDUSTRIES**

<i>Occupation</i>	<i>Industry</i>	<i>Training Level</i>	<i>Employment 2000</i>	<i>Projected Employment 2010</i>	<i>Average Occupation Growth Across Selected Industries 2000-2010</i>
Tank Car, Truck, and Ship Loaders	3	MTOJT	3,200	4,100	28.1%
Taxi Drivers and Chauffeurs	3,10,13,14	STOJT	6,100	7,800	27.9%
Counter Attendants, Cafeteria, Food Concession, and Coffee Shop	2,3,7,10,11,12,14,15	STOJT	36,000	46,000	27.8%
Personal Care and Service Workers, All Other	2,3,10,11,12,14	MTOJT	11,900	15,200	27.7%
First-Line Supervisors/Managers, Protective Service Workers, All Other	2,3,10,11,12	WE	10,100	12,900	27.7%
Structural Iron and Steel Workers	1,3,7,15	LTOJT	16,300	20,800	27.6%
Truck Drivers, Heavy and Tractor-Trailer	1,2,3,7,10,12,13,15	STOJT	90,400	115,300	27.5%
Helpers—Brickmasons, Blockmasons, Stonemasons, and Tile and Marble Setters	1,3,7	STOJT	6,200	7,900	27.4%
Power Plant Operators	2	LTOJT	1,100	1,400	27.3%
Plating and Coating Machine Setters, Operators, and Tenders, Metal and Plastic	1,3,5,7	MTOJT	1,100	1,400	27.3%
Food Preparation Workers	2,3,10,11,12,13,14	STOJT	30,700	39,000	27.0%
Reinforcing Iron and Rebar Workers	1,3,7,15	LTOJT	13,000	16,500	26.9%
Entertainers and Performers, Sports and Related Workers, All Other	3,12	LTOJT	5,200	6,600	26.9%
Truck Drivers, Light or Delivery Services	1,2,3,5,6,7,9,10,11,12,13,14,15	STOJT	71,100	90,200	26.9%
Carpenters	1,2,3,7,10,11,12,15	LTOJT	130,400	165,300	26.8%
Protective Service Workers, All Other	2,3,7,10,11,12,15	STOJT	28,100	35,600	26.7%
Dispatchers, Except Police, Fire, and Ambulance	1,2,3,7,9,10,11,12,13,14,15	MTOJT	15,000	19,000	26.7%
Construction Laborers	1,2,3,7,10,15	MTOJT	121,600	153,100	25.9%
Office Clerks, General	All Industries	STOJT	291,700	367,100	25.8%
Opticians, Dispensing	3,10,13	LTOJT	3,100	3,900	25.8%
Electro-Mechanical Technicians	1,2,3,5,7,8,10,11,12,15	WE	3,900	4,900	25.6%
Tile and Marble Setters	1,3,7	LTOJT	6,800	8,500	25.0%
Riggers	1,3,7,11	LTOJT	800	1,000	25.0%
Printing Workers, All Other	3,11	MTOJT	400	500	25.0%
Parking Enforcement Workers	2,12	STOJT	1,200	1,500	25.0%
Nonfarm Animal Caretakers	2,3	STOJT	1,600	2,000	25.0%
Electric Motor, Power Tool, and Related Repairers	1,3	LTOJT	1,600	2,000	25.0%
Control and Valve Installers and Repairers, Except Mechanical Door	2	LTOJT	400	500	25.0%
Animal Control Workers	2,3	STOJT	1,200	1,500	25.0%
Ambulance Drivers and Attendants, Except Emergency Medical Technicians	2,13	MTOJT	1,200	1,500	25.0%
Air Transportation Workers, All Other	3	LTOJT	800	1,000	25.0%
Stock Clerks and Order Fillers	All Industries	STOJT	102,700	128,100	24.7%
First-Line Supervisors/Managers of Food Preparation and Serving Workers	2,3,7,10,11,12,14,15	WE	17,800	22,200	24.7%
First-Line Supervisors/Managers of Construction Trades and Extraction Workers	1,2,3,7,10,11,12,15	WE	50,100	62,300	24.4%
Conveyor Operators and Tenders	3,10,11	MTOJT	13,300	16,500	24.1%
Mobile Heavy Equipment Mechanics, Except Engines	1,2,3,7,10,12,15	LTOJT	9,600	11,900	24.0%
Plasterers and Stucco Masons	1,3,7	LTOJT	16,300	20,200	23.9%
Automotive Service Technicians and Mechanics	1,2,3,7,10,11,12,13,15	LTOJT	37,300	46,200	23.9%
Vocational Education Teachers, Secondary School	2,12,14	WE	7,200	8,900	23.6%
Transit and Railroad Police	2	MTOJT	1,700	2,100	23.5%
First-Line Supervisors/Managers of Helpers, Laborers, and Material Movers, Hand	2,3,5,7,9,10,11,12,15	WE	8,500	10,500	23.5%
First-Line Supervisors/Managers of Mechanics, Installers, and Repairers	1,2,3,5,7,10,11,12,13,15	WE	25,200	31,100	23.4%
Packers and Packagers, Hand	3,5,8,9,10,11,14	STOJT	96,300	118,800	23.4%
Telemarketers	1,3,4,6,7,9,10,11,12,13,14,15	STOJT	50,200	61,800	23.1%
Textile, Apparel, and Furnishings Workers, All Other	3,10	LTOJT	5,200	6,400	23.1%
Packaging and Filling Machine Operators and Tenders	3,5,9,10,11	MTOJT	11,700	14,400	23.1%
Retail Salespersons	1,2,3,6,7,10,11,12,15	STOJT	419,300	515,700	23.0%
Janitors and Cleaners, Except Maids and Housekeeping Cleaners	All Industries	STOJT	172,500	212,100	23.0%
Recreation Workers	2,3,12,13,14	MTOJT	23,600	29,000	22.9%
Cashiers	2,3,6,10,11,12,13,14	STOJT	310,900	381,800	22.8%
First-Line Supervisors/Managers of Retail Sales Workers	1,3,6,9,10,11,12,14	LTOJT	123,200	151,000	22.6%
Telecommunications Line Installers and Repairers	1,2,7,9,10,11,15	LTOJT	18,800	23,000	22.3%
Semiconductor Processors	5	MTOJT	11,200	13,700	22.3%
Claims Adjusters, Examiners, and Investigators	2,3,4,6,7,9,11,12,13,15	LTOJT	26,000	31,800	22.3%
Vocational Education Teachers, Middle School	12	WE	900	1,100	22.2%
Fire Inspectors and Investigators	2	WE	900	1,100	22.2%
Helpers—Installation, Maintenance, and Repair Workers	1,2,3,5,7,9,10,11,12,15	STOJT	11,300	13,800	22.1%
Demonstrators and Product Promoters	1,3,7,10,11,12,15	STOJT	28,100	34,300	22.1%
Laborers and Freight, Stock, and Material Movers, Hand	1,2,3,5,6,7,9,10,11,12,14,15	STOJT	190,400	232,100	21.9%
Production, Planning, and Expediting Clerks	1,2,3,4,5,8,9,10,11,12,13,15	STOJT	71,900	87,600	21.8%
Paving, Surfacing, and Tamping Equipment Operators	1,2,3,7,15	MTOJT	4,600	5,600	21.7%

# APPENDIX A

**FIGURE A2—CONTINUED**  
**LOW SKILL OCCUPATIONS IN SELECTED INDUSTRIES**

<i>Occupation</i>	<i>Industry</i>	<i>Training Level</i>	<i>Employment 2000</i>	<i>Projected Employment 2010</i>	<i>Average Occupation Growth Across Selected Industries 2000-2010</i>
Automotive Body and Related Repairers	2,10	LTOJT	4,600	5,600	21.7%
Mail Clerks and Mail Machine Operators, Except Postal Service	2,3,4,5,6,7,8,9,10,11,12,13,15	STOJT	20,300	24,700	21.7%
Helpers—Painters, Paperhangers, Plasterers, and Stucco Masons	1,3,7,15	STOJT	8,800	10,700	21.6%
Bus Drivers, Transit and Intercity	2,3,11,12,13,14	MTOJT	25,100	30,500	21.5%
Maintenance Workers, Machinery	2,3,5,10	LTOJT	1,400	1,700	21.4%
Coil Winders, Tapers, and Finishers	5,10,11	STOJT	1,400	1,700	21.4%
Bicycle Repairers	10	MTOJT	1,400	1,700	21.4%
Managers, All Other	1,2,3,4,5,6,7,9,10,11,12,13,14,15	WE	53,500	64,900	21.3%
Brickmasons and Blockmasons	1,3,7,15	LTOJT	3,300	4,000	21.2%
Butchers and Meat Cutters	10	LTOJT	1,900	2,300	21.1%
Helpers—Roofers	1	STOJT	2,400	2,900	20.8%
Bus and Truck Mechanics and Diesel Engine Specialists	1,2,3,7,10,12,13,15	LTOJT	16,800	20,300	20.8%
Helpers—Production Workers	1,2,3,5,7,8,10,11	STOJT	18,900	22,800	20.6%
Roofers	1,7,12	MTOJT	16,600	20,000	20.5%
Audio and Video Equipment Technicians	2,3,9,11,12	MTOJT	8,800	10,600	20.5%
Laundry and Dry-Cleaning Workers	2,3,7,12,13,14,15	MTOJT	14,200	17,100	20.4%
Helpers—Carpenters	1,3,7,15	STOJT	10,800	13,000	20.4%
Water and Liquid Waste Treatment Plant and System Operators	2,3	LTOJT	6,500	7,800	20.0%
Precision Instrument and Equipment Repairers, All Other	1,3	LTOJT	1,000	1,200	20.0%
Police, Fire, and Ambulance Dispatchers	2,13	MTOJT	5,000	6,000	20.0%
Graders and Sorters, Agricultural Products	3,10	STOJT	1,000	1,200	20.0%
Fish and Game Wardens	2	MTOJT	500	600	20.0%
Cutting and Slicing Machine Setters, Operators, and Tenders	3,5,10	MTOJT	500	600	20.0%
Court, Municipal, and License Clerks	2	MTOJT	9,000	10,800	20.0%
Helpers—Electricians	1,2,3,7,15	STOJT	11,100	13,300	19.8%
Shipping, Receiving, and Traffic Clerks	1 to 15	STOJT	84,300	101,000	19.8%
Helpers—Pipelayers, Plumbers, Pipefitters, and Steamfitters	1,2,3,7,15	STOJT	7,600	9,100	19.7%
Pipelayers	1,2,3,7,15	MTOJT	6,100	7,300	19.7%
Detectives and Criminal Investigators	2	WE	6,200	7,400	19.4%
Painters, Construction and Maintenance	1,2,3,7,10,12,15	MTOJT	59,700	71,000	18.9%
Electrical and Electronic Equipment Assemblers	3,9,10,11	WE	3,200	3,800	18.8%
First-Line Supervisors/Managers of Police and Detectives	2	WE	10,800	12,800	18.5%
Sewing Machine Operators	3,10	MTOJT	3,300	3,900	18.2%
Farming, Fishing, & Forestry Workers, All Other	2,10,12	STOJT	3,300	3,900	18.2%
Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	3,5,11	MTOJT	2,200	2,600	18.2%
Machinists	1,3,5,7,8,10,11,12,15	LTOJT	13,900	16,400	18.0%
Carpet Installers	1,10	MTOJT	7,800	9,200	17.9%
Industrial Machinery Mechanics	2,3,5,10,11,12,15	LTOJT	2,800	3,300	17.9%
Pressers, Textile, Garment, and Related Materials	3	STOJT	11,800	13,900	17.8%
Industrial Truck and Tractor Operators	1,2,3,5,7,8,10,11,12,15	STOJT	27,600	32,500	17.8%
Cooks, Institution and Cafeteria	2,3,7,10,12,13,14,15	LTOJT	14,700	17,300	17.7%
Fence Erectors	1,3,7,10	MTOJT	12,100	14,200	17.4%
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	1,3,5,7,9,10,11,12,13,15	MTOJT	44,300	51,900	17.2%
First-Line Supervisors/Managers of Non-Retail Sales Workers	3,4,5,6,7,8,9,10,11,12,15	LTOJT	25,500	29,800	16.9%
Vehicle & Mobile Equipment Mechs, Installers, & Repairers, All Others	1,2,3,10	LTOJT	1,200	1,400	16.7%
Prepress Technicians and Workers	2,3,11	LTOJT	1,800	2,100	16.7%
Derrick Operators, Oil and Gas	15	MTOJT	600	700	16.7%
Baggage Porters and Bellhops	3,11,12	STOJT	1,200	1,400	16.7%
Airfield Operations Specialists	2,3	LTOJT	600	700	16.7%
Operating Engineers and Other Construction Equipment Operators	1,2,3,7,10,15	MTOJT	39,800	46,300	16.3%
Compliance Officers, Except Agriculture, Construction, Health and Safety, and Transportation	2,3,4,5,6,7,9,11,12,15	WE	13,500	15,700	16.3%
Procurement Clerks	1,5,7,8,9,10,11	STOJT	2,500	2,900	16.0%
Billing and Posting Clerks and Machine Operators	1,2,3,4,5,6,7,9,10,11,12,13,14,15	STOJT	40,800	47,300	15.9%
Driver/Sales Workers	2,3,7,10,11,12,15	STOJT	11,300	13,100	15.9%
First-Line Supervisors/Managers of Office and Administrative Support Workers	All Industries	MTOJT	126,300	146,400	15.9%
Advertising Sales Agents	3,10,11	MTOJT	12,800	14,800	15.6%
File Clerks	1,3,4,7,9,10,11,12,13,14,15	STOJT	25,000	28,900	15.6%
Bus Drivers, School	12,13,14	STOJT	19,900	23,000	15.6%
Aircraft Mechanics and Service Technicians	2,3,10,13	LTOJT	2,600	3,000	15.4%
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	1,3,4,5,7,8,9,10,11,12,15	MTOJT	117,900	136,000	15.4%
Plumbers, Pipefitters, and Steamfitters	1,2,3,7,12,15	LTOJT	39,900	46,000	15.3%



# APPENDIX A

FIGURE A2—CONTINUED  
LOW SKILL OCCUPATIONS IN SELECTED INDUSTRIES

Occupation	Industry	Training Level	Employment 2000	Projected Employment 2010	Average Occupation Growth Across Selected Industries 2000-2010
Printing Machine Operators	2,3,5,9,10,11,12	MTOJT	7,900	9,100	15.2%
Meat, Poultry, and Fish Cutters and Trimmers	10	STOJT	3,300	3,800	15.2%
Credit Authorizers, Checkers, and Clerks	3,4,6,10	STOJT	4,000	4,600	15.0%
Fire Fighters	2,12	LTOJT	24,900	28,600	14.9%
Bookkeeping, Accounting, and Auditing Clerks	All Industries	MTOJT	143,100	163,700	14.4%
Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic	3,5	MTOJT	700	800	14.3%
First-Line Supervisors/Managers of Landscaping, Lawn Service, and Groundskeeping Workers	2,3,7,12,14,15	WE	2,800	3,200	14.3%
Commercial Pilots	3,12,13	LTOJT	700	800	14.3%
Appraisers and Assessors of Real Estate	2,4,6,15	WE	3,500	4,000	14.3%
Maintenance and Repair Workers, General	All Industries	LTOJT	77,300	88,200	14.1%
Dental Laboratory Technicians	13	LTOJT	4,300	4,900	14.0%
Photographic Processing Machine Operators	3,10,11	STOJT	6,700	7,600	13.4%
Crane and Tower Operators	1,3,7,10,15	MTOJT	1,500	1,700	13.3%
Computer-Controlled Machine Tool Operators, Metal and Plastic	5,8,11	MTOJT	2,300	2,600	13.0%
Cement Masons and Concrete Finishers	1,2,3,7,15	LTOJT	17,700	20,000	13.0%
Team Assemblers	1,3,5,7,9,10,11,12,15	STOJT	33,100	37,400	13.0%
First-Line Supervisors/Managers of Fire Fighting and Prevention Workers	2	WE	7,800	8,800	12.8%
Service Station Attendants	2,3	STOJT	800	900	12.5%
Farm Equipment Mechanics	1,3,10	LTOJT	2,400	2,700	12.5%
Bindery Workers	3,11	STOJT	3,200	3,600	12.5%
Food Service Managers	3,10,12,14	WE	1,700	1,900	11.8%
New Accounts Clerks	6	WE	7,700	8,600	11.7%
Couriers and Messengers	2,3,4,6,7,11,12,13,15	STOJT	5,300	5,900	11.3%
First-Line Supervisors/Managers of Production and Operating Workers	1,2,3,5,7,8,9,10,11,12,14,15	WE	27,400	30,500	11.3%
Cleaners of Vehicles and Equipment	1,2,3,10,13	STOJT	15,300	17,000	11.1%
Payroll and Timekeeping Clerks	All Industries	STOJT	16,600	18,400	10.8%
Title Examiners, Abstractors, and Searchers	4,11	MTOJT	3,800	4,200	10.5%
Photographers	2,3,11	MTOJT	3,800	4,200	10.5%
Tax Preparers	3	STOJT	5,400	5,900	9.3%
Stationary Engineers and Boiler Operators	2,12,13	LTOJT	2,200	2,400	9.1%
Security and Fire Alarm Systems Installers	1	LTOJT	2,200	2,400	9.1%
Forest and Conservation Workers	2,3,7,12,15	STOJT	4,400	4,800	9.1%
Financial Examiners	2,4,6	WE	1,100	1,200	9.1%
Office Machine Operators, Except Computer	2,3,5,8,9,10,11,12	STOJT	2,300	2,500	8.7%
Dining Room and Cafeteria Attendants and Bartender Helpers	3,10,12	STOJT	11,600	12,600	8.6%
Secretaries, Administrative Assistants, & Other Office Support Workers	2,3,4,6,7,9,10,11,12,13,14,15	STOJT	72,000	78,200	8.6%
Highway Maintenance Workers	2	STOJT	3,500	3,800	8.6%
Tellers	3,6,7,11,12,15	STOJT	1,200	1,300	8.3%
Refuse and Recyclable Material Collectors	2,3	STOJT	11,200	12,100	8.0%
Insurance Appraisers, Auto Damage	3,4	MTOJT	1,300	1,400	7.7%
Construction and Building Inspectors	2,3,12	WE	3,900	4,200	7.7%
Roustabouts, Oil and Gas	3,15	STOJT	1,400	1,500	7.1%
Outdoor Power Equipment and Other Small Engine Mechanics	1,2,3,10,12	LTOJT	1,400	1,500	7.1%
Tire Repairers and Changers	3,10	STOJT	6,000	6,400	6.7%
Private Detectives and Investigators	2,6,10	MTOJT	1,700	1,800	5.9%
Locksmiths and Safe Repairers	1,2,3,11,12	MTOJT	3,700	3,900	5.4%
Electromechanical Equipment Assemblers	3,5,8,10	WE	5,600	5,900	5.4%
Order Clerks	1,3,9,10,11,12	STOJT	4,100	4,300	4.9%
Word Processors and Typists	3,4,7,9,10,11,12,13,14,15	MTOJT	4,700	4,900	4.3%
News Analysts, Reporters and Correspondents	11	WE	2,400	2,500	4.2%
Cooks, Restaurant	2,3,12	LTOJT	5,400	5,600	3.7%
Parts Salespersons	1,10	MTOJT	6,500	6,700	3.1%
Waiters and Waitresses	3,10,12,15	STOJT	15,000	15,400	2.7%
Computer Operators	3,4,5,6,7,8,9,10,11,12,13,15	MTOJT	15,400	15,800	2.6%
Combined Food Preparation and Serving Workers, Including Fast Food	2,3,7,10,11,12,13,15	STOJT	19,600	20,100	2.6%
Woodworkers, All Other	10	LTOJT	200	200	0.0%
Veterinary Assistants and Laboratory Animal Caretakers	3	STOJT	300	300	0.0%
Upholsterers	10	LTOJT	600	600	0.0%
Traffic Technicians	2	MTOJT	300	300	0.0%
Tool Grinders, Filers, and Sharpeners	1,3	LTOJT	600	600	0.0%
Tool and Die Makers	5,8	LTOJT	600	600	0.0%
Timing Device Assemblers, Adjusters, and Calibrators	5	LTOJT	400	400	0.0%
Telephone Operators	2	MTOJT	100	100	0.0%

## APPENDIX A

**FIGURE A2—CONTINUED**  
**LOW SKILL OCCUPATIONS IN SELECTED INDUSTRIES**

<i>Occupation</i>	<i>Industry</i>	<i>Training Level</i>	<i>Employment 2000</i>	<i>Projected Employment 2010</i>	<i>Average Occupation Growth Across Selected Industries 2000-2010</i>
Tailors, Dressmakers, and Custom Sewers	3,10,11	WE	2,300	2,300	0.0%
Switchboard Operators, Including Answering Service	All Industries	STOJT	8,900	8,900	0.0%
Subway and Streetcar Operators	2	MTOJT	300	300	0.0%
Service Unit Operators, Oil, Gas, and Mining	15	MTOJT	1,000	1,000	0.0%
Septic Tank Servicers and Sewer Pipe Cleaners	1,3	MTOJT	1,400	1,400	0.0%
Segmental Pavers	1	MTOJT	100	100	0.0%
Sawing Machine Setters, Operators, and Tenders, Wood	10	MTOJT	200	200	0.0%
Rail Car Repairers	13	LTOJT	100	100	0.0%
Radio Operators	2,11	MTOJT	200	200	0.0%
Pump Operators, Except Wellhead Pumps	3,15	MTOJT	200	200	0.0%
Power Distributors and Dispatchers	2	LTOJT	200	200	0.0%
Postal Service Mail Carriers	2	STOJT	100	100	0.0%
Pile-Driver Operators	7,15	MTOJT	800	800	0.0%
Pesticide Handlers, Sprayers, and Applicators, Vegetation	2,10	MTOJT	200	200	0.0%
Paper Goods Machine Setters, Operators, and Tenders	11	MTOJT	200	200	0.0%
Painting, Coating, and Decorating Workers	3,10,11	MTOJT	500	500	0.0%
Painters, Transportation Equipment	10	MTOJT	500	500	0.0%
Ophthalmic Laboratory Technicians	10	LTOJT	300	300	0.0%
Numerical Tool and Process Control Programmers	5	WE	100	100	0.0%
Motorcycle Mechanics	10	LTOJT	1,100	1,100	0.0%
Motorboat Operators	2	MTOJT	200	200	0.0%
Motorboat Mechanics	10	LTOJT	400	400	0.0%
Motion Picture Projectionists	3	STOJT	200	200	0.0%
Molders, Shapers, and Casters, Except Metal and Plastic	5	STOJT	100	100	0.0%
Mixing and Blending Machine Setters, Operators, and Tenders	5,10	MTOJT	200	200	0.0%
Manufactured Building and Mobile Home Installers	10	LTOJT	100	100	0.0%
Machine Feeders and Offbearers	11	STOJT	200	200	0.0%
Log Graders and Scalers	3,11	STOJT	200	200	0.0%
Locomotive Engineers	2	WE	100	100	0.0%
Loan Interviewers and Clerks	4	STOJT	200	200	0.0%
Lay-Out Workers, Metal and Plastic	5	LTOJT	100	100	0.0%
Lathe and Turning Machine Tool Setters, Operators, and Tenders Metal and Plastic	3	MTOJT	100	100	0.0%
Job Printers	2,3,11	LTOJT	1,200	1,200	0.0%
Jewelers and Precious Stone and Metal Workers	10	LTOJT	300	300	0.0%
Helpers—Extraction Workers	15	STOJT	400	400	0.0%
Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic	3,5	MTOJT	400	400	0.0%
Furnace, Kiln, Oven, Drier, and Kettle Operators and Tenders	12	MTOJT	100	100	0.0%
Forest Fire Inspectors and Prevention Specialists	2	WE	100	100	0.0%
Food Preparation and Serving Related Workers, All Other	2,3,7,10,12,15	STOJT	4,200	4,200	0.0%
Flight Attendants	3,13	LTOJT	500	500	0.0%
Fiberglass Laminators and Fabricators	10	STOJT	100	100	0.0%
Extraction Workers, All Other	15	MTOJT	600	600	0.0%
Etchers and Engravers	5	LTOJT	200	200	0.0%
Eligibility Interviewers, Government Programs	4,14	MTOJT	300	300	0.0%
Drilling and Boring Machine Tool Setters, Operators, and Tenders, Metal and Plastic	5	MTOJT	500	500	0.0%
Door-To-Door Sales Workers, News and Street Vendors, and Related Workers	3,6,10,11	STOJT	900	900	0.0%
Cooks, Fast Food	3,10,11	STOJT	800	800	0.0%
Communications Equipment Operators, All Other	3	MTOJT	100	100	0.0%
Coating, Painting, and Spraying Machine Setters, Operators, and Tenders	2,5	MTOJT	600	600	0.0%
Cleaning, Washing, and Metal Pickling Equipment Operators and Tenders	5	STOJT	100	100	0.0%
Chefs and Head Cooks	3,12	WE	1,400	1,400	0.0%
Cargo and Freight Agents	3,10	STOJT	600	600	0.0%
Camera and Photographic Equipment Repairers	1,3	MTOJT	200	200	0.0%
Brokerage Clerks	4,6,12	STOJT	600	600	0.0%
Bookbinders	2	MTOJT	100	100	0.0%
Boilermakers	1,3,7	LTOJT	300	300	0.0%
Airline Pilots, Copilots, and Flight Engineers	3	LTOJT	200	200	0.0%

Sacramento Regional Research Institute, October 2003

Data Source: Employment Development Department, Labor Market Information

## APPENDIX A

**FIGURE A3**  
**LOW AND MODERATE SKILL OCCUPATIONS IN SELECTED INDUSTRIES**

<i>Occupation</i>	<i>Industry</i>	<i>Training Level</i>	<i>Employment 2000</i>	<i>Projected Employment 2010</i>	<i>Average Occupation Growth Across Selected Industries 2000-2010</i>
Avionics Technicians	3,13	PSVE	100	300	200.0%
Real Estate Brokers	11,15	WE	100	300	200.0%
Extruding, Forming, Pressing, and Compacting Machine Setters, Operators, and Tenders	3,10	MTOJT	200	500	150.0%
Occupational Therapist Assistants	2,13	MTOJT	400	900	125.0%
Geological and Petroleum Technicians	3,7,11,12,15	AD	500	1,000	100.0%
Chemical Technicians	3,5	AD	100	200	100.0%
Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	5,8	MTOJT	300	600	100.0%
Purchasing Agents and Buyers, Farm Products	2,5,8,10	WE	300	600	100.0%
Occupational Therapist Aides	13	MTOJT	200	400	100.0%
Hotel, Motel, and Resort Desk Clerks	3,7,12,15	STOJT	400	800	100.0%
Food Cooking Machine Operators and Tenders	10	MTOJT	100	200	100.0%
Farmworkers, Farm and Ranch Animals	3	STOJT	0	100	100.0%
Crushing, Grinding, and Polishing Machine Setters, Operators, and Tenders	3,15	MTOJT	100	200	100.0%
Bailiffs	2	STOJT	100	200	100.0%
Aircraft Cargo Handling Supervisors	3,10	WE	200	400	100.0%
Agricultural Equipment Operators	10	STOJT	100	200	100.0%
Desktop Publishers	3,7,9,11,12,15	LTOJT	2,700	4,800	77.8%
Surgical Technologists	2,3,13	PSVE	1,900	3,300	73.7%
Physical Therapist Aides	13,14	MTOJT	2,200	3,800	72.7%
Social and Human Service Assistants	2,3,7,12,13,14,15	MTOJT	13,900	24,000	72.7%
Electrical Power-Line Installers and Repairers	7,11,15	LTOJT	1,400	2,400	71.4%
Physical Therapist Assistants	3,13	MTOJT	2,300	3,900	69.6%
Textile Bleaching and Dyeing Machine Operators and Tenders	3	MTOJT	600	1,000	66.7%
Personal and Home Care Aides	13,14,15	STOJT	14,900	24,400	63.8%
Medical Records and Health Information Technicians	2,3,4,7,12,13,14,15	AD	8,800	14,400	63.6%
Diagnostic Medical Sonographers	2,13	AD	800	1,300	62.5%
Home Health Aides	2,3,13,14	STOJT	15,700	24,800	58.0%
Pharmacy Technicians	2,3,4,10,13	MTOJT	11,100	17,500	57.7%
Coin, Vending, and Amusement Machine Servicers and Repairers	1,3,12	LTOJT	900	1,400	55.6%
Environmental Engineering Technicians	2,3,7,12,15	AD	1,100	1,700	54.5%
Plant and System Operators, All Other	2,9,11	LTOJT	2,200	3,400	54.5%
Cabinetmakers and Bench Carpenters	1,3,6,7,10	LTOJT	2,500	3,800	52.0%
Medical Assistants	2,3,4,7,11,12,13,14,14	MTOJT	51,000	77,100	51.2%
Dental Assistants	2,3,4,13	MTOJT	40,100	60,300	50.4%
Psychiatric Technicians	2,13,14	AD	600	900	50.0%
Nuclear Medicine Technologists	13	AD	200	300	50.0%
Electrical and Electronics Installers and Repairers, Transportation Equipment	2,3,10	PSVE	600	900	50.0%
Dental Hygienists	3,13	AD	18,800	28,200	50.0%
Stonemasons	1,7	LTOJT	600	900	50.0%
Medical Equipment Preparers	13	MTOJT	600	900	50.0%
Heat Treating Equipment Setters, Operators, and Tenders, Metal and Plastic	5	MTOJT	200	300	50.0%
Forging Machine Setters, Operators, and Tenders, Metal and Plastic	3	MTOJT	400	600	50.0%
Chemical Equipment Operators and Tenders	5	MTOJT	200	300	50.0%
Child Care Workers	2,3,12,13,14	STOJT	25,500	38,100	49.4%
Musicians and Singers	3,11,12	LTOJT	16,400	24,400	48.8%
Paralegals and Legal Assistants	2,3,4,6,7,9,11,12,15	AD	6,200	9,200	48.4%
Electrical & Electronic Equipment Mechs, Installers & Repairers, All Other	1,3,7,9,10,11,12,15	LTOJT	2,100	3,100	47.6%
Fitness Trainers and Aerobics Instructors	3,12	MTOJT	39,600	58,200	47.0%
Licensed Practical and Licensed Vocational Nurses	2,3,4,7,12,13,14,15	PSVE	22,300	32,500	45.7%
Recreational Vehicle Service Technicians	1,3,10	LTOJT	900	1,300	44.4%
Earth Drillers, Except Oil and Gas	1,3,7,15	MTOJT	1,600	2,300	43.8%
Radiologic Technologists and Technicians	2,3,4,7,12,13,15	AD	7,800	11,100	42.3%
Respiratory Therapists	3,7,12,13,15	AD	1,200	1,700	41.7%
Weighers, Measurers, Checkers, and Samplers, Recordkeeping	3,5,8,9,10,11	STOJT	3,600	5,100	41.7%
Office and Administrative Support Workers, All Other	2,3,5,7,8,10,11,12,13,14,15	STOJT	2,900	4,100	41.4%
Registered Nurses	2,3,4,7,9,11,12,13,14,15	AD	67,700	95,700	41.4%
Extruding and Drawing Machine Setters, Operators, and Tenders, Metal and Plastic	3,11	MTOJT	2,200	3,100	40.9%
Correctional Officers and Jailers	2	LTOJT	27,200	38,000	39.7%
Healthcare Support Workers, All Other	2,3,4,7,12,13,14,15	MTOJT	18,400	25,700	39.7%
Nursing Aides, Orderlies, and Attendants	2,3,4,7,12,13,14,15	STOJT	15,400	21,500	39.6%
Helpers, Construction Trades, All Other	1,2,3,7,12,15	STOJT	3,800	5,300	39.5%

# APPENDIX A

**FIGURE A3—CONTINUED**  
**LOW AND MODERATE SKILL OCCUPATIONS IN SELECTED INDUSTRIES**

<i>Occupation</i>	<i>Industry</i>	<i>Training Level</i>	<i>Employment 2000</i>	<i>Projected Employment 2010</i>	<i>Average Occupation Growth Across Selected Industries 2000-2010</i>
Securities, Commodities, and Financial Services Sales Agents	3,4,6,7,12,15	LTOJT	7,900	11,000	39.2%
Vocational Education Teachers Postsecondary	2,3,7,9,10,11,12,14,15	WE	17,600	24,500	39.2%
Metal Workers and Plastic Workers, All Other	3,5,10	MTOJT	2,300	3,200	39.1%
Customer Service Representatives	1 to 15	STOJT	194,000	268,900	38.6%
First-Line Supervisors/Managers of Correctional Officers	2,3,7,12,15	WE	5,700	7,900	38.6%
Medical Equipment Repairers	1,3,13	LTOJT	1,300	1,800	38.5%
Sales and Related Workers, All Other	1 to 15	MTOJT	72,700	100,500	38.2%
Amusement and Recreation Attendants	2,3,12,15	STOJT	33,400	46,100	38.0%
Farmworkers and Laborers, Crop, Nursery, and Greenhouse	3,10	STOJT	2,400	3,300	37.5%
Self-Enrichment Education Teachers	3,7,10,11,12,14,15	WE	20,300	27,900	37.4%
Legal & Related Workers, All Other	2,3,4,5,8,9,11,12	AD	7,300	10,000	37.0%
Building & Grounds Cleaning & Maintenance Workers, All Other	1,2,3,10,12,13,14,15	STOJT	6,500	8,900	36.9%
Insulation Workers	1,3,7	MTOJT	3,800	5,200	36.8%
Terrazzo Workers and Finishers	1,3,7	LTOJT	1,100	1,500	36.4%
Furniture Finishers	6,10	LTOJT	1,100	1,500	36.4%
Correspondence Clerks	3,4,9,10,11,13	STOJT	1,100	1,500	36.4%
Human Resources Assistants, Except Payroll and Timekeeping	1 to 15	STOJT	14,700	20,000	36.1%
Medical and Clinical Laboratory Technicians	2,3,7,12,13,15	AD	7,800	10,600	35.9%
Security Guards	2,3,5,7,10,11,12,13,14,15	STOJT	277,400	376,700	35.8%
Medical Transcriptionists	2,3,11,13	PSVE	7,000	9,500	35.7%
Reservation and Transportation Ticket Agents and Travel Clerks	3,11,12,13	STOJT	5,600	7,600	35.7%
Pharmacy Aides	2,10,13	MTOJT	5,900	8,000	35.6%
Millwrights	1,3,7,15	LTOJT	2,000	2,700	35.0%
Sheet Metal Workers	1,2,3,5,7,12,15	MTOJT	15,500	20,900	34.8%
Computer, Automated Teller, and Office Machine Repairers	1,3,5,6,9,10,11,12	LTOJT	23,900	32,200	34.7%
Production Workers, All Other	2,3,5,9,10,11,14	MTOJT	19,400	26,100	34.5%
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	1,2,3,7,10,12,15	LTOJT	11,500	15,400	33.9%
Emergency Medical Technicians and Paramedics	2,3,7,12,13,15	PSVE	9,800	13,100	33.7%
Forest and Conservation Technicians	2	AD	300	400	33.3%
Cardiovascular Technologists and Technicians	2,13	AD	900	1,200	33.3%
Transportation Inspectors	2,3,10	WE	600	800	33.3%
Statistical Assistants	2,3,9,11,13	MTOJT	600	800	33.3%
Sewers, Hand	3	MTOJT	300	400	33.3%
Rail Yard Engineers, Dinkey Operators, and Hostlers	3	WE	300	400	33.3%
Petroleum Pump System Operators, Refinery Operators, and Gaugers	15	LTOJT	300	400	33.3%
Paperhangers	1,15	MTOJT	600	800	33.3%
Mechanical Door Repairers	1	LTOJT	300	400	33.3%
Material Moving Workers, All Other	2,3,9,10,11,12,14	STOJT	4,800	6,400	33.3%
Hoist and Winch Operators	3	MTOJT	600	800	33.3%
Grinding and Polishing Workers, Hand	1,3,5	STOJT	300	400	33.3%
Food Servers, Nonrestaurant	2,3,12,14	STOJT	600	800	33.3%
Floor Layers, Except Carpet, Wood, and Hard Tiles	1,10	MTOJT	2,100	2,800	33.3%
Cutters and Trimmers, Hand	1,3,7	STOJT	300	400	33.3%
Landscaping and Groundskeeping Workers	1,2,3,7,10,11,12,13,14,15	STOJT	50,400	67,100	33.1%
Interviewers, Except Eligibility and Loan	2,3,4,7,11,12,13,14,15	STOJT	12,400	16,500	33.1%
Pest Control Workers	2,3	MTOJT	11,500	15,300	33.0%
Receptionists and Information Clerks	All Industries	STOJT	107,000	142,300	33.0%
Hazardous Materials Removal Workers	1,2,3,7,12,15	LTOJT	11,000	14,600	32.7%
Cooks, Short Order	3,10,12	STOJT	4,600	6,100	32.6%
Structural Metal Fabricators and Fitters	1,3,5,7,15	MTOJT	4,300	5,700	32.6%
First-Line Supervisors/Managers of Transportation and Material-Moving Machine and Vehicle Operators	2,3,7,9,10,11,12,13,14,15	WE	8,600	11,400	32.6%
Massage Therapists	3,12,13	MTOJT	4,000	5,300	32.5%
Financial, Information, & Record Clerks, All Other	2,3,4,5,6,7,8,9,10,11,12,13,14,15	STOJT	19,700	26,100	32.5%
Home Appliance Repairers	1,3,10	LTOJT	3,400	4,500	32.4%
Excavating and Loading Machine and Dragline Operators	1,3,7,12,15	MTOJT	3,100	4,100	32.3%
Counter and Rental Clerks	1,3,7,10,11,12,15	STOJT	35,100	46,300	31.9%
Molding, Coremaking, and Casting Machine Setters, Operators, and Tenders, Metal and Plastic	3,5,11	MTOJT	2,200	2,900	31.8%
Construction Trades & Related Workers, All Other	1,2,3,7,10,11,12,14,15	MTOJT	12,000	15,800	31.7%
Textile Cutting Machine Setters, Operators, and Tenders	3,11	MTOJT	1,900	2,500	31.6%
Camera Operators, Television, Video, and Motion Picture	3,11	MTOJT	9,300	12,200	31.2%
First-Line Supervisors/Managers of Personal Service Workers	2,3,10,11,12,13,14	WE	7,100	9,300	31.0%
Cost Estimators	1,3,4,5,6,7,9,10,11,12,15	WE	21,700	28,400	30.9%
Coaches and Scouts	3,12,14	LTOJT	6,200	8,100	30.6%

# APPENDIX A

**FIGURE A3—CONTINUED**  
**LOW AND MODERATE SKILL OCCUPATIONS IN SELECTED INDUSTRIES**

<i>Occupation</i>	<i>Industry</i>	<i>Training Level</i>	<i>Employment 2000</i>	<i>Projected Employment 2010</i>	<i>Average Occupation Growth Across Selected Industries 2000-2010</i>
Assemblers and Fabricators, All Other	1,3,5,7,10,11,14	WE	23,500	30,700	30.6%
Legal Secretaries	2,3,4,6,7,11,12,15	PSVE	5,900	7,700	30.5%
Adult Literacy, Remedial Education, and GED Teachers and Instructors	2,3,12,14	WE	9,200	12,000	30.4%
Insurance Claims and Policy Processing Clerks	3,4,6,7,12,13,15	MTOJT	3,300	4,300	30.3%
Bakers	10	MTOJT	10,300	13,400	30.1%
Photographic Process Workers	3,10,11	LTOJT	1,000	1,300	30.0%
Library Technicians	2,11,12	STOJT	13,000	16,900	30.0%
Glaziers	1,3,7,10,12	LTOJT	12,100	15,700	29.8%
Electrical and Electronics Repairers, Commercial and Industrial Equipment	1,2,3,5,7,8,10,11,12,15	PSVE	5,400	7,000	29.6%
Electricians	1,2,3,5,7,9,10,11,12,15	LTOJT	60,500	78,300	29.4%
Police and Sheriff's Patrol Officers	2,12	LTOJT	61,800	79,900	29.3%
Transportation Workers, All Other	2,3,10,12	MTOJT	2,400	3,100	29.2%
Drafters, Engineering, and Mapping Technicians, All Other	1,2,3,5,7,8,9,10,11,12,15	AD	9,000	11,600	28.9%
Elevator Installers and Repairers	1,2,3,7	LTOJT	7,300	9,400	28.8%
Woodworking Machine Setters, Operators, and Tenders, Except Sawing	10	MTOJT	700	900	28.6%
Rolling Machine Setters, Operators, and Tenders, Metal and Plastic	3	MTOJT	700	900	28.6%
Proofreaders and Copy Markers	3,7,11,12,15	STOJT	1,400	1,800	28.6%
Motor Vehicle Operators, All Other	2,7,10,11,12,13,14,15	STOJT	9,100	11,700	28.6%
Installation, Maintenance, and Repair Workers, All Other	1,2,3,5,7,1,11,12,15	LTOJT	10,500	13,500	28.6%
Floor Sanders and Finishers	1	MTOJT	700	900	28.6%
Athletic Trainers	3,12	LTOJT	700	900	28.6%
Drywall and Ceiling Tile Installers	1,3,7,10,15	MTOJT	27,000	34,700	28.5%
Inspectors, Testers, Sorters, Samplers, and Weighers	1,2,3,6,7,9,10,11,12,15	WE	17,200	22,100	28.5%
Bill and Account Collectors	1,2,3,4,6,9,10,11,12,13,14,15	STOJT	34,800	44,700	28.4%
Library Assistants, Clerical	2,11,12	STOJT	7,400	9,500	28.4%
Tank Car, Truck, and Ship Loaders	3	MTOJT	3,200	4,100	28.1%
Taxi Drivers and Chauffeurs	3,10,13,14	STOJT	6,100	7,800	27.9%
Welders, Cutters, Solderers, and Brazers	1,2,3,5,7,10,11,12,15	PSVE	15,800	20,200	27.8%
Counter Attendants, Cafeteria, Food Concession, and Coffee Shop	2,3,7,10,11,12,14,15	STOJT	36,000	46,000	27.8%
Personal Care and Service Workers, All Other	2,3,10,11,12,14	MTOJT	11,900	15,200	27.7%
First-Line Supervisors/Managers, Protective Service Workers, All Other	2,3,10,11,12	WE	10,100	12,900	27.7%
Structural Iron and Steel Workers	1,3,7,15	LTOJT	16,300	20,800	27.6%
Truck Drivers, Heavy and Tractor-Trailer	1,2,3,7,10,12,13,15	STOJT	90,400	115,300	27.5%
Helpers—Brickmasons, Blockmasons, Stonemasons, and Tile and Marble Setters	1,3,7	STOJT	6,200	7,900	27.4%
Power Plant Operators	2	LTOJT	1,100	1,400	27.3%
Plating and Coating Machine Setters, Operators, and Tenders, Metal and Plastic	1,3,5,7	MTOJT	1,100	1,400	27.3%
Food Preparation Workers	2,3,10,11,12,13,14	STOJT	30,700	39,000	27.0%
Reinforcing Iron and Rebar Workers	1,3,7,15	LTOJT	13,000	16,500	26.9%
Entertainers and Performers, Sports and Related Workers, All Other	3,12	LTOJT	5,200	6,600	26.9%
Truck Drivers, Light or Delivery Services	1,2,3,5,6,7,9,10,11,12,13,14,15	STOJT	71,100	90,200	26.9%
Carpenters	1,2,3,7,10,11,12,15	LTOJT	130,400	165,300	26.8%
Protective Service Workers, All Other	2,3,7,10,11,12,15	STOJT	28,100	35,600	26.7%
Surveying and Mapping Technicians	2,3,7,11,12,15	PSVE	1,500	1,900	26.7%
Real Estate Sales Agents	2,4,7,15	PSVE	1,500	1,900	26.7%
Dispatchers, Except Police, Fire, and Ambulance	1,2,3,7,9,10,11,12,13,14,15	MTOJT	15,000	19,000	26.7%
Library, Museum, Training, & Education Workers, All Other	2,3,7,12,13,14,15	AD	10,400	13,100	26.0%
Construction Laborers	1,2,3,7,10,15	MTOJT	121,600	153,100	25.9%
Office Clerks, General	All Industries	STOJT	291,700	367,100	25.8%
Opticians, Dispensing	3,10,13	LTOJT	3,100	3,900	25.8%
Electro-Mechanical Technicians	1,2,3,5,7,8,10,11,12,15	WE	3,900	4,900	25.6%
Medical Secretaries	2,3,7,12,13,15	PSVE	34,900	43,800	25.5%
Mechanical Engineering Technicians	1,3,5,8,10,11	AD	2,400	3,000	25.0%
Tile and Marble Setters	1,3,7	LTOJT	6,800	8,500	25.0%
Riggers	1,3,7,11	LTOJT	800	1,000	25.0%
Printing Workers, All Other	3,11	MTOJT	400	500	25.0%
Parking Enforcement Workers	2,12	STOJT	1,200	1,500	25.0%
Nonfarm Animal Caretakers	2,3	STOJT	1,600	2,000	25.0%
Electric Motor, Power Tool, and Related Repairers	1,3	LTOJT	1,600	2,000	25.0%
Control and Valve Installers and Repairers, Except Mechanical Door	2	LTOJT	400	500	25.0%
Animal Control Workers	2,3	STOJT	1,200	1,500	25.0%
Ambulance Drivers and Attendants, Except Emergency Medical Technicians	2,13	MTOJT	1,200	1,500	25.0%
Air Transportation Workers, All Other	3	LTOJT	800	1,000	25.0%
Stock Clerks and Order Fillers	All Industries	STOJT	102,700	128,100	24.7%

# APPENDIX A

**FIGURE A3—CONTINUED**  
**LOW AND MODERATE SKILL OCCUPATIONS IN SELECTED INDUSTRIES**

<i>Occupation</i>	<i>Industry</i>	<i>Training Level</i>	<i>Employment 2000</i>	<i>Projected Employment 2010</i>	<i>Average Occupation Growth Across Selected Industries 2000-2010</i>
First-Line Supervisors/Managers of Food Preparation and Serving Workers	2,3,7,10,11,12,14,15	WE	17,800	22,200	24.7%
First-Line Supervisors/Managers of Construction Trades and Extraction Workers	1,2,3,7,10,11,12,15	WE	50,100	62,300	24.4%
Conveyor Operators and Tenders	3,10,11	MTOJT	13,300	16,500	24.1%
Mobile Heavy Equipment Mechanics, Except Engines	1,2,3,7,10,12,15	LTOJT	9,600	11,900	24.0%
Plasterers and Stucco Masons	1,3,7	LTOJT	16,300	20,200	23.9%
Automotive Service Technicians and Mechanics	1,2,3,7,10,11,12,13,15	LTOJT	37,300	46,200	23.9%
Executive Secretaries and Administrative Assistants	1,2,3,4,5,6,7,9,10,11,12,13,14,15	PSVE	163,100	201,900	23.8%
Vocational Education Teachers, Secondary School	2,12,14	WE	7,200	8,900	23.6%
Transit and Railroad Police	2	MTOJT	1,700	2,100	23.5%
First-Line Supervisors/Managers of Helpers, Laborers, and Material Movers, Hand	2,3,5,7,9,10,11,12,15	WE	8,500	10,500	23.5%
First-Line Supervisors/Managers of Mechanics, Installers, and Repairers	1,2,3,5,7,10,11,12,13,15	WE	25,200	31,100	23.4%
Packers and Packagers, Hand	3,5,8,9,10,11,14	STOJT	96,300	118,800	23.4%
Electrical and Electronic Engineering Technicians	1,2,3,5,7,9,10,11,12,15	AD	25,800	31,800	23.3%
Telemarketers	1,3,4,6,7,9,10,11,12,13,14,15	STOJT	50,200	61,800	23.1%
Textile, Apparel, and Furnishings Workers, All Other	3,10	LTOJT	5,200	6,400	23.1%
Packaging and Filling Machine Operators and Tenders	3,5,9,10,11	MTOJT	11,700	14,400	23.1%
Retail Salespersons	1,2,3,6,7,10,11,12,15	STOJT	419,300	515,700	23.0%
Janitors and Cleaners, Except Maids and Housekeeping Cleaners	All Industries	STOJT	172,500	212,100	23.0%
Recreation Workers	2,3,12,13,14	MTOJT	23,600	29,000	22.9%
Cashiers	2,3,6,10,11,12,13,14	STOJT	310,900	381,800	22.8%
First-Line Supervisors/Managers of Retail Sales Workers	1,3,6,9,10,11,12,14	LTOJT	123,200	151,000	22.6%
Telecommunications Line Installers and Repairers	1,2,7,9,10,11,15	LTOJT	18,800	23,000	22.3%
Life, Physical, and Social Science Technicians, All Other	2,3,5,7,8,12,13,15	AD	10,300	12,600	22.3%
Semiconductor Processors	5	MTOJT	11,200	13,700	22.3%
Claims Adjusters, Examiners, and Investigators	2,3,4,6,7,9,11,12,13,15	LTOJT	26,000	31,800	22.3%
Vocational Education Teachers, Middle School	12	WE	900	1,100	22.2%
Fire Inspectors and Investigators	2	WE	900	1,100	22.2%
Helpers—Installation, Maintenance, and Repair Workers	1,2,3,5,7,9,10,11,12,15	STOJT	11,300	13,800	22.1%
Demonstrators and Product Promoters	1,3,7,10,11,12,15	STOJT	28,100	34,300	22.1%
Laborers and Freight, Stock, and Material Movers, Hand	1,2,3,5,6,7,9,10,11,12,14,15	STOJT	190,400	232,100	21.9%
Production, Planning, and Expediting Clerks	1,2,3,4,5,8,9,10,11,12,13,15	STOJT	71,900	87,600	21.8%
Paving, Surfacing, and Tamping Equipment Operators	1,2,3,7,15	MTOJT	4,600	5,600	21.7%
Automotive Body and Related Repairers	2,10	LTOJT	4,600	5,600	21.7%
Mail Clerks and Mail Machine Operators, Except Postal Service	2,3,4,5,6,7,8,9,10,11,12,13,15	STOJT	20,300	24,700	21.7%
Helpers—Painters, Paperhangers, Plasterers, and Stucco Masons	1,3,7,15	STOJT	8,800	10,700	21.6%
Bus Drivers, Transit and Intercity	2,3,11,12,13,14	MTOJT	25,100	30,500	21.5%
Maintenance Workers, Machinery	2,3,5,10	LTOJT	1,400	1,700	21.4%
Coil Winders, Tapers, and Finishers	5,10,11	STOJT	1,400	1,700	21.4%
Bicycle Repairers	10	MTOJT	1,400	1,700	21.4%
Managers, All Other	1,2,3,4,5,6,7,9,10,11,12,13,14,15	WE	53,500	64,900	21.3%
Brickmasons and Blockmasons	1,3,7,15	LTOJT	3,300	4,000	21.2%
Butchers and Meat Cutters	10	LTOJT	1,900	2,300	21.1%
Helpers—Roofers	1	STOJT	2,400	2,900	20.8%
Bus and Truck Mechanics and Diesel Engine Specialists	1,2,3,7,10,12,13,15	LTOJT	16,800	20,300	20.8%
Helpers—Production Workers	1,2,3,5,7,8,10,11	STOJT	18,900	22,800	20.6%
Roofers	1,7,12	MTOJT	16,600	20,000	20.5%
Audio and Video Equipment Technicians	2,3,9,11,12	MTOJT	8,800	10,600	20.5%
Laundry and Dry-Cleaning Workers	2,3,7,12,13,14,15	MTOJT	14,200	17,100	20.4%
Helpers—Carpenters	1,3,7,15	STOJT	10,800	13,000	20.4%
Mechanical Drafters	3,5,8	PSVE	500	600	20.0%
Water and Liquid Waste Treatment Plant and System Operators	2,3	LTOJT	6,500	7,800	20.0%
Precision Instrument and Equipment Repairers, All Other	1,3	LTOJT	1,000	1,200	20.0%
Police, Fire, and Ambulance Dispatchers	2,13	MTOJT	5,000	6,000	20.0%
Graders and Sorters, Agricultural Products	3,10	STOJT	1,000	1,200	20.0%
Fish and Game Wardens	2	MTOJT	500	600	20.0%
Cutting and Slicing Machine Setters, Operators, and Tenders	3,5,10	MTOJT	500	600	20.0%
Court, Municipal, and License Clerks	2	MTOJT	9,000	10,800	20.0%
Helpers—Electricians	1,2,3,7,15	STOJT	11,100	13,300	19.8%
Shipping, Receiving, and Traffic Clerks	All Industries	STOJT	84,300	101,000	19.8%
Helpers—Pipelayers, Plumbers, Pipefitters, and Steamfitters	1,2,3,7,15	STOJT	7,600	9,100	19.7%
Pipelayers	1,2,3,7,15	MTOJT	6,100	7,300	19.7%
Electronic Equipment Installers and Repairers, Motor Vehicles	1,10	PSVE	3,100	3,700	19.4%
Detectives and Criminal Investigators	2	WE	6,200	7,400	19.4%

## APPENDIX A

**FIGURE A3—CONTINUED**  
**LOW AND MODERATE SKILL OCCUPATIONS IN SELECTED INDUSTRIES**

<i>Occupation</i>	<i>Industry</i>	<i>Training Level</i>	<i>Employment 2000</i>	<i>Projected Employment 2010</i>	<i>Average Occupation Growth Across Selected Industries 2000-2010</i>
Painters, Construction and Maintenance	1,2,3,7,10,12,15	MTOJT	59,700	71,000	18.9%
Electrical and Electronic Equipment Assemblers	3,9,10,11	WE	3,200	3,800	18.8%
First-Line Supervisors/Managers of Police and Detectives	2	WE	10,800	12,800	18.5%
Sewing Machine Operators	3,10	MTOJT	3,300	3,900	18.2%
Farming, Fishing, & Forestry Workers, All Other	2,10,12	STOJT	3,300	3,900	18.2%
Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	3,5,11	MTOJT	2,200	2,600	18.2%
Machinists	1,3,5,7,8,10,11,12,15	LTOJT	13,900	16,400	18.0%
Carpet Installers	1,10	MTOJT	7,800	9,200	17.9%
Industrial Machinery Mechanics	2,3,5,10,11,12,15	LTOJT	2,800	3,300	17.9%
Pressers, Textile, Garment, and Related Materials	3	STOJT	11,800	13,900	17.8%
Industrial Truck and Tractor Operators	1,2,3,5,7,8,10,11,12,15	STOJT	27,600	32,500	17.8%
Cooks, Institution and Cafeteria	2,3,7,10,12,13,14,15	LTOJT	14,700	17,300	17.7%
Travel Agents	3	PSVE	15,400	18,100	17.5%
Fence Erectors	1,3,7,10	MTOJT	12,100	14,200	17.4%
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	1,3,5,7,9,10,11,12,13,15	MTOJT	44,300	51,900	17.2%
First-Line Supervisors/Managers of Non-Retail Sales Workers	3,4,5,6,7,8,9,10,11,12,15	LTOJT	25,500	29,800	16.9%
Forensic Science Technicians	2	AD	600	700	16.7%
Court Reporters	2,3	PSVE	1,800	2,100	16.7%
Agricultural and Food Science Technicians	2,10	AD	1,200	1,400	16.7%
Vehicle & Mobile Equipment Mechs, Installers, & Repairers, All Others	1,2,3,10	LTOJT	1,200	1,400	16.7%
Prepress Technicians and Workers	2,3,11	LTOJT	1,800	2,100	16.7%
Derrick Operators, Oil and Gas	15	MTOJT	600	700	16.7%
Baggage Porters and Bellhops	3,11,12	STOJT	1,200	1,400	16.7%
Airfield Operations Specialists	2,3	LTOJT	600	700	16.7%
Operating Engineers and Other Construction Equipment Operators	1,2,3,7,10,15	MTOJT	39,800	46,300	16.3%
Compliance Officers, Except Agriculture, Construction, Health and Safety, and Transportation	2,3,4,5,6,7,9,11,12,15	WE	13,500	15,700	16.3%
Industrial Engineering Technicians	5,8,9,11	AD	3,100	3,600	16.1%
Procurement Clerks	1,5,7,8,9,10,11	STOJT	2,500	2,900	16.0%
Billing and Posting Clerks and Machine Operators	1,2,3,4,5,6,7,9,10,11,12,13,14,15	STOJT	40,800	47,300	15.9%
Driver/Sales Workers	2,3,7,10,11,12,15	STOJT	11,300	13,100	15.9%
First-Line Supervisors/Managers of Office and Administrative Support Workers	All Industries	MTOJT	126,300	146,400	15.9%
Advertising Sales Agents	3,10,11	MTOJT	12,800	14,800	15.6%
File Clerks	1,3,4,7,9,10,11,12,13,14,15	STOJT	25,000	28,900	15.6%
Bus Drivers, School	12,13,14	STOJT	19,900	23,000	15.6%
Telecommunications Equipment Installers and Repairers, Except Line Installers	1,2,3,7,9,10,11,15	PSVE	2,600	3,000	15.4%
Aircraft Mechanics and Service Technicians	2,3,10,13	LTOJT	2,600	3,000	15.4%
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	1,3,4,5,7,8,9,10,11,12,15	MTOJT	117,900	136,000	15.4%
Plumbers, Pipefitters, and Steamfitters	1,2,3,7,12,15	LTOJT	39,900	46,000	15.3%
Printing Machine Operators	2,3,5,9,10,11,12	MTOJT	7,900	9,100	15.2%
Meat, Poultry, and Fish Cutters and Trimmers	10	STOJT	3,300	3,800	15.2%
Credit Authorizers, Checkers, and Clerks	3,4,6,10	STOJT	4,000	4,600	15.0%
Fire Fighters	2,12	LTOJT	24,900	28,600	14.9%
Bookkeeping, Accounting, and Auditing Clerks	All Industries	MTOJT	143,100	163,700	14.4%
Electronic Home Entertainment Equipment Installers and Repairers	1,3,10,11	PSVE	700	800	14.3%
Electrical and Electronics Drafters	1,2,3,5,8,11	PSVE	2,800	3,200	14.3%
Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic	3,5	MTOJT	700	800	14.3%
First-Line Supervisors/Managers of Landscaping, Lawn Service, and Groundskeeping Workers	2,3,7,12,14,15	WE	2,800	3,200	14.3%
Commercial Pilots	3,12,13	LTOJT	700	800	14.3%
Appraisers and Assessors of Real Estate	2,4,6,15	WE	3,500	4,000	14.3%
Maintenance and Repair Workers, General	All Industries	LTOJT	77,300	88,200	14.1%
Dental Laboratory Technicians	13	LTOJT	4,300	4,900	14.0%
Photographic Processing Machine Operators	3,10,11	STOJT	6,700	7,600	13.4%
Crane and Tower Operators	1,3,7,10,15	MTOJT	1,500	1,700	13.3%
Computer-Controlled Machine Tool Operators, Metal and Plastic	5,8,11	MTOJT	2,300	2,600	13.0%
Cement Masons and Concrete Finishers	1,2,3,7,15	LTOJT	17,700	20,000	13.0%
Team Assemblers	1,3,5,7,9,10,11,12,15	STOJT	33,100	37,400	13.0%
First-Line Supervisors/Managers of Fire Fighting and Prevention Workers	2	WE	7,800	8,800	12.8%
Service Station Attendants	2,3	STOJT	800	900	12.5%
Farm Equipment Mechanics	1,3,10	LTOJT	2,400	2,700	12.5%
Bindery Workers	3,11	STOJT	3,200	3,600	12.5%
Data Entry Keyers	3,4,5,6,7,9,10,11,12,13,14,15	PSVE	41,200	46,300	12.4%



# APPENDIX A

**FIGURE A3—CONTINUED**  
**LOW AND MODERATE SKILL OCCUPATIONS IN SELECTED INDUSTRIES**

Occupation	Industry	Training Level	Employment 2000	Projected Employment 2010	Average Occupation Growth Across Selected Industries 2000-2010
Secretaries, Except Legal, Medical, and Executive	1,3,4,5,6,7,8,9,10,11,12,13,14,15	PSVE	98,100	110,100	12.2%
Food Service Managers	3,10,12,14	WE	1,700	1,900	11.8%
New Accounts Clerks	6	WE	7,700	8,600	11.7%
Couriers and Messengers	2,3,4,6,7,11,12,13,15	STOJT	5,300	5,900	11.3%
First-Line Supervisors/Managers of Production and Operating Workers	1,2,3,5,7,8,9,10,11,12,14,15	WE	27,400	30,500	11.3%
Cleaners of Vehicles and Equipment	1,2,3,10,13	STOJT	15,300	17,000	11.1%
Payroll and Timekeeping Clerks	All Industries	STOJT	16,600	18,400	10.8%
Environmental Science and Protection Technicians, Including Health	2,3,7,12,15	AD	1,900	2,100	10.5%
Title Examiners, Abstractors, and Searchers	4,11	MTOJT	3,800	4,200	10.5%
Photographers	2,3,11	MTOJT	3,800	4,200	10.5%
Tax Preparers	3	STOJT	5,400	5,900	9.3%
Stationary Engineers and Boiler Operators	2,12,13	LTOJT	2,200	2,400	9.1%
Security and Fire Alarm Systems Installers	1	LTOJT	2,200	2,400	9.1%
Forest and Conservation Workers	2,3,7,12,15	STOJT	4,400	4,800	9.1%
Office Machine Operators, Except Computer	2,3,5,8,9,10,11,12	STOJT	2,300	2,500	8.7%
Dining Room and Cafeteria Attendants and Bartender Helpers	3,10,12	STOJT	11,600	12,600	8.6%
Secretaries, Administrative Assistants, & Other Office Support Workers	2,3,4,6,7,9,10,11,12,13,14,15	STOJT	72,000	78,200	8.6%
Highway Maintenance Workers	2	STOJT	3,500	3,800	8.6%
Civil Engineering Technicians	3,7,11,12,15	AD	1,200	1,300	8.3%
Broadcast Technicians	3,11	PSVE	4,800	5,200	8.3%
Tellers	3,6,7,11,12,15	STOJT	1,200	1,300	8.3%
Refuse and Recyclable Material Collectors	2,3	STOJT	11,200	12,100	8.0%
Insurance Appraisers, Auto Damage	3,4	MTOJT	1,300	1,400	7.7%
Construction and Building Inspectors	2,3,12	WE	3,900	4,200	7.7%
Roustabouts, Oil and Gas	3,15	STOJT	1,400	1,500	7.1%
Outdoor Power Equipment and Other Small Engine Mechanics	1,2,3,10,12	LTOJT	1,400	1,500	7.1%
Tire Repairers and Changers	3,10	STOJT	6,000	6,400	6.7%
Private Detectives and Investigators	2,6,10	MTOJT	1,700	1,800	5.9%
Locksmiths and Safe Repairers	1,2,3,11,12	MTOJT	3,700	3,900	5.4%
Electromechanical Equipment Assemblers	3,5,8,10	WE	5,600	5,900	5.4%
Order Clerks	1,3,9,10,11,12	STOJT	4,100	4,300	4.9%
Word Processors and Typists	3,4,7,9,10,11,12,13,14,15	MTOJT	4,700	4,900	4.3%
News Analysts, Reporters and Correspondents	11	WE	2,400	2,500	4.2%
Architectural and Civil Drafters	1,2,3,7,12,15	PSVE	2,600	2,700	3.8%
Cooks, Restaurant	2,3,12	LTOJT	5,400	5,600	3.7%
Parts Salespersons	1,10	MTOJT	6,500	6,700	3.1%
Waiters and Waitresses	3,10,12,15	STOJT	15,000	15,400	2.7%
Computer Operators	3,4,5,6,7,8,9,10,11,12,13,15	MTOJT	15,400	15,800	2.6%
Combined Food Preparation and Serving Workers, Including Fast Food	2,3,7,10,11,12,13,15	STOJT	19,600	20,100	2.6%
Veterinary Technologists and Technicians	3	AD	100	100	0.0%
Respiratory Therapy Technicians	13	AD	100	100	0.0%
Law Clerks	2	AD	1,100	1,100	0.0%
Dietetic Technicians	12	AD	100	100	0.0%
Biological Technicians	3	AD	100	100	0.0%
Woodworkers, All Other	10	LTOJT	200	200	0.0%
Veterinary Assistants and Laboratory Animal Caretakers	3	STOJT	300	300	0.0%
Upholsterers	10	LTOJT	600	600	0.0%
Traffic Technicians	2	MTOJT	300	300	0.0%
Tool Grinders, Filers, and Sharpeners	1,3	LTOJT	600	600	0.0%
Tool and Die Makers	5,8	LTOJT	600	600	0.0%
Timing Device Assemblers, Adjusters, and Calibrators	5	LTOJT	400	400	0.0%
Telephone Operators	2	MTOJT	100	100	0.0%
Tailors, Dressmakers, and Custom Sewers	3,10,11	WE	2,300	2,300	0.0%
Switchboard Operators, Including Answering Service	All Industries	STOJT	8,900	8,900	0.0%
Subway and Streetcar Operators	2	MTOJT	300	300	0.0%
Service Unit Operators, Oil, Gas, and Mining	15	MTOJT	1,000	1,000	0.0%
Septic Tank Servicers and Sewer Pipe Cleaners	1,3	MTOJT	1,400	1,400	0.0%
Segmental Pavers	1	MTOJT	100	100	0.0%
Sawing Machine Setters, Operators, and Tenders, Wood	10	MTOJT	200	200	0.0%
Rail Car Repairers	13	LTOJT	100	100	0.0%
Radio Operators	2,11	MTOJT	200	200	0.0%
Pump Operators, Except Wellhead Pumps	3,15	MTOJT	200	200	0.0%
Power Distributors and Dispatchers	2	LTOJT	200	200	0.0%



## APPENDIX A

**FIGURE A3—CONTINUED**  
**LOW AND MODERATE SKILL OCCUPATIONS IN SELECTED INDUSTRIES**

<i>Occupation</i>	<i>Industry</i>	<i>Training Level</i>	<i>Employment 2000</i>	<i>Projected Employment 2010</i>	<i>Average Occupation Growth Across Selected Industries 2000-2010</i>
Postal Service Mail Carriers	2	STOJT	100	100	0.0%
Pile-Driver Operators	7,15	MTOJT	800	800	0.0%
Pesticide Handlers, Sprayers, and Applicators, Vegetation	2,10	MTOJT	200	200	0.0%
Paper Goods Machine Setters, Operators, and Tenders	11	MTOJT	200	200	0.0%
Painting, Coating, and Decorating Workers	3,10,11	MTOJT	500	500	0.0%
Painters, Transportation Equipment	10	MTOJT	500	500	0.0%
Ophthalmic Laboratory Technicians	10	LTOJT	300	300	0.0%
Numerical Tool and Process Control Programmers	5	WE	100	100	0.0%
Motorcycle Mechanics	10	LTOJT	1,100	1,100	0.0%
Motorboat Operators	2	MTOJT	200	200	0.0%
Motorboat Mechanics	10	LTOJT	400	400	0.0%
Motion Picture Projectionists	3	STOJT	200	200	0.0%
Molders, Shapers, and Casters, Except Metal and Plastic	5	STOJT	100	100	0.0%
Mixing and Blending Machine Setters, Operators, and Tenders	5,10	MTOJT	200	200	0.0%
Manufactured Building and Mobile Home Installers	10	LTOJT	100	100	0.0%
Machine Feeders and Offbearers	11	STOJT	200	200	0.0%
Log Graders and Scalars	3,11	STOJT	200	200	0.0%
Locomotive Engineers	2	WE	100	100	0.0%
Loan Interviewers and Clerks	4	STOJT	200	200	0.0%
Lay-Out Workers, Metal and Plastic	5	LTOJT	100	100	0.0%
Lathe and Turning Machine Tool Setters, Operators, and Tenders Metal and Plastic	3	MTOJT	100	100	0.0%
Job Printers	2,3,11	LTOJT	1,200	1,200	0.0%
Jewelers and Precious Stone and Metal Workers	10	LTOJT	300	300	0.0%
Helpers—Extraction Workers	15	STOJT	400	400	0.0%
Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic	3,5	MTOJT	400	400	0.0%
Furnace, Kiln, Oven, Drier, and Kettle Operators and Tenders	12	MTOJT	100	100	0.0%
Forest Fire Inspectors and Prevention Specialists	2	WE	100	100	0.0%
Food Preparation and Serving Related Workers, All Other	2,3,7,10,12,15	STOJT	4,200	4,200	0.0%
Flight Attendants	3,13	LTOJT	500	500	0.0%
Fiberglass Laminators and Fabricators	10	STOJT	100	100	0.0%
Extraction Workers, All Other	15	MTOJT	600	600	0.0%
Etchers and Engravers	5	LTOJT	200	200	0.0%
Eligibility Interviewers, Government Programs	4,14	MTOJT	300	300	0.0%
Drilling and Boring Machine Tool Setters, Operators, and Tenders, Metal and Plastic	5	MTOJT	500	500	0.0%
Door-To-Door Sales Workers, News and Street Vendors, and Related Workers	3,6,10,11	STOJT	900	900	0.0%
Cooks, Fast Food	3,10,11	STOJT	800	800	0.0%
Communications Equipment Operators, All Other	3	MTOJT	100	100	0.0%
Coating, Painting, and Spraying Machine Setters, Operators, and Tenders	2,5	MTOJT	600	600	0.0%
Cleaning, Washing, and Metal Pickling Equipment Operators and Tenders	5	STOJT	100	100	0.0%
Chefs and Head Cooks	3,12	WE	1,400	1,400	0.0%
Cargo and Freight Agents	3,10	STOJT	600	600	0.0%
Camera and Photographic Equipment Repairers	1,3	MTOJT	200	200	0.0%
Brokerage Clerks	4,6,12	STOJT	600	600	0.0%
Bookbinders	2	MTOJT	100	100	0.0%
Boilermakers	1,3,7	LTOJT	300	300	0.0%
Airline Pilots, Copilots, and Flight Engineers	3	LTOJT	200	200	0.0%

Sacramento Regional Research Institute, October 2003

Data Source: Employment Development Department, Labor Market Information

## Appendix B—Knowledge and Skills

### Knowledge and Skills for the 15 Selected Industries

FIGURE B1  
KNOWLEDGE AND SKILLS  
ADMINISTRATIVE, SUPPORT, AND WASTE SERVICES

<i>Knowledge Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>	<i>Skills Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>
Mathematics	38.2	44.7	41.4	Reading Comprehension	45.8	62.4	54.1
English Language	32.1	42.3	37.2	Active Listening	41.1	56.6	48.9
Mechanical	43.1	25.3	34.2	Operation and Control	53.0	44.4	48.7
Computers and Electronics	17.5	47.4	32.4	Mathematics	43.6	50.8	47.2
Clerical	25.8	36.1	30.9	Speaking	38.9	53.2	46.1
Engineering and Technology	25.1	29.4	27.2	Equipment Selection	43.5	46.3	44.9
Customer and Personal Service	25.7	28.4	27.1	Writing	35.7	49.5	42.6
Physics	20.9	22.4	21.6	Monitoring	36.7	46.0	41.3
Production and Processing	29.5	11.9	20.7	Coordination	33.4	49.2	41.3
Design	14.0	26.2	20.1	Critical Thinking	29.1	49.4	39.3
Public Safety and Security	21.4	18.4	19.9	Judgment and Decision Making	33.2	44.8	39.0
Administration and Management	15.6	21.4	18.5	Complex Problem Solving	30.7	46.0	38.3
Communications and Media	16.1	19.9	18.0	Quality Control Analysis	36.7	39.5	38.1
Chemistry	16.0	19.9	18.0	Operation Monitoring	37.8	34.2	36.0
Transportation	23.4	11.6	17.5	Active Learning	25.1	45.7	35.4
Telecommunications	14.2	19.9	17.1	Time Management	26.4	37.5	32.0
Education and Training	12.5	18.4	15.4	Science	18.1	40.0	29.0
Law and Government	13.5	14.9	14.2	Equipment Maintenance	33.7	23.4	28.6
Medicine and Dentistry	4.4	22.7	13.5	Social Perceptiveness	23.4	32.3	27.9
Psychology	9.7	16.9	13.3	Service Orientation	23.0	32.6	27.8
Building and Construction	16.5	9.4	12.9	Systems Evaluation	24.2	31.2	27.7
Biology	4.4	20.6	12.5	Learning Strategies	20.5	33.4	26.9
Geography	12.7	10.7	11.7	Troubleshooting	27.4	26.0	26.7
Economics and Accounting	12.1	10.7	11.4	Operations Analysis	21.0	31.8	26.4
Personnel and Human Resources	10.1	8.7	9.4	Systems Analysis	19.8	30.5	25.1
Sales and Marketing	10.4	6.2	8.3	Management of Material Resources	21.5	28.4	25.0
Fine Arts	5.5	9.6	7.5	Installation	24.0	23.8	23.9
Therapy and Counseling	3.4	11.5	7.5	Repairing	27.0	19.8	23.4
Sociology and Anthropology	4.4	7.7	6.0	Technology Design	17.2	28.2	22.7
Foreign Language	2.6	1.7	2.1	Instructing	17.1	24.8	20.9
Food Production	2.2	2.0	2.1	Persuasion	10.9	17.6	14.3
Philosophy and Theology	1.0	2.9	2.0	Management of Personnel Resources	12.4	15.6	14.0
History and Archeology	0.9	2.8	1.8	Negotiation	10.3	14.6	12.4
				Management of Financial Resources	10.2	12.6	11.4
				Programming	1.5	10.5	6.0

Sacramento Regional Research Institute, October 2003

Data Source: O\*Net

Note: Importance rankings are based on a standardized scale of 1-100.

## APPENDIX B

**FIGURE B2**  
**KNOWLEDGE AND SKILLS**  
**AMBULATORY HEALTH CARE SERVICES**

<i>Knowledge Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>	<i>Skills Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>
Clerical	45.3	53.2	49.3	Reading Comprehension	53.9	65.7	59.8
English Language	44.5	46.6	45.6	Active Listening	56.5	59.4	57.9
Customer and Personal Service	48.8	35.9	42.3	Speaking	55.0	56.0	55.5
Mathematics	41.3	40.8	41.0	Writing	46.8	52.8	49.8
Computers and Electronics	28.7	50.6	39.7	Monitoring	40.8	53.0	46.9
Medicine and Dentistry	16.0	60.5	38.3	Operation and Control	37.9	55.6	46.7
Biology	9.9	44.0	26.9	Coordination	40.2	52.1	46.1
Psychology	20.2	30.6	25.4	Mathematics	42.0	48.9	45.5
Public Safety and Security	23.7	23.9	23.8	Service Orientation	43.7	44.1	43.9
Chemistry	13.6	33.3	23.4	Social Perceptiveness	40.6	44.8	42.7
Mechanical	27.6	18.3	23.0	Judgment and Decision Making	37.0	46.8	41.9
Administration and Management	23.1	22.2	22.6	Critical Thinking	34.6	48.0	41.3
Therapy and Counseling	14.2	29.6	21.9	Complex Problem Solving	35.3	43.6	39.5
Telecommunications	24.3	18.7	21.5	Equipment Selection	34.3	44.1	39.2
Education and Training	19.9	18.3	19.1	Time Management	33.0	37.1	35.1
Communications and Media	21.8	16.1	19.0	Active Learning	29.0	40.9	34.9
Transportation	22.7	10.8	16.7	Operation Monitoring	26.1	41.3	33.7
Law and Government	18.3	14.5	16.4	Quality Control Analysis	28.6	34.2	31.4
Engineering and Technology	14.1	16.0	15.1	Science	16.2	45.5	30.8
Economics and Accounting	21.4	8.1	14.7	Learning Strategies	25.1	31.9	28.5
Physics	12.0	15.4	13.7	Systems Evaluation	26.1	30.2	28.1
Personnel and Human Resources	13.9	7.7	10.8	Instructing	24.3	25.9	25.1
Geography	16.0	5.0	10.5	Management of Material Resources	22.4	26.7	24.6
Sociology and Anthropology	8.3	8.7	8.5	Systems Analysis	20.3	27.0	23.6
Sales and Marketing	11.6	2.4	7.0	Equipment Maintenance	24.0	18.4	21.2
Production and Processing	10.6	3.4	7.0	Technology Design	17.6	21.6	19.6
Design	6.2	4.5	5.3	Operations Analysis	17.2	20.0	18.6
Building and Construction	7.3	1.8	4.5	Troubleshooting	20.6	16.1	18.4
Foreign Language	3.6	2.5	3.1	Persuasion	18.5	17.2	17.9
Food Production	3.6	0.9	2.2	Management of Personnel Resources	14.9	16.1	15.5
Philosophy and Theology	2.0	2.2	2.1	Installation	15.0	13.4	14.2
Fine Arts	2.4	0.0	1.2	Negotiation	14.5	12.5	13.5
History and Archeology	1.2	0.8	1.0	Repairing	17.9	8.8	13.4
				Management of Financial Resources	14.6	9.3	11.9
				Programming	2.5	6.1	4.3

Sacramento Regional Research Institute, October 2003

Data Source: O\*Net

Note: Importance rankings are based on a standardized scale of 1-100.

## APPENDIX B

**FIGURE B3**  
**KNOWLEDGE AND SKILLS**  
**COMPUTER AND PERIPHERAL EQUIPMENT MANUFACTURING**

<i>Knowledge Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>	<i>Skills Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>
Mathematics	49.4	65.3	57.3	Reading Comprehension	54.9	74.8	64.8
Computers and Electronics	33.2	67.0	50.1	Mathematics	52.0	71.5	61.7
English Language	42.8	53.3	48.0	Active Listening	46.4	63.0	54.7
Engineering and Technology	20.7	65.6	43.1	Speaking	47.1	59.7	53.4
Clerical	48.8	36.8	42.8	Writing	46.9	59.6	53.2
Design	15.2	69.3	42.3	Quality Control Analysis	36.3	65.3	50.8
Mechanical	34.4	40.2	37.3	Critical Thinking	36.5	60.5	48.5
Production and Processing	35.6	36.2	35.9	Complex Problem Solving	36.6	59.7	48.1
Administration and Management	22.3	41.3	31.8	Coordination	38.0	57.0	47.5
Physics	14.1	40.2	27.2	Equipment Selection	40.0	51.9	45.9
Telecommunications	19.7	33.6	26.6	Operation and Control	44.5	47.2	45.9
Economics and Accounting	27.5	21.3	24.4	Monitoring	40.6	50.0	45.3
Customer and Personal Service	30.6	18.0	24.3	Judgment and Decision Making	36.3	52.2	44.2
Communications and Media	24.7	22.0	23.4	Operations Analysis	22.4	62.5	42.5
Education and Training	17.2	22.9	20.1	Active Learning	28.8	53.8	41.3
Psychology	13.6	19.0	16.3	Operation Monitoring	30.0	47.6	38.8
Personnel and Human Resources	16.6	15.3	15.9	Technology Design	17.3	58.5	37.9
Public Safety and Security	13.9	11.1	12.5	Time Management	27.9	46.7	37.3
Transportation	16.0	9.0	12.5	Systems Evaluation	27.0	47.3	37.1
Building and Construction	12.7	11.7	12.2	Systems Analysis	22.3	49.4	35.8
Law and Government	11.1	8.3	9.7	Science	14.8	56.5	35.6
Sales and Marketing	14.7	2.9	8.8	Troubleshooting	24.8	42.8	33.8
Chemistry	9.7	4.3	7.0	Management of Material Resources	28.6	34.1	31.3
Geography	6.7	4.8	5.8	Learning Strategies	20.4	36.3	28.4
Sociology and Anthropology	5.4	5.7	5.5	Social Perceptiveness	26.8	28.7	27.7
Fine Arts	1.7	4.2	2.9	Installation	21.8	31.6	26.7
Therapy and Counseling	2.9	2.0	2.5	Equipment Maintenance	24.9	26.1	25.5
Philosophy and Theology	2.0	2.0	2.0	Service Orientation	25.2	20.9	23.1
Biology	2.0	1.4	1.7	Repairing	19.4	25.5	22.5
Food Production	2.3	0.7	1.5	Instructing	17.2	24.3	20.8
History and Archeology	1.9	0.7	1.3	Management of Personnel Resources	15.5	22.2	18.9
Medicine and Dentistry	1.7	0.7	1.2	Persuasion	15.6	21.9	18.8
Foreign Language	1.1	0.7	0.9	Negotiation	18.8	18.6	18.7
				Management of Financial Resources	18.9	18.2	18.5
				Programming	5.9	26.2	16.1

Sacramento Regional Research Institute, October 2003

Data Source: O\*Net

Note: Importance rankings are based on a standardized scale of 1-100.

## APPENDIX B

**FIGURE B4**  
**KNOWLEDGE AND SKILLS**  
**COMPUTER SYSTEMS DESIGN AND RELATED SERVICES**

<i>Knowledge Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>	<i>Skills Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>
Clerical	49.2	62.2	55.7	Reading Comprehension	57.8	71.2	64.5
Computers and Electronics	37.5	69.2	53.3	Writing	51.0	60.2	55.6
English Language	46.9	55.1	51.0	Active Listening	51.6	55.7	53.7
Mathematics	51.6	49.1	50.3	Speaking	52.8	53.5	53.1
Administration and Management	27.9	36.9	32.4	Mathematics	51.0	50.6	50.8
Telecommunications	26.9	30.9	28.9	Monitoring	42.6	52.1	47.3
Communications and Media	29.8	27.0	28.4	Complex Problem Solving	38.9	52.3	45.6
Economics and Accounting	31.7	22.8	27.3	Coordination	38.5	52.1	45.3
Customer and Personal Service	30.7	23.4	27.1	Critical Thinking	37.4	52.3	44.8
Engineering and Technology	16.2	33.8	25.0	Judgment and Decision Making	39.1	47.6	43.3
Mechanical	23.3	23.6	23.5	Active Learning	30.4	45.9	38.2
Production and Processing	26.8	18.7	22.7	Quality Control Analysis	31.9	44.3	38.1
Law and Government	15.8	26.8	21.3	Time Management	30.4	44.1	37.2
Education and Training	20.5	20.2	20.4	Equipment Selection	34.8	39.2	37.0
Design	11.3	25.5	18.4	Operation and Control	37.4	36.0	36.7
Public Safety and Security	16.6	15.6	16.1	Systems Evaluation	29.2	37.3	33.2
Personnel and Human Resources	17.3	14.8	16.0	Social Perceptiveness	31.2	34.0	32.6
Psychology	14.8	16.6	15.7	Operations Analysis	23.5	36.5	30.0
Physics	11.7	16.6	14.2	Learning Strategies	25.4	34.3	29.8
Transportation	17.4	9.5	13.4	Service Orientation	26.5	32.2	29.4
Sales and Marketing	18.3	5.7	12.0	Systems Analysis	24.2	33.6	28.9
Chemistry	7.6	11.9	9.8	Management of Material Resources	27.6	28.2	27.9
Building and Construction	10.4	7.8	9.1	Operation Monitoring	22.9	29.7	26.3
Geography	10.2	8.0	9.1	Science	13.9	36.5	25.2
Sociology and Anthropology	6.6	8.8	7.7	Troubleshooting	21.2	28.3	24.8
Therapy and Counseling	3.1	11.4	7.3	Instructing	23.9	19.3	21.6
Medicine and Dentistry	1.7	12.5	7.1	Persuasion	18.8	24.2	21.5
Biology	1.8	12.0	6.9	Negotiation	19.3	21.2	20.2
Philosophy and Theology	1.6	3.1	2.3	Technology Design	15.1	23.6	19.4
Fine Arts	4.2	0.0	2.1	Management of Financial Resources	20.3	17.8	19.0
Foreign Language	1.2	1.8	1.5	Installation	15.6	22.3	19.0
History and Archeology	1.4	1.5	1.4	Management of Personnel Resources	18.1	19.1	18.6
Food Production	0.9	0.8	0.8	Repairing	16.3	18.1	17.2
				Equipment Maintenance	19.5	13.8	16.7
				Programming	5.5	7.6	6.5

Sacramento Regional Research Institute, October 2003

Data Source: O\*Net

Note: Importance rankings are based on a standardized scale of 1-100.

## APPENDIX B

**FIGURE B5**  
**KNOWLEDGE AND SKILLS**  
**CONSTRUCTION OF BUILDINGS**

<i>Knowledge Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>	<i>Skills Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>
Mathematics	40.4	49.4	44.9	Reading Comprehension	47.3	67.1	57.2
English Language	36.2	48.8	42.5	Active Listening	45.6	56.7	51.2
Clerical	30.0	48.1	39.0	Speaking	44.0	54.8	49.4
Computers and Electronics	21.4	53.6	37.5	Mathematics	45.0	51.9	48.5
Mechanical	38.2	22.0	30.1	Writing	36.0	55.6	45.8
Customer and Personal Service	30.1	24.7	27.4	Operation and Control	41.7	45.9	43.8
Engineering and Technology	23.1	28.7	25.9	Coordination	37.2	49.2	43.2
Administration and Management	18.3	27.3	22.8	Monitoring	38.4	47.8	43.1
Public Safety and Security	21.4	21.0	21.2	Equipment Selection	43.1	41.8	42.4
Building and Construction	29.7	10.4	20.1	Critical Thinking	32.5	50.8	41.6
Design	16.3	23.0	19.6	Judgment and Decision Making	34.6	46.4	40.5
Physics	17.2	21.7	19.5	Complex Problem Solving	33.6	47.0	40.3
Communications and Media	18.3	20.4	19.4	Active Learning	26.4	44.9	35.7
Telecommunications	17.2	21.3	19.2	Quality Control Analysis	32.9	37.1	35.0
Law and Government	14.5	21.3	17.9	Time Management	27.7	38.0	32.9
Chemistry	13.4	22.4	17.9	Social Perceptiveness	26.7	34.3	30.5
Education and Training	14.8	19.8	17.3	Service Orientation	26.2	33.3	29.7
Psychology	12.5	20.0	16.3	Operation Monitoring	25.5	33.3	29.4
Economics and Accounting	18.5	13.5	16.0	Systems Evaluation	25.5	30.8	28.2
Production and Processing	20.1	11.3	15.7	Learning Strategies	21.9	33.3	27.6
Medicine and Dentistry	3.6	26.4	15.0	Science	14.7	37.9	26.3
Transportation	17.6	9.9	13.8	Operations Analysis	22.7	29.1	25.9
Biology	4.4	22.1	13.2	Systems Analysis	21.7	29.4	25.5
Geography	11.0	13.1	12.1	Management of Material Resources	24.5	25.8	25.2
Sales and Marketing	13.8	6.2	10.0	Installation	26.8	20.8	23.8
Personnel and Human Resources	11.0	8.9	9.9	Equipment Maintenance	26.2	20.0	23.1
Therapy and Counseling	4.1	15.1	9.6	Troubleshooting	23.8	21.8	22.8
Sociology and Anthropology	5.6	8.1	6.9	Instructing	17.7	22.9	20.3
Fine Arts	3.0	2.0	2.5	Technology Design	17.1	22.8	20.0
Foreign Language	2.4	2.1	2.3	Repairing	24.6	15.1	19.9
History and Archeology	1.1	3.2	2.2	Persuasion	13.5	18.6	16.0
Philosophy and Theology	1.7	2.2	1.9	Negotiation	12.8	17.6	15.2
Food Production	2.0	1.0	1.5	Management of Personnel Resources	13.4	16.3	14.9
				Management of Financial Resources	13.3	13.6	13.4
				Programming	2.2	9.9	6.0

Sacramento Regional Research Institute, October 2003

Data Source: O\*Net

Note: Importance rankings are based on a standardized scale of 1-100.

## APPENDIX B

**FIGURE B6**  
**KNOWLEDGE AND SKILLS**  
**EDUCATIONAL SERVICES**

<i>Knowledge Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>	<i>Skills Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>
Mathematics	42.2	44.6	43.4	Reading Comprehension	52.4	66.4	59.4
English Language	41.9	43.6	42.8	Active Listening	49.2	56.2	52.7
Computers and Electronics	27.3	53.6	40.5	Speaking	49.0	53.9	51.5
Clerical	36.3	36.6	36.5	Writing	42.9	54.4	48.6
Mechanical	29.4	29.5	29.5	Mathematics	44.8	50.5	47.6
Engineering and Technology	17.8	38.6	28.2	Monitoring	40.0	49.6	44.8
Customer and Personal Service	32.3	19.4	25.9	Coordination	35.7	52.1	43.9
Design	12.6	37.5	25.1	Complex Problem Solving	34.7	50.7	42.7
Administration and Management	20.2	28.9	24.6	Critical Thinking	33.1	50.6	41.8
Communications and Media	23.4	25.4	24.4	Equipment Selection	37.4	45.7	41.5
Telecommunications	20.0	26.6	23.3	Operation and Control	40.6	41.8	41.2
Production and Processing	24.9	19.1	22.0	Judgment and Decision Making	35.2	45.2	40.2
Physics	13.0	26.0	19.5	Active Learning	27.8	51.6	39.7
Education and Training	15.1	21.3	18.2	Quality Control Analysis	33.6	45.5	39.5
Economics and Accounting	20.2	15.9	18.1	Time Management	28.7	40.6	34.6
Public Safety and Security	16.9	17.6	17.2	Operations Analysis	23.2	40.6	31.9
Law and Government	13.8	19.0	16.4	Social Perceptiveness	31.5	29.9	30.7
Psychology	13.1	12.8	13.0	Systems Evaluation	25.5	35.7	30.6
Personnel and Human Resources	12.3	13.6	13.0	Operation Monitoring	26.7	32.5	29.6
Transportation	15.6	9.1	12.3	Learning Strategies	22.7	36.0	29.4
Building and Construction	11.1	12.1	11.6	Management of Material Resources	24.5	31.8	28.2
Fine Arts	8.1	14.5	11.3	Systems Analysis	20.5	35.1	27.8
Geography	10.6	11.2	10.9	Service Orientation	29.4	25.8	27.6
Sales and Marketing	15.9	4.3	10.1	Troubleshooting	22.5	31.9	27.2
Chemistry	9.5	8.3	8.9	Science	12.7	39.0	25.9
Sociology and Anthropology	6.2	7.3	6.8	Technology Design	16.9	34.7	25.8
Therapy and Counseling	2.7	6.7	4.7	Equipment Maintenance	25.4	24.2	24.8
Medicine and Dentistry	2.3	6.6	4.4	Installation	19.1	29.8	24.4
Biology	2.2	5.8	4.0	Instructing	20.5	27.2	23.9
Philosophy and Theology	1.5	4.3	2.9	Repairing	20.6	24.5	22.6
History and Archeology	1.3	3.2	2.2	Persuasion	15.2	19.8	17.5
Foreign Language	2.5	1.4	1.9	Management of Personnel Resources	14.5	19.8	17.2
Food Production	1.6	0.3	1.0	Management of Financial Resources	14.5	17.7	16.1
				Negotiation	13.6	18.2	15.9
				Programming	2.8	11.2	7.0

Sacramento Regional Research Institute, October 2003

Data Source: O\*Net

Note: Importance rankings are based on a standardized scale of 1-100.

## APPENDIX B

**FIGURE B7**  
**KNOWLEDGE AND SKILLS**  
**HEAVY AND CIVIL ENGINEERING CONSTRUCTION**

<i>Knowledge Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>	<i>Skills Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>
Mathematics	40.7	49.4	45.0	Reading Comprehension	46.2	67.1	56.7
English Language	38.4	48.8	43.6	Active Listening	47.7	56.7	52.2
Clerical	31.0	48.1	39.5	Speaking	46.5	54.8	50.6
Computers and Electronics	22.0	53.6	37.8	Mathematics	43.6	51.9	47.8
Mechanical	38.3	22.0	30.2	Writing	37.5	55.6	46.5
Customer and Personal Service	34.1	24.7	29.4	Coordination	37.8	49.2	43.5
Engineering and Technology	22.4	28.7	25.5	Operation and Control	40.3	45.9	43.1
Administration and Management	19.5	27.3	23.4	Monitoring	36.8	47.8	42.3
Public Safety and Security	22.7	21.0	21.9	Critical Thinking	31.8	50.8	41.3
Communications and Media	19.2	20.4	19.8	Equipment Selection	40.5	41.8	41.1
Physics	17.8	21.7	19.8	Judgment and Decision Making	34.1	46.4	40.2
Telecommunications	17.6	21.3	19.5	Complex Problem Solving	33.0	47.0	40.0
Design	14.0	23.0	18.5	Active Learning	25.3	44.9	35.1
Law and Government	15.5	21.3	18.4	Quality Control Analysis	30.9	37.1	34.0
Chemistry	14.3	22.4	18.4	Time Management	27.2	38.0	32.6
Education and Training	16.2	19.8	18.0	Social Perceptiveness	29.5	34.3	31.9
Psychology	14.7	20.0	17.4	Service Orientation	29.6	33.3	31.4
Building and Construction	24.3	10.4	17.4	Operation Monitoring	26.7	33.3	30.0
Economics and Accounting	19.2	13.5	16.4	Systems Evaluation	25.4	30.8	28.1
Production and Processing	20.0	11.3	15.6	Learning Strategies	21.7	33.3	27.5
Medicine and Dentistry	4.2	26.4	15.3	Science	14.9	37.9	26.4
Transportation	18.4	9.9	14.2	Systems Analysis	21.5	29.4	25.4
Biology	5.0	22.1	13.6	Operations Analysis	21.1	29.1	25.1
Geography	11.9	13.1	12.5	Management of Material Resources	24.1	25.8	25.0
Sales and Marketing	15.1	6.2	10.6	Equipment Maintenance	26.5	20.0	23.3
Personnel and Human Resources	11.3	8.9	10.1	Troubleshooting	24.5	21.8	23.2
Therapy and Counseling	5.0	15.1	10.0	Installation	22.1	20.8	21.5
Sociology and Anthropology	6.6	8.1	7.4	Instructing	18.4	22.9	20.7
Fine Arts	2.7	2.0	2.4	Technology Design	15.8	22.8	19.3
History and Archeology	1.3	3.2	2.3	Repairing	23.5	15.1	19.3
Foreign Language	2.2	2.1	2.2	Persuasion	14.2	18.6	16.4
Philosophy and Theology	1.9	2.2	2.0	Negotiation	12.7	17.6	15.2
Food Production	2.6	1.0	1.8	Management of Personnel Resources	13.6	16.3	15.0
				Management of Financial Resources	13.6	13.6	13.6
				Programming	2.3	9.9	6.1

Sacramento Regional Research Institute, October 2003

Data Source: O\*Net

Note: Importance rankings are based on a standardized scale of 1-100.



## APPENDIX B

**FIGURE B8**  
**KNOWLEDGE AND SKILLS**  
**INFORMATION**

<i>Knowledge Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>	<i>Skills Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>
English Language	43.3	45.4	44.3	Reading Comprehension	51.4	62.1	56.8
Mathematics	42.3	44.1	43.2	Active Listening	53.3	59.0	56.2
Clerical	34.9	42.9	38.9	Speaking	54.6	55.8	55.2
Customer and Personal Service	42.3	33.2	37.7	Writing	44.4	52.0	48.2
Computers and Electronics	23.9	42.6	33.3	Mathematics	44.9	46.9	45.9
Administration and Management	24.6	24.8	24.7	Monitoring	40.3	49.2	44.7
Mechanical	29.1	19.1	24.1	Coordination	40.5	47.5	44.0
Education and Training	21.7	21.3	21.5	Critical Thinking	35.1	46.4	40.7
Communications and Media	22.3	19.9	21.1	Judgment and Decision Making	37.2	43.5	40.4
Public Safety and Security	22.8	19.1	21.0	Complex Problem Solving	35.4	44.9	40.2
Engineering and Technology	16.7	23.0	19.8	Operation and Control	35.5	41.2	38.4
Psychology	18.1	20.8	19.5	Equipment Selection	35.0	41.4	38.2
Chemistry	12.7	22.4	17.6	Service Orientation	39.7	36.1	37.9
Law and Government	17.9	17.0	17.5	Social Perceptiveness	39.0	36.4	37.7
Telecommunications	18.9	15.7	17.3	Active Learning	29.8	45.0	37.4
Economics and Accounting	21.9	12.5	17.2	Time Management	32.0	39.4	35.7
Physics	13.2	19.4	16.3	Quality Control Analysis	29.4	34.7	32.1
Medicine and Dentistry	6.3	25.3	15.8	Learning Strategies	26.0	34.2	30.1
Biology	7.1	22.9	15.0	Systems Evaluation	27.7	29.4	28.5
Design	9.9	18.1	14.0	Systems Analysis	23.1	28.6	25.8
Production and Processing	17.2	9.8	13.5	Instructing	24.9	26.5	25.7
Transportation	17.8	8.5	13.1	Management of Material Resources	25.0	26.5	25.7
Personnel and Human Resources	14.8	10.4	12.6	Operation Monitoring	22.7	28.4	25.5
Sales and Marketing	17.7	5.7	11.7	Operations Analysis	21.8	28.7	25.2
Therapy and Counseling	7.4	15.3	11.3	Science	13.4	33.7	23.5
Geography	12.9	8.6	10.7	Equipment Maintenance	22.8	16.4	19.6
Building and Construction	12.3	7.6	10.0	Troubleshooting	21.8	16.4	19.1
Sociology and Anthropology	8.0	8.4	8.2	Technology Design	15.6	20.2	17.9
Fine Arts	5.6	9.5	7.6	Management of Personnel Resources	18.9	16.8	17.9
Food Production	3.8	2.2	3.0	Persuasion	17.2	18.3	17.7
Foreign Language	3.5	2.0	2.7	Installation	16.5	15.6	16.0
Philosophy and Theology	2.5	2.6	2.6	Management of Financial Resources	17.5	13.8	15.7
History and Archeology	2.0	2.8	2.4	Negotiation	15.4	15.3	15.4
				Repairing	18.5	10.0	14.2
				Programming	2.8	7.9	5.3

Sacramento Regional Research Institute, October 2003

Data Source: O\*Net

Note: Importance rankings are based on a standardized scale of 1-100.

## APPENDIX B

**FIGURE B9**  
**KNOWLEDGE AND SKILLS**  
**INSURANCE CARRIERS AND RELATED**

<i>Knowledge Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>	<i>Skills Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>
Clerical	61.3	72.4	66.8	Reading Comprehension	64.7	72.4	68.5
English Language	53.0	57.7	55.4	Active Listening	62.2	64.6	63.4
Mathematics	54.9	43.6	49.2	Speaking	60.7	63.6	62.1
Computers and Electronics	39.0	56.7	47.9	Writing	58.0	62.3	60.2
Customer and Personal Service	38.6	33.4	36.0	Monitoring	44.1	56.6	50.4
Economics and Accounting	40.2	25.1	32.7	Coordination	39.4	59.2	49.3
Administration and Management	24.8	39.8	32.3	Mathematics	52.1	43.0	47.5
Law and Government	25.4	34.2	29.8	Judgment and Decision Making	42.8	49.7	46.3
Communications and Media	29.5	28.2	28.8	Complex Problem Solving	40.6	50.4	45.5
Telecommunications	28.6	21.7	25.1	Critical Thinking	39.0	51.0	45.0
Psychology	17.2	25.5	21.3	Social Perceptiveness	37.6	48.9	43.2
Medicine and Dentistry	9.8	32.6	21.2	Time Management	30.4	50.7	40.5
Education and Training	16.1	19.8	17.9	Service Orientation	36.7	44.1	40.4
Public Safety and Security	16.9	18.9	17.9	Active Learning	31.7	43.4	37.6
Chemistry	9.9	18.7	14.3	Operation and Control	26.1	42.6	34.3
Sales and Marketing	15.8	12.6	14.2	Systems Evaluation	28.3	32.3	30.3
Biology	6.2	22.1	14.1	Learning Strategies	23.1	35.3	29.2
Personnel and Human Resources	15.5	12.4	14.0	Quality Control Analysis	26.4	31.3	28.8
Therapy and Counseling	8.0	16.2	12.1	Equipment Selection	24.5	32.2	28.4
Geography	10.7	11.6	11.1	Systems Analysis	22.9	29.0	26.0
Transportation	11.1	10.6	10.9	Management of Material Resources	20.8	30.5	25.7
Mechanical	13.3	7.3	10.3	Persuasion	20.6	29.8	25.2
Sociology and Anthropology	6.9	12.1	9.5	Negotiation	19.9	26.9	23.4
Production and Processing	12.2	1.6	6.9	Management of Financial Resources	21.2	22.5	21.8
Physics	6.3	6.5	6.4	Operation Monitoring	14.2	27.1	20.6
Engineering and Technology	7.1	4.5	5.8	Instructing	19.1	21.3	20.2
Building and Construction	7.9	3.3	5.6	Operations Analysis	15.7	24.2	19.9
Design	3.8	2.5	3.1	Science	11.7	23.8	17.7
History and Archeology	2.0	2.8	2.4	Management of Personnel Resources	12.2	20.2	16.2
Philosophy and Theology	2.0	2.6	2.3	Technology Design	10.4	13.5	11.9
Foreign Language	2.3	1.9	2.1	Troubleshooting	13.1	7.7	10.4
Fine Arts	1.7	1.9	1.8	Equipment Maintenance	10.9	5.7	8.3
Food Production	1.0	1.5	1.2	Installation	7.4	5.8	6.6
				Programming	4.7	8.5	6.6
				Repairing	6.4	2.3	4.4

Sacramento Regional Research Institute, October 2003

Data Source: O\*Net

Note: Importance rankings are based on a standardized scale of 1-100.

## APPENDIX B

**FIGURE B10**  
**KNOWLEDGE AND SKILLS**  
**NON-DEPOSITORY CREDIT INTERMEDIATION**

<i>Knowledge Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>	<i>Skills Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>
Clerical	51.8	91.1	71.4	Reading Comprehension	58.0	76.1	67.1
English Language	47.0	62.1	54.6	Writing	51.9	71.0	61.4
Computers and Electronics	34.3	65.9	50.1	Active Listening	56.1	64.6	60.3
Mathematics	55.0	38.4	46.7	Speaking	57.9	60.6	59.2
Economics and Accounting	41.3	33.6	37.4	Monitoring	42.2	57.9	50.0
Administration and Management	23.8	40.5	32.1	Coordination	32.7	66.8	49.7
Customer and Personal Service	39.1	23.5	31.3	Mathematics	55.2	39.4	47.3
Law and Government	23.4	39.0	31.2	Complex Problem Solving	37.6	54.7	46.2
Communications and Media	27.0	32.3	29.6	Time Management	25.3	61.4	43.3
Telecommunications	26.7	31.5	29.1	Judgment and Decision Making	39.9	45.0	42.4
Public Safety and Security	19.6	12.0	15.8	Critical Thinking	36.8	47.9	42.3
Education and Training	16.2	14.8	15.5	Social Perceptiveness	35.3	40.8	38.0
Personnel and Human Resources	14.6	14.5	14.5	Service Orientation	34.4	40.8	37.6
Sales and Marketing	21.6	4.3	12.9	Active Learning	29.0	40.7	34.8
Transportation	13.7	11.8	12.7	Operation and Control	26.5	41.1	33.8
Psychology	14.9	10.3	12.6	Systems Evaluation	28.4	32.4	30.4
Geography	12.1	8.7	10.4	Quality Control Analysis	25.9	32.5	29.2
Mechanical	16.0	3.3	9.6	Management of Material Resources	19.8	37.8	28.8
Production and Processing	16.7	0.8	8.8	Management of Financial Resources	22.5	32.6	27.5
Sociology and Anthropology	6.4	8.5	7.4	Equipment Selection	24.3	30.3	27.3
Building and Construction	12.2	0.0	6.1	Learning Strategies	20.8	33.7	27.2
Physics	8.8	3.0	5.9	Persuasion	19.6	29.2	24.4
Engineering and Technology	10.5	0.8	5.6	Systems Analysis	22.1	26.6	24.4
Chemistry	7.6	0.0	3.8	Negotiation	18.4	28.5	23.4
Design	7.2	0.0	3.6	Operations Analysis	16.5	28.5	22.5
Therapy and Counseling	3.8	3.3	3.6	Operation Monitoring	14.9	16.0	15.4
History and Archeology	2.1	4.8	3.5	Management of Personnel Resources	11.8	18.9	15.4
Fine Arts	2.9	3.0	3.0	Instructing	16.8	13.4	15.1
Philosophy and Theology	1.6	3.5	2.5	Troubleshooting	16.0	6.2	11.1
Foreign Language	2.2	2.6	2.4	Technology Design	9.5	9.5	9.5
Medicine and Dentistry	2.5	1.0	1.8	Science	9.8	8.9	9.3
Biology	1.8	0.0	0.9	Programming	5.3	12.2	8.7
Food Production	0.8	0.0	0.4	Installation	10.2	5.8	8.0
				Equipment Maintenance	13.2	1.8	7.5
				Repairing	9.9	1.8	5.8

Sacramento Regional Research Institute, October 2003

Data Source: O\*Net

Note: Importance rankings are based on a standardized scale of 1-100.

## APPENDIX B

**FIGURE B11**  
**KNOWLEDGE AND SKILLS**  
**RETAIL TRADE**

<i>Knowledge Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>	<i>Skills Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>
Mechanical	39.7	40.9	40.3	Reading Comprehension	46.8	54.9	50.9
Mathematics	39.1	39.1	39.1	Equipment Selection	43.5	53.8	48.6
Computers and Electronics	21.6	56.4	39.0	Mathematics	44.7	51.9	48.3
English Language	35.2	34.6	34.9	Active Listening	44.9	51.1	48.0
Clerical	30.0	33.2	31.6	Operation and Control	42.9	46.1	44.5
Customer and Personal Service	32.1	28.6	30.4	Speaking	41.9	43.0	42.4
Engineering and Technology	23.0	36.3	29.6	Quality Control Analysis	36.3	46.4	41.3
Production and Processing	27.0	17.4	22.2	Writing	37.8	39.6	38.7
Design	14.1	29.6	21.9	Monitoring	36.9	39.9	38.4
Telecommunications	15.4	25.9	20.7	Complex Problem Solving	32.6	41.3	37.0
Physics	15.5	22.8	19.1	Judgment and Decision Making	34.2	39.4	36.8
Administration and Management	18.0	17.3	17.6	Critical Thinking	31.5	41.1	36.3
Building and Construction	17.2	17.9	17.6	Coordination	33.0	39.2	36.1
Public Safety and Security	17.5	17.0	17.3	Repairing	28.4	41.2	34.8
Economics and Accounting	17.9	15.3	16.6	Troubleshooting	27.8	41.8	34.8
Communications and Media	16.9	15.8	16.4	Operation Monitoring	29.4	37.3	33.3
Transportation	15.6	11.1	13.3	Installation	26.3	40.0	33.1
Education and Training	13.6	11.8	12.7	Equipment Maintenance	30.4	35.4	32.9
Sales and Marketing	15.9	7.1	11.5	Active Learning	25.8	37.3	31.5
Chemistry	13.4	6.6	10.0	Time Management	27.1	33.4	30.3
Psychology	10.3	9.6	10.0	Service Orientation	28.1	31.6	29.8
Law and Government	11.8	7.8	9.8	Operations Analysis	22.1	32.8	27.4
Personnel and Human Resources	10.6	6.5	8.5	Management of Material Resources	24.4	29.3	26.8
Biology	4.5	8.8	6.6	Science	15.8	37.1	26.5
Geography	8.4	4.7	6.5	Systems Evaluation	25.4	27.2	26.3
Food Production	5.9	3.6	4.8	Technology Design	19.0	31.3	25.1
Medicine and Dentistry	2.4	5.8	4.1	Social Perceptiveness	27.2	22.8	25.0
Sociology and Anthropology	4.7	3.0	3.9	Learning Strategies	20.7	28.7	24.7
Fine Arts	4.0	1.6	2.8	Systems Analysis	20.1	26.5	23.3
Therapy and Counseling	2.1	3.3	2.7	Instructing	17.0	15.9	16.5
Philosophy and Theology	1.1	1.9	1.5	Management of Financial Resources	13.2	17.3	15.2
Foreign Language	1.6	0.3	0.9	Persuasion	14.1	12.3	13.2
History and Archeology	0.9	0.0	0.5	Negotiation	12.8	10.4	11.6
				Management of Personnel Resources	12.8	9.8	11.3
				Programming	2.4	4.0	3.2

Sacramento Regional Research Institute, October 2003

Data Source: O\*Net

Note: Importance rankings are based on a standardized scale of 1-100.

## APPENDIX B

**FIGURE B12**  
**KNOWLEDGE AND SKILLS**  
**SEMICONDUCTOR AND ELECTRONIC COMPONENT MANUFACTURING**

<i>Knowledge Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>	<i>Skills Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>
Mathematics	45.5	56.5	51.0	Reading Comprehension	52.4	68.3	60.4
Computers and Electronics	28.1	61.3	44.7	Mathematics	51.6	65.2	58.4
English Language	35.6	49.1	42.4	Operation and Control	52.8	47.0	49.9
Mechanical	44.8	36.2	40.5	Quality Control Analysis	42.9	56.6	49.7
Engineering and Technology	28.5	50.5	39.5	Equipment Selection	47.2	51.5	49.4
Clerical	33.7	41.3	37.5	Writing	40.8	54.9	47.9
Production and Processing	41.4	30.7	36.1	Active Listening	40.0	54.5	47.3
Design	20.6	47.1	33.8	Critical Thinking	34.9	55.1	45.0
Physics	20.6	32.2	26.4	Speaking	39.0	48.9	43.9
Administration and Management	16.8	32.3	24.6	Monitoring	39.5	48.3	43.9
Communications and Media	18.1	20.1	19.1	Complex Problem Solving	34.4	52.5	43.5
Telecommunications	15.2	21.3	18.3	Operation Monitoring	41.1	41.5	41.3
Customer and Personal Service	21.9	11.6	16.7	Coordination	31.2	50.2	40.7
Economics and Accounting	17.8	15.4	16.6	Judgment and Decision Making	34.3	46.3	40.3
Education and Training	14.1	17.8	15.9	Active Learning	28.4	49.7	39.0
Building and Construction	17.2	14.3	15.7	Operations Analysis	25.9	48.8	37.4
Public Safety and Security	17.5	11.6	14.5	Science	21.8	48.1	35.0
Chemistry	16.1	12.8	14.4	Troubleshooting	28.8	38.5	33.7
Personnel and Human Resources	11.7	12.4	12.0	Systems Evaluation	26.2	39.7	32.9
Psychology	9.7	11.9	10.8	Technology Design	20.7	43.0	31.8
Transportation	13.5	6.2	9.8	Time Management	23.6	38.8	31.2
Law and Government	11.1	8.1	9.6	Systems Analysis	22.0	40.3	31.2
Sales and Marketing	9.5	1.6	5.5	Equipment Maintenance	32.1	25.7	28.9
Geography	5.9	2.6	4.2	Management of Material Resources	23.9	32.0	27.9
Sociology and Anthropology	3.8	3.9	3.8	Learning Strategies	21.3	32.8	27.0
Biology	2.0	4.4	3.2	Installation	26.4	27.7	27.0
Fine Arts	2.5	2.3	2.4	Repairing	26.3	22.6	24.4
Therapy and Counseling	1.9	1.6	1.7	Social Perceptiveness	21.2	22.7	21.9
Food Production	2.3	0.8	1.6	Instructing	16.8	21.0	18.9
Medicine and Dentistry	1.6	1.3	1.4	Service Orientation	16.9	18.4	17.6
Philosophy and Theology	1.1	1.1	1.1	Management of Personnel Resources	13.2	19.1	16.1
Foreign Language	1.6	0.4	1.0	Persuasion	12.4	18.4	15.4
History and Archeology	1.2	0.8	1.0	Negotiation	14.1	16.2	15.1
				Management of Financial Resources	13.2	16.5	14.8
				Programming	5.4	18.7	12.1

Sacramento Regional Research Institute, October 2003

Data Source: O\*Net

Note: Importance rankings are based on a standardized scale of 1-100.

## APPENDIX B

**FIGURE B13**  
**KNOWLEDGE AND SKILLS**  
**SOCIAL ASSISTANCE**

<i>Knowledge Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>	<i>Skills Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>
Clerical	43.9	71.8	57.9	Active Listening	56.9	65.8	61.4
English Language	46.0	56.5	51.3	Reading Comprehension	52.6	68.0	60.3
Customer and Personal Service	51.6	44.9	48.3	Speaking	57.3	62.6	60.0
Mathematics	41.7	42.9	42.3	Writing	47.8	58.8	53.3
Administration and Management	32.7	37.4	35.1	Coordination	44.3	53.7	49.0
Computers and Electronics	22.9	46.0	34.4	Service Orientation	45.7	51.7	48.7
Psychology	25.3	39.7	32.5	Social Perceptiveness	45.5	51.3	48.4
Education and Training	28.2	32.1	30.1	Monitoring	40.7	55.0	47.9
Medicine and Dentistry	11.1	38.7	24.9	Time Management	37.6	46.5	42.0
Therapy and Counseling	13.8	31.1	22.5	Judgment and Decision Making	38.7	44.8	41.7
Telecommunications	21.4	21.9	21.6	Mathematics	41.1	41.6	41.3
Communications and Media	20.4	22.8	21.6	Complex Problem Solving	35.5	45.9	40.7
Economics and Accounting	26.2	15.2	20.7	Critical Thinking	35.8	42.8	39.3
Public Safety and Security	22.4	17.5	19.9	Learning Strategies	29.6	37.9	33.7
Biology	9.4	27.4	18.4	Active Learning	29.3	37.9	33.6
Chemistry	13.4	21.5	17.4	Operation and Control	31.4	35.1	33.3
Law and Government	18.8	15.5	17.2	Instructing	30.9	34.3	32.6
Personnel and Human Resources	22.4	11.7	17.0	Equipment Selection	29.9	30.8	30.4
Transportation	18.6	11.3	15.0	Systems Evaluation	27.4	29.0	28.2
Mechanical	19.0	8.1	13.5	Management of Material Resources	26.0	25.3	25.6
Sociology and Anthropology	11.3	15.1	13.2	Systems Analysis	22.8	26.9	24.9
Geography	13.1	7.3	10.2	Quality Control Analysis	24.0	24.6	24.3
Sales and Marketing	13.6	3.1	8.4	Management of Personnel Resources	23.4	21.6	22.5
Production and Processing	14.3	2.0	8.2	Persuasion	18.6	21.6	20.1
Physics	9.5	5.5	7.5	Science	10.5	29.2	19.8
Engineering and Technology	8.4	4.2	6.3	Operations Analysis	19.0	20.5	19.7
Food Production	6.4	1.8	4.1	Operation Monitoring	17.9	19.8	18.9
Philosophy and Theology	3.1	4.4	3.8	Negotiation	17.0	16.7	16.9
History and Archeology	2.1	4.3	3.2	Management of Financial Resources	18.9	14.6	16.8
Foreign Language	3.1	3.2	3.1	Technology Design	11.3	12.4	11.8
Building and Construction	5.3	0.6	3.0	Equipment Maintenance	15.7	5.1	10.4
Fine Arts	3.2	2.5	2.8	Troubleshooting	13.4	7.1	10.2
Design	3.9	1.3	2.6	Installation	8.5	5.7	7.1
				Repairing	10.2	1.9	6.0
				Programming	2.3	3.9	3.1

Sacramento Regional Research Institute, October 2003

Data Source: O\*Net

Note: Importance rankings are based on a standardized scale of 1-100.

## APPENDIX B

**FIGURE B14**  
**KNOWLEDGE AND SKILLS**  
**SPECIALTY TRADE CONTRACTORS**

<i>Knowledge Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>	<i>Skills Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>
Mechanical	49.9	44.7	47.3	Mathematics	47.9	64.3	56.1
Computers and Electronics	19.7	68.6	44.2	Reading Comprehension	44.6	64.6	54.6
Mathematics	37.2	49.0	43.1	Equipment Selection	46.1	54.7	50.4
Engineering and Technology	30.7	50.5	40.6	Active Listening	44.0	50.6	47.3
Design	21.5	52.7	37.1	Speaking	39.8	45.8	42.8
English Language	30.0	38.9	34.5	Operation and Control	37.0	48.4	42.7
Building and Construction	38.2	19.3	28.7	Quality Control Analysis	31.2	52.6	41.9
Clerical	24.7	29.3	27.0	Writing	34.3	48.8	41.6
Physics	20.1	31.3	25.7	Coordination	36.2	45.3	40.7
Telecommunications	15.2	32.3	23.8	Critical Thinking	29.6	51.7	40.7
Production and Processing	20.4	24.0	22.2	Complex Problem Solving	32.7	47.8	40.2
Customer and Personal Service	21.2	19.0	20.1	Monitoring	36.4	42.6	39.5
Administration and Management	13.2	23.2	18.2	Installation	30.3	46.9	38.6
Public Safety and Security	18.0	16.5	17.2	Judgment and Decision Making	31.8	44.1	37.9
Economics and Accounting	15.3	17.3	16.3	Active Learning	24.0	47.4	35.7
Communications and Media	15.5	15.7	15.6	Troubleshooting	19.4	51.5	35.4
Transportation	16.4	9.8	13.1	Repairing	24.2	46.0	35.1
Education and Training	10.9	14.9	12.9	Operations Analysis	22.0	44.0	33.0
Law and Government	10.9	7.1	9.0	Time Management	25.0	34.1	29.6
Psychology	7.6	10.0	8.8	Equipment Maintenance	21.3	37.6	29.5
Geography	10.0	7.3	8.7	Technology Design	16.2	42.4	29.3
Personnel and Human Resources	7.4	8.7	8.1	Systems Evaluation	23.3	34.4	28.8
Chemistry	12.9	2.9	7.9	Operation Monitoring	18.0	39.6	28.8
Sales and Marketing	11.3	4.2	7.8	Management of Material Resources	24.3	33.0	28.6
Sociology and Anthropology	3.6	1.9	2.7	Systems Analysis	19.5	36.3	27.9
Fine Arts	2.6	0.9	1.8	Science	11.6	43.0	27.3
Therapy and Counseling	1.3	2.0	1.6	Learning Strategies	19.5	29.8	24.7
Philosophy and Theology	0.9	2.1	1.5	Service Orientation	22.4	27.0	24.7
Medicine and Dentistry	1.4	0.9	1.1	Social Perceptiveness	22.9	20.8	21.8
Foreign Language	1.3	0.4	0.8	Management of Financial Resources	12.6	21.4	17.0
Biology	1.1	0.0	0.5	Instructing	14.3	18.6	16.5
History and Archeology	0.6	0.0	0.3	Persuasion	13.7	13.5	13.6
Food Production	0.1	0.0	0.1	Negotiation	12.2	14.0	13.1
				Management of Personnel Resources	10.2	15.0	12.6
				Programming	1.8	17.1	9.5

Sacramento Regional Research Institute, October 2003

Data Source: O\*Net

Note: Importance rankings are based on a standardized scale of 1-100.

## APPENDIX B

**FIGURE B15**  
**KNOWLEDGE AND SKILLS**  
**STATE AND LOCAL GOVERNMENT**

<i>Knowledge Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>	<i>Skills Category</i>	<i>Low Skilled</i>	<i>Moderate Skilled</i>	<i>Overall</i>
English Language	39.9	48.9	44.4	Reading Comprehension	50.3	67.1	58.7
Mathematics	38.4	49.6	44.0	Active Listening	50.9	57.4	54.2
Computers and Electronics	23.5	51.8	37.6	Speaking	50.3	55.9	53.1
Clerical	32.0	43.1	37.5	Writing	42.9	54.3	48.6
Mechanical	36.7	22.1	29.4	Mathematics	41.7	54.3	48.0
Customer and Personal Service	33.0	25.7	29.3	Critical Thinking	37.7	54.3	46.0
Public Safety and Security	29.3	23.3	26.3	Coordination	40.2	49.2	44.7
Engineering and Technology	22.3	27.6	25.0	Judgment and Decision Making	40.7	46.8	43.7
Administration and Management	22.5	26.2	24.4	Operation and Control	42.6	44.3	43.5
Law and Government	20.4	24.2	22.3	Equipment Selection	41.9	43.6	42.8
Medicine and Dentistry	9.1	32.3	20.7	Monitoring	39.8	44.9	42.3
Chemistry	16.9	24.3	20.6	Complex Problem Solving	36.6	47.4	42.0
Communications and Media	20.5	20.3	20.4	Active Learning	30.7	46.2	38.4
Telecommunications	18.9	20.6	19.7	Quality Control Analysis	34.0	37.1	35.6
Psychology	15.6	22.1	18.9	Time Management	32.2	37.5	34.9
Physics	16.8	20.5	18.6	Social Perceptiveness	33.4	35.4	34.4
Education and Training	18.0	18.7	18.4	Service Orientation	33.0	33.0	33.0
Biology	8.9	27.6	18.3	Operation Monitoring	29.4	34.9	32.1
Design	11.0	22.0	16.5	Systems Evaluation	29.2	32.1	30.7
Transportation	21.0	8.2	14.6	Science	19.1	41.8	30.4
Production and Processing	18.4	9.6	14.0	Learning Strategies	25.5	34.0	29.8
Economics and Accounting	15.4	12.4	13.9	Systems Analysis	25.1	31.6	28.3
Building and Construction	16.5	8.7	12.6	Equipment Maintenance	29.5	21.8	25.6
Geography	15.4	9.6	12.5	Management of Material Resources	25.4	25.8	25.6
Therapy and Counseling	7.7	16.3	12.0	Operations Analysis	22.0	28.8	25.4
Personnel and Human Resources	13.0	9.4	11.2	Troubleshooting	27.1	23.5	25.3
Sociology and Anthropology	8.0	8.7	8.3	Instructing	22.8	23.8	23.3
Sales and Marketing	9.8	6.1	7.9	Technology Design	17.3	25.3	21.3
Food Production	4.8	2.8	3.8	Installation	20.9	21.7	21.3
Fine Arts	4.3	1.8	3.1	Repairing	23.5	18.3	20.9
Foreign Language	3.5	2.0	2.8	Persuasion	16.5	22.3	19.4
History and Archeology	2.2	2.9	2.5	Negotiation	14.1	20.4	17.3
Philosophy and Theology	2.2	2.1	2.2	Management of Personnel Resources	17.1	17.3	17.2
				Management of Financial Resources	13.9	12.9	13.4
				Programming	2.4	11.2	6.8

Sacramento Regional Research Institute, October 2003

Data Source: O\*Net

Note: Importance rankings are based on a standardized scale of 1-100.



## O\*Net Definitions of Knowledge and Skills Categories

### Knowledge Categories

- Administration and Management—knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.
- Biology—knowledge of plant and animal organisms, their tissues, cells, functions, interdependencies, and interactions with each other and the environment.
- Building and Construction—knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.
- Chemistry—knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.
- Clerical—knowledge of administrative and clerical procedures and systems such as word processing, managing files and records, stenography and transcription, designing forms, and other office procedures and terminology.
- Communications and Media—knowledge of media production, communication, and dissemination techniques and methods. This includes alternative ways to inform and entertain via written, oral, and visual media.
- Computers and Electronics—knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.
- Customer and Personal Service—knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.
- Design—knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.
- Economics and Accounting—knowledge of economic and accounting principles and practices, the financial markets, banking and the analysis and reporting of financial data.
- Education and Training—knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.
- Engineering and Technology—knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.
- English Language—knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.
- Fine Arts—knowledge of the theory and techniques required to compose, produce, and perform works of music, dance, visual arts, drama, and sculpture.

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- Food Production—knowledge of techniques and equipment for planting, growing, and harvesting food products (both plant and animal) for consumption, including storage/handling techniques.
- Foreign Language—knowledge of the structure and content of a foreign (non-English) language including the meaning and spelling of words, rules of composition and grammar, and pronunciation.
- Geography—knowledge of principles and methods for describing the features of land, sea, and air masses, including their physical characteristics, locations, interrelationships, and distribution of plant, animal, and human life.
- History and Archeology—knowledge of historical events and their causes, indicators, and effects on civilizations and cultures.
- Law and Government—knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.
- Mathematics—knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.
- Mechanical—knowledge of machines and tools, including their designs, uses, repair, and maintenance.
- Medicine and Dentistry—knowledge of the information and techniques needed to diagnose and treat human injuries, diseases, and deformities. This includes symptoms, treatment alternatives, drug properties and interactions, and preventive health-care measures.
- Personnel and Human Resources—knowledge of principles and procedures for personnel recruitment, selection, training, compensation and benefits, labor relations and negotiation, and personnel information systems.
- Philosophy and Theology—knowledge of different philosophical systems and religions. This includes their basic principles, values, ethics, ways of thinking, customs, practices, and their impact on human culture.
- Physics—knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.
- Production and Processing—knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.
- Psychology—knowledge of human behavior and performance; individual differences in ability, personality, and interests; learning and motivation; psychological research methods; and the assessment and treatment of behavioral and affective disorders.
- Public Safety and Security—knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.
- Sales and Marketing—knowledge of principles and methods for showing, promoting, and selling products or services. This includes marketing strategy and tactics, product demonstration, sales techniques, and sales control systems.

- Sociology and Anthropology—knowledge of group behavior and dynamics, societal trends and influences, human migrations, ethnicity, cultures and their history and origins.
- Telecommunications—knowledge of transmission, broadcasting, switching, control, and operation of telecommunications systems.
- Therapy and Counseling—knowledge of principles, methods, and procedures for diagnosis, treatment, and rehabilitation of physical and mental dysfunctions, and for career counseling and guidance.
- Transportation—knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.

### **Skills Categories**

- Active Learning—understanding the implications of new information for both current and future problem-solving and decision-making.
- Active Listening—giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.
- Complex Problem Solving—identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.
- Coordination—adjusting actions in relation to others' actions.
- Critical Thinking—using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.
- Equipment Maintenance—performing routine maintenance on equipment and determining when and what kind of maintenance is needed.
- Equipment Selection—determining the kind of tools and equipment needed to do a job.
- Installation—installing equipment, machines, wiring, or programs to meet specifications.
- Instructing—teaching others how to do something.
- Judgment and Decision Making—considering the relative costs and benefits of potential actions to choose the most appropriate one.
- Learning Strategies—selecting and using training/instructional methods and procedures appropriate for the situation when learning or teaching new things.
- Management of Financial Resources—determining how money will be spent to get the work done, and accounting for these expenditures.
- Management of Material Resources—obtaining and seeing to the appropriate use of equipment, facilities, and materials needed to do certain work.
- Management of Personnel Resources—motivating, developing, and directing people as they work, identifying the best people for the job.
- Mathematics—using mathematics to solve problems.
- Monitoring—monitoring/assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.
- Negotiation—bringing others together and trying to reconcile differences.

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- Operation and Control—controlling operations of equipment or systems.
- Operation Monitoring—watching gauges, dials, or other indicators to make sure a machine is working properly.
- Operations Analysis—analyzing needs and product requirements to create a design.
- Persuasion—persuading others to change their minds or behavior.
- Programming—writing computer programs for various purposes.
- Quality Control Analysis—conducting tests and inspections of products, services, or processes to evaluate quality or performance.
- Reading Comprehension—understanding written sentences and paragraphs in work related documents.
- Repairing—repairing machines or systems using the needed tools.
- Science—using scientific rules and methods to solve problems.
- Service Orientation—actively looking for ways to help people.
- Social Perceptiveness—being aware of others' reactions and understanding why they react as they do.
- Speaking—talking to others to convey information effectively.
- Systems Analysis—determining how a system should work and how changes in conditions, operations, and the environment will affect outcomes.
- Systems Evaluation—identifying measures or indicators of system performance and the actions needed to improve or correct performance, relative to the goals of the system.
- Technology Design—generating or adapting equipment and technology to serve user needs.
- Time Management—managing one's own time and the time of others.
- Troubleshooting—determining causes of operating errors and deciding what to do about it.
- Writing—communicating effectively in writing as appropriate for the needs of the audience.