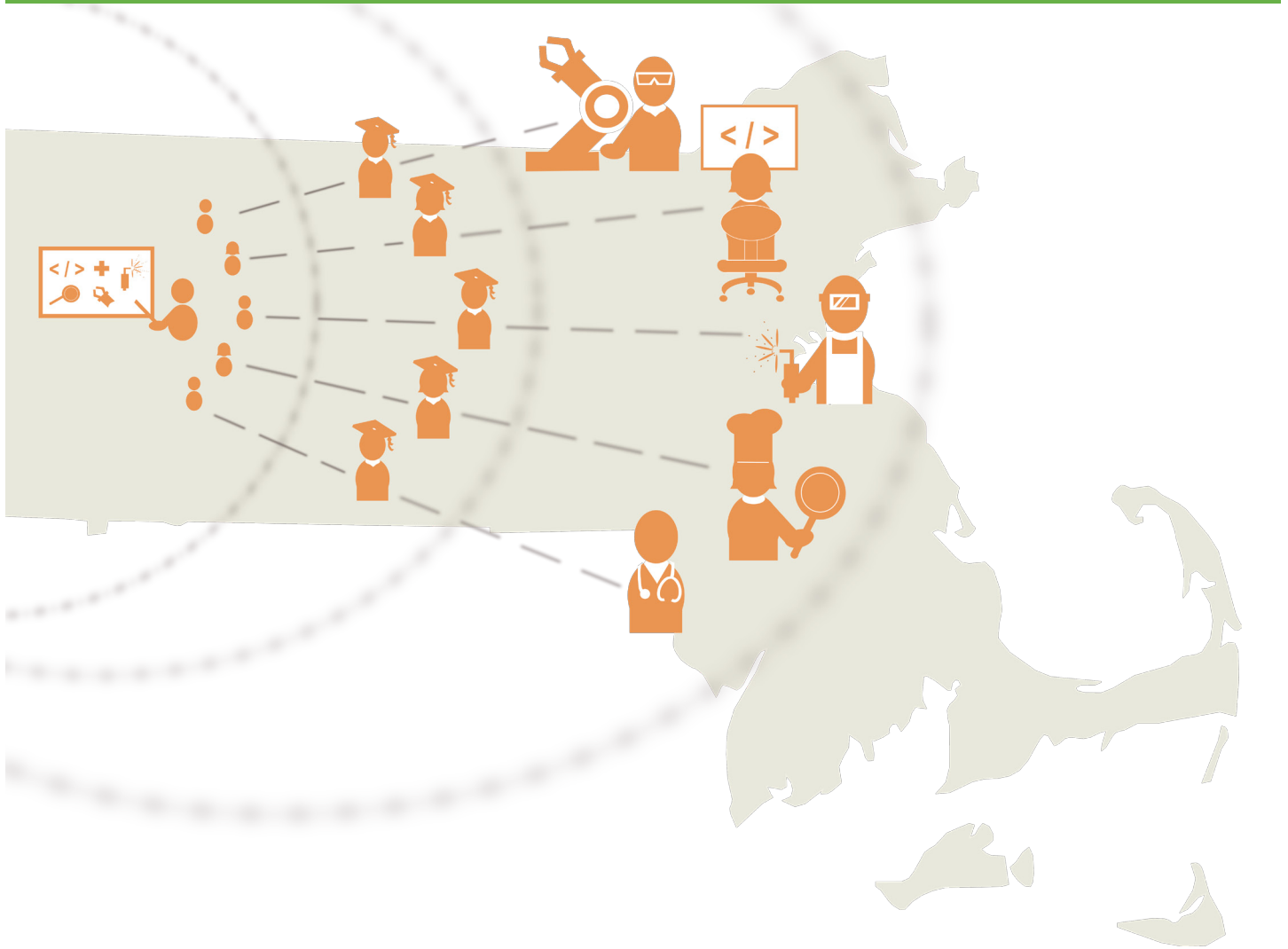


MEETING THE COMMONWEALTH'S WORKFORCE NEEDS: Occupational Projections and Vocational Education

OCTOBER 2015



Northeastern University
Kitty and Michael Dukakis Center for
Urban and Regional Policy

In conjunction with the
Massachusetts School
Building Authority

Alan Clayton-Matthews
Barry Bluestone
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Northeastern University
*Dukakis Center for Urban
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Massachusetts School Building Authority
Funding Affordable, Sustainable, and Efficient Schools in Partnership with Local Communities

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Research & Survey Data

The research and data for this report was collected, analyzed, and organized by the team of Barry Bluestone (Director), Alan Clayton-Matthews (Senior Research Associate), and Nancy Lee (Former Senior Research Associate) at the Dukakis Center for Urban & Regional Policy. In addition, David J. Ferreira, Executive Director of the Massachusetts Association of Vocational Administrators (M.A.V.A.) and 72 vocational school administrators participated in the online survey administered by the Dukakis Center for Urban & Regional Policy.

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Kitty and Michael Dukakis Center for Urban & Regional Policy

The Kitty and Michael Dukakis Center for Urban & Regional Policy conducts interdisciplinary research, in collaboration with civic leaders and scholars both within and beyond Northeastern University, to identify and implement real solutions to the critical challenges facing urban areas throughout Greater Boston, the Commonwealth of Massachusetts, and the nation. Founded in 1999 as a “think and do” tank, the Dukakis Center's collaborative research and problem-solving model applies powerful data analysis, a bevy of multidisciplinary research and evaluation techniques, and a policy-driven perspective to address a wide range of issues facing cities and towns. These include affordable housing, local economic development, workforce development, transportation, public finance, and environmental sustainability. The staff of the Dukakis Center works to catalyze broad-based efforts to solve urban problems, acting as both a convener and a trusted and committed partner to local, state, and national agencies and organizations. The Center is housed within Northeastern University's innovative School of Public Policy and Urban Affairs.

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STATE TREASURER & RECEIVER GENERAL, DEBORAH B. GOLDBERG



As treasurer, I have the privilege of supporting a range of initiatives that impact long-term sustainable economic growth in our state.

At the Massachusetts School Building Authority (MSBA), we are investing in 21st century classrooms where teachers are able to provide the education necessary for the jobs here in Massachusetts. *Meeting the Commonwealth's Workforce Needs* utilizes comprehensive data and innovative analysis to further explore this relationship between what our students learn today and educational requirements the job market will demand tomorrow.

A core piece of our mission at the MSBA is to enhance how we align capital projects in our schools with the critical thinking that a global economy demands across a range of industries – from health IT, precision manufacturing, service industries, and even cosmetology. As we work with communities across the state, we believe we can better match our school buildings to provide the environments needed for the skill sets necessary to grow our economic base. This also underscores the need to support 21st century learning in our public schools that is defined by project-based skill attainment, group workspace, and flexible classrooms.

The diversity of the Massachusetts economy highlights the need for strong post-secondary education options for our students, from vocational-technical schools and programs, to community colleges, and four-year colleges and universities. This report offers key insights into how these educational opportunities and challenges relate to the labor market.

I am grateful to Northeastern University's Kitty and Michael Dukakis Center for Urban and Regional Policy and the thoughtful work from Alan Clayton-Matthews, Barry Bluestone, and Nancy Lee who made this report possible. At the MSBA, we look forward to helping shape the discussion around the state's future labor demands. Working together we will ensure that our state achieves its full economic potential.

MSBA EXECUTIVE DIRECTOR, JOHN K. McCARTHY

The mission of the Massachusetts School Building Authority (MSBA) is to partner with Massachusetts communities to support the design and construction of educationally-appropriate, flexible, sustainable, and cost-effective public school facilities. We are proud to say that since our inception in 2004, we have invested over \$11B in hundreds of communities throughout the Commonwealth. This investment enables communities to create 21st century learning environments that will allow Massachusetts students to compete in the 21st century economy. Today we are working with communities to construct, renovate, and repair projects for more than 300 community schools. The MSBA recognizes that our impact extends beyond the enriched learning environments that result from our partnerships with the communities. These construction projects play a major role in the state's economy.



Last year the MSBA commissioned The Dukakis Center for Urban and Regional Planning (The Dukakis Center) to quantify the direct and indirect economic benefits that flow to our state and its workers as a result of our programs. The resulting report, *The Economic Impact of MSBA Investments on the Massachusetts Economy**, showed that the MSBA has added:

- \$7.764 billion to the Massachusetts Gross State Product
- Close to 10,000 jobs per year
- \$4.526 billion in total employment earnings
- \$411.8 million in total additional state tax revenue including:
 - \$296.3 million in additional state personal income tax revenue
 - \$67.1 million in additional state sales tax revenue
 - \$48.5 million in additional state business tax revenue

More recently, the MSBA decided to focus on one type of educational facilities we construct – vocational high schools – to better understand the important role graduates of these schools will have in our 21st century economy. We commissioned The Dukakis Center to conduct a labor market analysis and prepare a report that answered the following questions concerning the unique opportunities vocational education schools provide to the Commonwealth's students.

1. Is the MSBA constructing vocational facilities with programs that are still relevant in today's economy?
2. Are there areas of the economy where additional vocational programs are needed?

This report encompasses much more than the two questions posed and provides a view of what jobs are needed in the future, and how vocational programs fit in the future economy.

The MSBA thanks Barry Bluestone and Alan Clayton-Matthews of The Dukakis Center. They have been great partners in our journey to preparing Massachusetts students for the 21st century economy.

*View *The Economic Impact of MSBA Investments on the Massachusetts Economy* report on the MSBA website at: http://www.massschoolbuildings.org/news_events/Economic_Impact_Report

EXECUTIVE SUMMARY

Many have argued that to successfully compete in the 21st Century U.S. labor market one needs at least a four-year college education. Indeed, for many of the best paid jobs in the Commonwealth, there is some truth to this claim. To compete with young workers with an advanced education who are coming to Massachusetts to find employment, it is necessary that we do everything we can to assure that all of our own residents who can benefit from a bachelor's degree or graduate study are afforded this opportunity.

But as this research reveals, by the beginning of the next decade a majority of expected job openings in Massachusetts will still require less formal education than the B.A. degree with a large majority requiring no more than vocational education or a community college associates degree.

This conclusion is based on new research that projects the education requirements needed to fill the jobs that likely will become open in Massachusetts by 2022. The Dukakis Center for Urban and Regional Policy at Northeastern analyzed U.S. Department of Labor projections to estimate the number of likely job openings in each of 675 detailed occupations between 2012 and 2022. Then, using U.S. Census Bureau American Community Survey data on current Massachusetts workers and the education trajectory of vocational school graduates, we projected how many of these future job openings in each detailed occupation could be filled with workers who will likely attend vocational schools in the Commonwealth. Finally, a survey of vocational school administrators was conducted to ascertain whether the state's vocational schools are prepared to meet future labor market needs.

This report has six major conclusions:

- Between 2012 and 2022, our research projects a total of nearly 1.2 million job openings in the Commonwealth. Two-thirds (66%) of all these expected job openings — nearly 780,000 — will occur as the result of retirements from existing jobs and the need for replacement workers who choose to leave a job in a particular occupation for another one. The remaining 382,000 of these projected job openings will occur as the result of net new job creation — an increase of 11.4 percent over 2012 levels. As such, simply looking at net employment growth misses two-thirds of the action in the coming Massachusetts labor market. Moreover, unless there is a profound change in the education requirements for these projected job openings, the vast majority of these replacement jobs will require little more education than that of current workers who occupy these positions.
- More than three out of five of the nearly 1.2 million job openings (63%) — due to net new job creation plus the need for replacement workers — will require less than a B.A. degree and one-third (33%) will require no more than a high school degree.
- Assuming no expansion of the vocational school system in Massachusetts, vocational school graduates will be able to fill approximately 11.7 percent of all job openings by 2022. Many of these jobs will be filled by students who go no further than a degree from a vocational school. But based on the experience of recent vocational school graduates, we expect a large number of future graduates to pursue additional education. As such,

while the state's future vocational school graduates will fill nearly 16 percent of all projected openings requiring no more than a high school degree, those going on to further education could fill 11 percent of openings requiring some college, 23 percent of openings requiring a community college associates degree, and nearly six percent of openings requiring a B.A. or more.

- Notwithstanding the vocational schools' ability to meet a significant portion of Massachusetts projected job openings, the Commonwealth's vocational schools need to find a way to increase their efforts at preparing workers for fields that are most dependent on such training. Mainly because of the need to fill jobs vacated by retiring workers, by 2022 Massachusetts employers will need to fill 27,000 job openings in Production Occupations and nearly 43,000 in Construction and Extraction Occupations. At present rates, the Commonwealth's vocational schools are projected to meet only 23 percent of expected demand for production workers about 23 percent in Construction.
- While various regions of the state have vocational schools that seem to be positioned well to meet their regions' projected occupational openings, there are other areas of the state including the City of Boston, the Metro North Region, Metro Southwest, and the Cape & Islands where more attention needs to be paid to increasing the capacity of vocational schools to meet projected job needs.
- A concurrent Dukakis Center analysis of the state's regional vocational schools and comprehensive schools with vocational programs suggests that for the most part the administrators of these schools are well aware of specific future occupational demand in the Commonwealth and are trying to meet that demand. With additional resources these schools could be well positioned to increase their training capacity to meet the Commonwealth's need for skilled workers.

Report Highlights

“... The majority of the expected job openings in MA between now and 2022 will require no more than a vocational education or a community college associate's degree.” (*Introduction, Page 5*)

“...net growth in employment of nearly 382,000 jobs — an 11.4 percent increase in total employment during this decade” (*Section 2, Page 8*)

“...the number of projected total replacement workers between 2012 and 2022 is expected to reach nearly 780,000 — more than twice as many as net new job positions” (*Section 2, Page 10*)

“Altogether, counting new jobs and replacements jobs will require training of nearly 1.2 million workers by 2022.” (*Section 2, Page 10*)

“...Simply looking at employment growth misses two-thirds of the action in the labor market” (*Section 2, Page 10*)

“...if the state's vocational schools continue to school the same number of students through 2022 as they do now, graduates from these schools could fill approximately 11.7 percent of all job openings over the decade” (*Section 4, Page 19*)

“...various regions of the Commonwealth will be in much better shape to meet the needs of employers than others. It also suggests the possible need of focusing more attention on vocational education in areas like Boston, the Metro North Region, Metro Southwest, and the Cape & Islands.” (*Section 4, Page 19*)

INTRODUCTION

In the 1960s, a well-known bumper sticker exclaimed “Don’t be a Fool. Stay in School.” Today, many argue that to succeed in the 21st Century workplace, one needs at least a four-year college education. To obtain many of the best paid jobs in the Commonwealth, there is truth in this statement. To compete with young people who are coming to Massachusetts with an advanced education, it is necessary that we do everything we can to assure that all of our residents who could benefit from a bachelor’s degree or graduate study are afforded this opportunity.

Yet, as this report will show, the majority of job openings in Massachusetts between now and 2022 are expected to require no more than a good vocational high school education (with associated on-the-job training), some college, or a community college professional credential or associates degree. Making sure that Massachusetts invests in these schools is every bit as important as its investments in its state colleges and universities.

This report has six sections:

- **SECTION 1** provides information on the methodology we used to project detailed occupation needs from 2012 through 2022 for Massachusetts as a whole, for each of the Workforce Investment Areas (WIAs) within the state, and occupational supply from the Commonwealth’s vocational schools and vocational programs in comprehensive schools.
- **SECTION 2** provides data on projected net new jobs, replacement jobs, and total job openings through 2022 for the Commonwealth.
- **SECTION 3** provides data on the educational requirements for the expected growth in job openings through 2022.
- **SECTION 4** provides an assessment of how much of the expected growth in job openings by specific occupation can currently be filled by the state’s regional vocational high schools and vocational programs in the Commonwealth’s comprehensive high schools.
- **SECTION 5** provides the results of a recent survey of Massachusetts Vocational School administrators carried out by the Dukakis Center regarding their perceptions of what occupational fields will be expanding and the need for additional capacity to meet these needs.
- **SECTION 6** includes a summary and conclusions.

SECTION ONE

Projecting Occupational Supply and Demand – Methodology

The ultimate objective of this analysis is to compare the supply of graduating seniors from high school vocational technical programs to the “demand” for employment — job openings — by occupation and educational attainment.

This report provides occupational demand estimates for two geographic levels. The first is for Massachusetts as a whole and the second is for each of the state’s sixteen (16) Workforce Investment Areas which correspond to geographically-defined labor markets.

Occupational supply is available for ninety-six (96) schools including twenty-six (26) regional vocational schools and seventy (70) comprehensive schools that offer vocational courses. These schools can be aggregated to the Workforce Investment Areas or generated statewide.

Altogether, forecasts for net job growth, replacement jobs, and total job openings have been prepared for 675 specific occupations based on U.S. Bureau of Labor Statistics data. These are also aggregated into 22 broad occupation categories.

The distribution of educational attainment for job openings by occupation represents the current distribution of educational attainment by occupation as estimated from the American Community Survey for Massachusetts from 2010-2013. The assumption here is that the educational requirements for specific occupations will remain more or less the same as current requirements.

Educational levels required for each of the specific occupations range from less than high school to post-graduate degrees. In particular, we have developed estimates for the number of jobs in each specific job and broad occupation category for:

- Less than High School
- High School Degree or GED
- Some College
- Associates Degree
- B.A. or equivalent
- M.A. or equivalent
- Professional degree
- Ph.D.

For the sake of ease of presentation, many tables provide aggregated data on High School or Less; Some College or Associates Degree; and B.A. or more.

Programs are aligned to occupations using the U.S. Department of Labor’s O*NET to match program titles to occupations.

The distribution of education for specific occupations is based on an analysis of the American Community Survey (ACS) for Massachusetts for the years 2009 through 2013. Hence, the distribution of education by school year completed is based on the actual schooling completed of existing job holders for each specific occupation.

SECTION 1

To assess the alignment between vocational technical school curricula and projected demand for specific occupations, data were gathered on the specific programs of seniors in the state's regional vocational schools and in vocational programs in comprehensive high schools. The distribution of the supply of these vocational technical seniors by vocational program is then compared to the projected distribution of demand by specific occupation. This is done in the following steps:

1. Within each vocational tech program, seniors are assigned to the O*NET-aligned detailed occupations in proportion to projected openings in the statewide or WIA market.
2. For each school, seniors are assigned to educational attainment levels using the school district's higher education attendance rates and the 6-year completion rates. The 6-year completion rates are increased by 10 percentage points to reflect ultimate educational attainment levels. For academic regional school districts the higher education attendance rates reflect the whole district — not just vocational technical students — so for academic districts the average higher education attendance rates of vocational technical districts was used instead.
3. For each level of educational attainment, the school's seniors are allocated to occupations to match as closely as possible the distribution of that level of educational attainment across occupations in projected openings, subject to the number of seniors in each occupation from step 1 and the numbers of seniors with each level of educational attainment from step 2.

DATA SOURCES

- Projections of employment and job openings, 2012-2022, statewide and by Workforce Investment Area (U.S. Bureau of Labor Statistics) (675 detailed occupations, 16 WIA's)
- Educational attainment by occupation, 2010-2013 (American Community Survey, U.S. Census Bureau) (479 occupations)
- Senior enrollment by school and vocational education program (2013-14) (Massachusetts Department of Elementary and Secondary Education)
- The search tool of O*NET (onetonline.org) to build the alignment of vocational education programs to occupations. (U.S. Department of Labor, Employment & Training Administration)
- Higher education attendance of seniors, by school district (2011-2012) (Massachusetts Department of Elementary and Secondary Education)
- 6-year completion rates for Massachusetts community and 4-year colleges (Massachusetts Board of Higher Education)

SECTION TWO

Projected Net New Jobs, Replacement Jobs, and Total Job Openings

Occupational Employment 2012

In 2012, there were 3.347 million jobs in the Commonwealth scattered over 675 specific occupations. At the most aggregated level in our analysis — 2-digit Occupation Codes — these 675 occupations are found in twenty-two (22) broad occupations. The largest of these “2-digit” occupations was Office and Administrative Support Occupations with total employment of more than 497,000 or nearly 15 percent of the state’s job base. This single broad occupation group accounted for nearly one in seven jobs in Massachusetts. The second largest broad occupation sector was Sales and Related Occupations employing more than 341,000 workers. These were followed by Food Preparation and Serving Related Occupations (281,000 jobs) and Healthcare Practitioners and Related Technical Occupations (225,000). (See Table 1) Altogether these top four broad occupations included one-third of all Massachusetts employees.

Other broad occupation groups with at least 200,000 employees included:

- Management Occupations - 222,774
- Education, Training, and Library Occupations - 205,501
- Business & Financial Operations Occupations - 201,823

Following these were a number of traditional “blue collar” occupations including:

- Production Occupations - 160,645
- Transportation & Material Moving Occupations - 159,535
- Construction & Extraction Occupations - 116,411

Note that these three “traditional” occupations still account for 436,000 jobs in the Commonwealth. One in eight workers in Massachusetts is employed in these blue collar fields.

Table 1 also provides data on the change in projected employment between 2012 and 2022. Overall, we project a net growth in employment of nearly 382,000 jobs — an 11.4 percent increase in total employment during this decade. This compares with a growth of 7.6 percent between April 2005 and April 2015, a period that included the Great Recession. The 2012-2022 projection is premised on relatively steady growth in the Massachusetts economy based on its recent history of economic strength.

The two broad occupations with the most projected jobs are Food Preparation and Serving Related Occupations and Healthcare Practitioners and Technical Occupations. This is consistent with the expectation that upward trends in restaurant patronage and healthcare usage will continue apace. Each of these broad occupations is expected to generate more than 40,000 additional jobs or 4,000 net new jobs per year. Other fast growing occupations include:

- Business & Financial Operations Occupations (+29,110)
- Computer & Mathematical Occupations (+28,034)
- Personal Care & Service Occupations (+28,032)
- Office & Administrative Support Occupations (+26,695)

In contrast, our projections suggest that the number of workers in legal occupations will expand by fewer than 320 per year while there will be an absolute loss in production jobs averaging 460 per year. This loss in production jobs is expected given huge increases in productivity throughout much of the manufacturing sector. Thus, while total output in the production occupations may increase, new technology makes it possible to produce this output with fewer production workers.

SECTION 2, TABLE 1

2-Digit Occupations Arrayed By 2012 Employment Level

	Occupation Type	Employment 2012	Employment 2022	10-Year Change in Employment	Rank by Growth
430000	Office and Administrative Support Occupations	497,406	524,101	+26,695	6
410000	Sales and Related Occupations	341,489	364,632	+23,143	9
350000	Food Preparation and Serving Related Occupations	280,707	327,050	+46,343	1
290000	Healthcare Practitioners and Related Technical Occupations	225,025	265,514	+40,489	2
110000	Management Occupations	222,774	248,020	+25,246	7
250000	Education, Training, and Library Occupations	205,501	227,173	+21,672	11
130000	Business and Financial Operations Occupations	201,823	230,933	+29,110	3
510000	Production Occupations	160,645	156,051	-4,594	22
530000	Transportation and Material Moving Occupations	159,535	173,198	+13,663	13
150000	Computer and Mathematical Occupations	143,366	171,400	+28,034	4
470000	Construction and Extraction Occupations	116,411	139,931	+23,520	8
370000	Building and Grounds Cleaning and Maintenance Occupations	112,240	123,333	+11,093	14
390000	Personal Care and Service Occupations	108,631	136,663	+28,032	5
310000	Healthcare Support Occupations	104,853	127,467	+22,614	10
490000	Installation, Maintenance, and Repair Occupations	102,082	110,938	+8,856	15
210000	Community and Social Services Occupations	74,919	89,046	+14,127	12
330000	Protective Service Occupations	74,435	79,585	+5,150	17
170000	Architecture and Engineering Occupations	73,179	76,744	+3,565	19
270000	Arts, Design, Entertainment, Sports, and Media Occupations	60,379	65,357	+4,978	18
190000	Life, Physical, and Social Science Occupations	49,412	56,052	+6,640	16
230000	Legal Occupations	31,254	34,425	+3,171	20
450000	Farming, Fishing, and Forestry Occupations	1,154	1,217	+63	21
TOTALS	All Occupations	3,347,220	3,717,830	381,610	

SOURCE: Projections based on U.S. Bureau of Labor Statistics Employment Projections Series

Replacement Workers

Net employment growth does not take into account the need for workers who will obtain jobs as replacements for those who are retiring, moving out of state, or leaving a particular occupation for other work within the Commonwealth. Given the rapid aging of Massachusetts's population, there will be the need for a large number of workers to fill existing occupational positions. Indeed, as **Table 2** indicates, the number of projected total replacement workers between 2012 and 2022 is expected to reach nearly 780,000 — more than twice as many as net new job positions. Altogether, counting new jobs + replacements jobs will require training of nearly 1.2 million workers by 2022.

This does NOT mean that the Commonwealth will need to find an additional 780,000 workers to fill these positions because a significant share of these replacements will come from already employed workers moving from one broad occupation to another. But it does mean that these reemployed workers will need at least some training to be able to perform work in their new occupations.

Altogether, we project that by 2022 nearly 1.2 million workers will need to learn new skills to either take brand new jobs or gain employment as replacements for those who retire, leave the state for other regions, or move to other occupations within the Commonwealth.

Not surprisingly, the broad occupations requiring the most replacement workers are found in the Food Preparation & Serving Related Occupations, Office & Administrative Support Occupations, and Sales & Related Occupations. All of these are in industries which normally have a high turnover of employees.

But there are a number of occupations where the total employment change is expected to be modest, but nonetheless there will be the need for many replacement workers. In this category, Production Workers stand out.

While we project a 10-year net loss of nearly 4,600 such jobs, there will be an expected need for nearly 32,000 replacement workers primarily for those retiring from manufacturing. The number of replacement workers in Protective Service Occupations will be four times the growth in net employment. The number of replacement workers in Architecture and Engineering Occupations will be nearly five times the number of net new positions.

What this suggests is that simply looking at employment growth misses two-thirds of the action in the labor market.

779,410 Projected total replacement workers between 2012 and 2022

1.2 M Workers will require training by 2022

+32,000 Expected need for replacement workers for retiring production employees

4 x More replacement openings than net job openings in Protective Service Occupations

5 x More replacement openings than net job openings in Architecture and Engineering Occupations

Appendix A provides data on projected net employment growth, projected replacements, and total job growth for all 675 detailed 5-digit occupation codes.

SECTION 2, TABLE 2

2-Digit Occupations by 2012-2022 Replacement Openings & Total Openings

TABLE 2

SOC	Occupation Type	10-Year Change in Employment	10-Year Change in Replacements	10-Year Change in Total Openings
350000	Food Preparation and Serving Related Occupations	46,343	107,020	153,360
430000	Office and Administrative Support Occupations	26,695	107,040	133,740
410000	Sales and Related Occupations	23,143	102,170	125,310
290000	Healthcare Practitioners and Technical Occupations	40,489	46,440	86,930
130000	Business and Financial Operations Occupations	29,110	42,040	71,150
110000	Management Occupations	25,246	44,810	70,060
250000	Education, Training, and Library Occupations	21,672	43,840	65,510
150000	Computer and Mathematical Occupations	28,034	22,470	50,500
390000	Personal Care and Service Occupations	28,032	22,350	50,380
530000	Transportation and Material Moving Occupations	13,663	35,810	49,470
470000	Construction and Extraction Occupations	23,520	19,170	42,690
310000	Healthcare Support Occupations	22,614	19,980	42,590
510000	Production Occupations	-4,594	31,890	27,300
370000	Building and Grounds Cleaning and Maintenance Occupations	11,093	22,910	34,000
490000	Installation, Maintenance, and Repair Occupations	8,856	23,640	32,500
210000	Community and Social Service Occupations	14,127	17,050	31,180
330000	Protective Service Occupations	5,150	20,500	25,650
170000	Architecture and Engineering Occupations	3,565	17,450	21,020
190000	Life, Physical, and Social Science Occupations	6,640	13,650	20,290
270000	Arts, Design, Entertainment, Sports, and Media Occupations	4,978	13,820	18,800
230000	Legal Occupations	3,171	5,030	8,200
450000	Farming, Fishing, and Forestry Occupations	63	330	390
Totals	All Occupations	381,610	779,410	1,161,020

SOURCE: Projections based on U.S. Bureau of Statistics Projections Series

SECTION THREE

Education Requirements For Job Openings in the Commonwealth

Using American Community Survey data for all Massachusetts workers, we estimated the education completed for the current workforce for each occupation in the state. **Figure 1** provides details on this distribution.

Accordingly, only about 9 percent of all Massachusetts workers have less than a high school degree. Another 24 percent have a high school degree, but no additional education. Nearly 22 percent have pursued college, but not completed it. Just under 8 percent have an associates degree from a community college. Those with a terminal BA degree constitute 22.5 percent of all workers with another 10.5 percent having a terminal master's degree. Only about 4 percent have a professional degree or Ph.D. Essentially, this is the current distribution of education across all jobs in the Commonwealth:

Figure 2 provides a summary of this education distribution. As the figure suggests, about one-third of job holders in Massachusetts have a high school degree or less; a little less than 30 percent have some college or an associates degree, while a little more than a third have a BA or more. Hence, while there will be strong demand for college graduates in 2022, nearly two-thirds of job openings will require no more than a degree from a 2-year community college if education requirements remain roughly equivalent to today's.

FIGURE 1

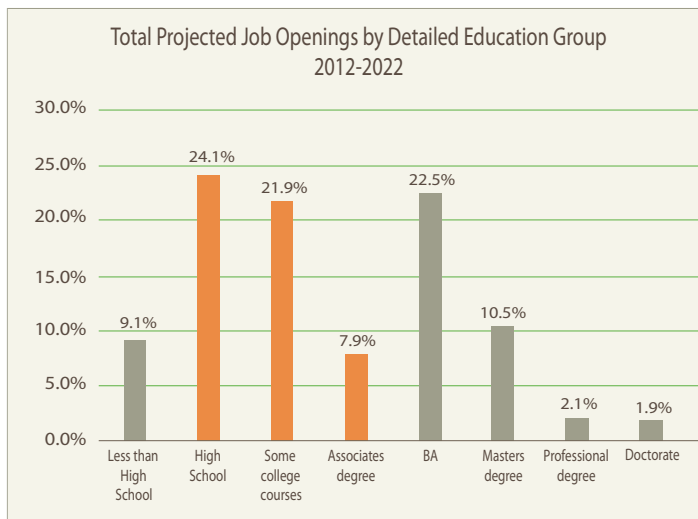
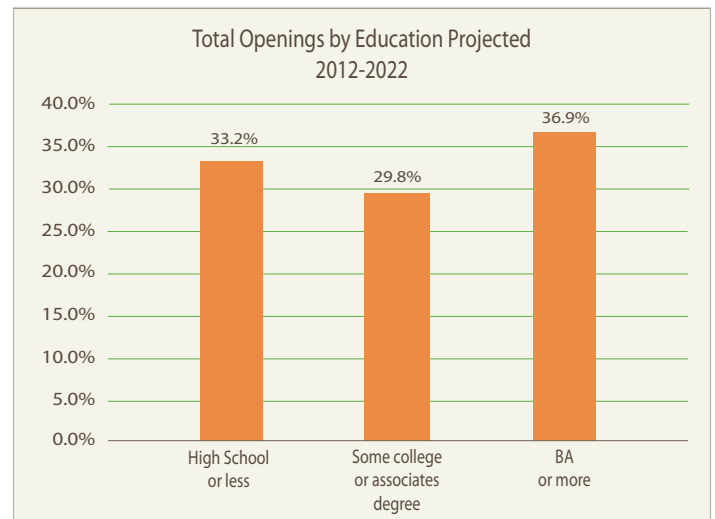


FIGURE 2



SOURCE: American Community Survey, U.S. Census Bureau

SECTION 3, TABLE 3

Not surprisingly, the number of job openings in each occupation requiring a given amount of education varies substantially. The 2-digit occupations requiring the least education are found in **Table 3**. Two-thirds of the jobs in Building and Grounds Cleaning and Maintenance Occupations, Production Occupations, and Construction and Extraction Occupations require no more than a high school degree. These three occupations alone are projected to require training for more than 112,000 Massachusetts workers between 2012 and 2022. The Commonwealth's vocational technical schools play a significant role in providing training for the range of production and construction occupations.

For four additional 2-digit occupations in this subset, at least half the employees require no more than a high school education. These are Farming, Fishing, and Forestry Occupations; Transportation and Material Moving Occupations; Installation, Maintenance, and Repair Occupations; and Food Preparation and Serving Related Occupations. These four alone account for a projected 236,000 openings between 2012 and 2022. Again, the state's vocational schools provide training in many of these occupations.

2-Digit Occupations Requiring Least Education

TABLE 3

Occupation Type	High School or less	Some college or associates degree	BA or more
370000 Building and Grounds Cleaning and Maintenance Occupations	68.9%	22.9%	8.2%
510000 Production Occupations	65.6%	25.0%	9.3%
470000 Construction and Extraction Occupations	65.6%	25.8%	8.6%
450000 Farming, Fishing, and Forestry Occupations	63.5%	23.3%	13.2%
530000 Transportation and Material Moving Occupations	62.5%	27.9%	9.6%
490000 Installation, Maintenance, and Repair Occupations	58.0%	32.9%	9.0%
350000 Food Preparation and Serving Related Occupations	55.0%	33.7%	11.3%
390000 Personal Care and Service Occupations	47.1%	36.6%	16.3%
290000 Healthcare Practitioners and Related Technical Occupations	40.3%	46.0%	13.7%
330000 Protective Service Occupations	40.2%	33.7%	11.3%
410000 Sales and Related Occupations	36.4%	33.8%	29.8%
430000 Office and Administrative Support Occupations	36.0%	40.6%	23.4%
310000 Healthcare Support Occupations	28.5%	40.9%	33.8%
210000 Community and Social Services Occupations	12.7%	23.1%	64.2%
110000 Management Occupations	12.0%	20.9%	67.1%
250000 Education, Training, and Library Occupations	11.1%	24.5%	61.5%
170000 Architecture and Engineering Occupations	8.5%	21.7%	69.8%
270000 Arts, Design, Entertainment, Sports, and Media Occupations	7.6%	35.2%	57.7%
130000 Business and Financial Operations Occupations	5.8%	19.4%	74.9%
150000 Computer and Mathematical Occupations	5.8%	19.4%	74.9%
190000 Life, Physical, and Social Science Occupations	4.1%	9.3%	86.7%
230000 Legal Occupations	3.6%	10.8%	85.6%
TOTALS All Occupations	33.2%	29.8%	36.9%

SOURCE: American Community Survey, U.S. Census Bureau

SECTION 3, TABLE 4

2-Digit Occupations Requiring Some College or Associates Degree

TABLE 4

Occupation Type	High School or less	Some college or associates degree	BA or more
290000 Healthcare Practitioners and Related Technical Occupations	40.3%	46.0%	13.7%
310000 Healthcare Support Occupations	28.5%	40.9%	33.8%
430000 Office and Administrative Support Occupations	36.0%	40.6%	23.4%
390000 Personal Care and Service Occupations	47.1%	36.6%	16.3%
270000 Arts, Design, Entertainment, Sports, and Media Occupations	7.6%	35.2%	57.7%
410000 Sales and Related Occupations	36.4%	33.8%	29.8%
350000 Food Preparation and Serving Related Occupations	55.0%	33.7%	11.3%
330000 Protective Service Occupations	40.2%	33.7%	11.3%
490000 Installation, Maintenance, and Repair Occupations	58.0%	32.9%	9.0%
530000 Transportation and Material Moving Occupations	62.5%	27.9%	9.6%
470000 Construction and Extraction Occupations	65.6%	25.8%	8.6%
510000 Production Occupations	65.6%	25.0%	9.3%
250000 Education, Training, and Library Occupations	11.1%	24.5%	61.5%
450000 Farming, Fishing, and Forestry Occupations	63.5%	23.3%	13.2%
210000 Community and Social Services Occupations	12.7%	23.1%	64.2%
370000 Building and Grounds Cleaning and Maintenance Occupations	68.9%	22.9%	8.2%
170000 Architecture and Engineering Occupations	8.5%	21.7%	69.8%
110000 Management Occupations	12.0%	20.9%	67.1%
130000 Business and Financial Operations Occupations	5.8%	19.4%	74.9%
150000 Computer and Mathematical Occupations	5.8%	19.4%	74.9%
230000 Legal Occupations	3.6%	10.8%	85.6%
190000 Life, Physical, and Social Science Occupations	4.1%	9.3%	86.7%

SOURCE: American Community Survey, U.S. Census Bureau

A second subset of 2-digit occupations have a heavy concentration of jobs requiring some college or an associates degree. These are found in [Table 4](#). Leading the list are Healthcare Practitioners and Technical Occupations, Healthcare Support Occupations, and Office and Administrative Support Occupations. For each of these occupations, at least 40 percent of the job openings from 2012 to 2022 are expected to require such an educational background. Other 2-digit occupations in which at least a third of projected job openings will require some college or completion of community college include Personal Care and Service Occupations; Arts, Design, Entertainment, Sports, and Media Occupations; Sales and Related Occupations, Food Preparation and Serving Related Occupations; and Protective Service Occupations.

SECTION 3, TABLE 5

Finally there are those 2-digit occupations in which a substantial proportion of expected job openings will require a four year college degree, professional degree, or post-graduate education including the Master's degree or Ph.D. These are found in **Table 5**. Essentially, three-quarters or more of the openings in Life, Physical, and Social Science Occupations; Legal Occupations; Business and Financial Operations Occupations; and Computer and Mathematical Occupations fall into this category.

2-Digit Occupations Requiring a B.A. or More Education

TABLE 5

SOC	Occupation Type	High School or less	Some college or associates degree	BA or more
190000	Life, Physical, and Social Science Occupations	4.1%	9.3%	86.7%
230000	Legal Occupations	3.6%	10.8%	85.6%
130000	Business and Financial Operations Occupations	5.8%	19.4%	74.9%
150000	Computer and Mathematical Occupations	5.8%	19.4%	74.9%
170000	Architecture and Engineering Occupations	8.5%	21.7%	69.8%
110000	Management Occupations	12.0%	20.9%	67.1%
210000	Community and Social Services Occupations	12.7%	23.1%	64.2%
250000	Education, Training, and Library Occupations	11.1%	24.5%	61.5%
270000	Arts, Design, Entertainment, Sports, and Media Occupations	7.6%	35.2%	57.7%
310000	Healthcare Support Occupations	28.5%	40.9%	33.8%
410000	Sales and Related Occupations	36.4%	33.8%	29.8%
430000	Office and Administrative Support Occupations	36.0%	40.6%	23.4%
390000	Personal Care and Service Occupations	47.1%	36.6%	16.3%
290000	Healthcare Practitioners and Related Technical Occupations	40.3%	46.0%	13.7%
450000	Farming, Fishing, and Forestry Occupations	63.5%	23.3%	13.2%
330000	Protective Service Occupations	40.2%	33.7%	11.3%
350000	Food Preparation and Serving Related Occupations	55.0%	33.7%	11.3%

SOURCE: American Community Survey, U.S. Census Bureau

Appendix B provides data on current education requirements for all 675 detailed occupations.

SECTION FOUR

Assessing the Ability of Vocational Education in the Commonwealth to Supply Expected Labor Market Demand

How much of the expected demand for employment will likely be filled by graduates of the Commonwealth's twenty-six (26) regional vocational schools and 70 vocational programs within comprehensive high schools? Here we have projected the supply of vocational school seniors and seniors in vocational programs in comprehensive high schools taking into account current rates of post-high school education for these students.

Appendix C provides data on programmatic offerings of each of the regional vocational schools.

Table 6 (see next two pages) provides the projections of final education completed by these high school seniors along with annual occupational demand through 2022 by education required.

Overall, currently there are just under 13,560 high school seniors in the Commonwealth's regional vocational schools and in the vocational tracks of comprehensive schools. Given recent past history, we expect nearly 6,075 of these to make graduation from their schools the highest level of formal education they will obtain. Another 2,820 or so will go onto some college, but not graduate. About 2,115 will go to community college and receive an associates degree or occupational certification. Nearly 2,550 or nearly one in five will go on to a B.A. degree or higher.

Our best projection of annual job openings through 2022 across all occupations and all education groups (as noted in Table 2) is 116,100. Hence, if the state's vocational schools continue to school the same number of students through 2022 as they do now, graduates from these schools could fill approximately 11.7 percent of all job openings over the decade.

However, given the future schooling of vocational school graduates and comprehensive high school graduates in vocational tracks, our projections suggest that about 15.7 percent of future jobs in the state requiring a high school degree or less will be filled by vocational school graduates; about 11 percent of job openings requiring some college; and more than one in five (23%) of job openings requiring an associates degree. They will even fill about 6 percent of the jobs requiring a B.A. or more.

The proportion of job openings potentially filled by vocational school graduates varies widely across the full set of 2-digit major occupations. In three of these 22 occupational categories, vocational school graduates would have had the appropriate training in high school (and further education) so that they could fill approximately half or more of the projected job openings. This includes more than 60 percent of the small number of expected openings in Farming, Fishing, and Forestry Occupations; nearly 53 percent in Architecture and Related Engineering Occupations; and more than 47 percent in Arts, Design, Entertainment, Sports, and Media Occupations. More than a quarter (28%) of the expected job openings in Computer and Mathematical Occupations in the state could be filled by students in the Commonwealth's vocational schools or vocational tracks in comprehensive high schools.

On the other hand, given present programs, vocational school graduates can be expected to fill only 23 percent of the job openings in both Production Occupations and Construction and Extraction Occupations. This suggests that the vocational schools might well devote more resources to their manufacturing and construction trades so as to help fulfill future demand for these important positions.

SECTION 4, TABLE 6

Annual Supply vs. Openings, Major Occupation Group
Supply is from all schools; Openings are Statewide Projections

SUPPLY

Occupation Type	High School or less	Some college	Associates degree	BA or more	Total
110000 Management Occupations	520	173	140	336	1,169
130000 Business and Financial Operations Occupations	278	90	56	175	599
150000 Computer and Mathematical Occupations	482	260	182	464	1,388
170000 Architecture and Engineering Occupations	332	250	261	291	1,135
190000 Life, Physical, and Social Science Occupations	31	17	12	51	111
210000 Community and Social Services Occupations	33	26	13	21	93
230000 Legal Occupations	3	0	1	2	6
250000 Education, Training, and Library Occupations	346	190	157	275	968
270000 Arts, Design, Entertainment, Sports, and Media Occupations	350	178	109	251	887
290000 Healthcare Practitioners and Related Technical Occupations	166	150	330	209	855
310000 Healthcare Support Occupations	210	164	115	38	527
330000 Protective Service Occupations	22	14	18	13	67
350000 Food Preparation and Serving Related Occupations	557	245	109	67	978
370000 Building and Grounds Cleaning and Maintenance Occupations	147	65	31	31	274
390000 Personal Care and Service Occupations	323	126	57	48	554
410000 Sales and Related Occupations	165	74	55	88	382
430000 Office and Administrative Support Occupations	111	81	47	42	281
450000 Farming, Fishing, and Forestry Occupations	9	5	4	6	24
470000 Construction and Extraction Occupations	596	211	121	50	978
490000 Installation, Maintenance, and Repair Occupations	833	320	186	51	1,391
510000 Production Occupations	498	152	99	39	788
530000 Transportation and Material Moving Occupations	61	30	9	4	104
TOTAL: ALL OCCUPATIONS	6,074	2,822	2,114	2,549	13,559

SECTION 4, TABLE 6

OPENINGS					SUPPLY AS A PERCENT OF OPENINGS				
High School or less	Some college	Associates degree	BA or more	Total	High School or less	Some college	Associates degree	BA or more	Total
826	990	454	4,639	6,909	62.9%	17.4%	30.8%	7.2%	16.9%
542	843	414	5,224	7,023	51.3%	10.7%	13.5%	3.3%	8.5%
287	674	287	3,717	4,965	167.9%	38.6%	63.5%	12.5%	28.0%
183	286	182	1,502	2,153	181.4%	87.4%	143.9%	19.4%	52.7%
81	122	62	1,729	1,994	38.2%	14.2%	19.4%	2.9%	5.6%
389	469	238	1,967	3,062	8.5%	5.5%	5.5%	1.1%	3.1%
29	44	43	691	807	8.6%	0.9%	2.2%	0.3%	0.7%
591	805	372	4,673	6,442	58.6%	23.5%	42.2%	5.9%	15.0%
263	356	107	1,160	1,885	133.1%	49.9%	102.3%	21.6%	47.1%
606	1,365	1,644	4,934	8,548	27.3%	11.0%	20.1%	4.2%	10.0%
1,688	1,349	577	573	4,188	12.5%	12.2%	19.9%	6.6%	12.6%
637	739	294	853	2,522	3.4%	2.0%	6.1%	1.6%	2.7%
8,299	4,271	806	1,700	15,075	6.7%	5.7%	13.6%	3.9%	6.5%
2,304	611	154	274	3,342	6.4%	10.7%	20.3%	11.2%	8.2%
2,333	1,481	332	807	4,953	13.8%	8.5%	17.2%	5.9%	11.2%
4,508	3,381	800	3,683	12,373	3.7%	2.2%	6.9%	2.4%	3.1%
5,053	4,265	1,443	3,290	14,051	2.2%	1.9%	3.3%	1.3%	2.0%
25	7	2	5	39	36.3%	82.3%	143.9%	112.1%	60.9%
2,754	846	235	361	4,196	21.7%	25.0%	51.3%	13.7%	23.3%
1,862	783	273	290	3,207	44.8%	40.9%	68.4%	17.5%	43.4%
2,287	652	221	325	3,485	21.8%	23.3%	44.9%	12.1%	22.6%
3,047	1,091	271	469	4,879	2.0%	2.7%	3.4%	1.0%	2.1%
38,593	25,429	9,212	42,865	116,099	15.7%	11.1%	23.0%	5.9%	11.7%

SOURCE: Senior Enrollment by School and Vocational Program, Massachusetts Department of Elementary and Secondary Education, Alignment between Vocational Education Programs and Occupations, U.S. Bureau of Labor Statistics, O*NET, Openings: U.S. Bureau of Labor Statistics

SECTION 4

Appendix D provides data on the supply of students and job openings for the 22 two-digit occupations for each of the state's 16 Workforce Investment Areas (WIAs).

As the Appendix makes clear, there is wide disparity across WIAs in the proportion of projected job openings that potentially can be filled by students graduating from vocational technical schools or vocational programs within comprehensive high schools.

In the Boston WIA, at present graduation rates only 4 percent of the expected job openings could be filled by students from the regional or local vocational programs. Indeed, not much more than 7 percent of the openings that require high school or less will apparently be filled in this way.

The Metro North WIA is not much better in this regard with just 7 percent of all job openings that could be filled by vocational program graduates.

In contrast, more than a quarter (26.9%) of the projected job openings in the Berkshire WIA could be filled with these graduates; more than 38% of the openings in the Bristol WIA; nearly 47 percent in the Greater New Bedford WIA; and topping the list, more than half (51%) in the Greater Lowell Workforce Investment Area.

This suggests that various regions of the Commonwealth will be in much better shape to meet the needs of employers than others. It also suggests the possible need of focusing more attention on vocational education in areas like Boston, the Metro North Region, Metro Southwest, and the Cape & Islands.

Close inspection of **Appendix D** suggests that the vocational technical regional schools in many districts can more than fulfill the job openings for those occupations requiring no more than a high school education. For example, the vocational programs serving the Berkshire Workforce Investment Area could more than fulfill the workforce needs for new and replacement workers in Management Occupations; Business and Financial Operations Occupations; Computer and Mathematical Occupations; Architecture and Engineering Occupations; Arts, Design, Entertainment, Sports, and Media Occupations; and Installation, Maintenance and

Repair Occupations. Moreover, these schools will also train students going on to post-secondary education needed to fulfill more than enough openings requiring some college or an associates degree in Architecture and Engineering Occupations and in Arts, Design, Entertainment, Sports, and Media Occupations.

This begins to demonstrate just how important the Commonwealth's vocational schools and technical programs are to meeting many of the state's employment needs into the future.

At the same time, these WIA-based results suggest where more could be done by vocational schools to meet future labor force demand. In the Boston WIA, for example, the regional vocational programs are only on track to fill four percent of the expected job openings in Construction; 14 percent in Installation, Maintenance, and Repair Occupations; and 29 percent of Production Occupation openings. In the Metro North WIA, the vocational programs in this region are expected to fulfill less than 33% of Installation, Maintenance, and Repair Occupations and less than one of five openings in Construction and Production Occupations.

The best record for meeting projected labor market demand in these traditional blue-collar fields are in such regions as Central Massachusetts, the North Central region, the Berkshires, Bristol, Greater New Bedford, Greater Lowell, and the Lower Merrimack Valley.

“This begins to demonstrate just how important the Commonwealth's vocational schools and technical programs are to meeting many of the state's employment needs into the future.”

SECTION FIVE

How Prepared are the Commonwealth's Vocational Schools to Meet Future Labor Market Demand?

The Dukakis Center surveyed administrators at Massachusetts vocational technical high schools to elicit their opinions on trends in vocational technical education and future employment demand in the Commonwealth. The objective was to assess whether these administrators have a reasonably good idea of what programs they might like to expand to meet future occupational demand, which programs should be continued at current levels, and which might be phased down or out.

An online survey was administered to the superintendents, principals, and career and technical education (CTE) directors at the 26 regional vocational technical schools, 28 comprehensive/city vocational technical schools, the three agricultural vocational schools, and the two independent/collaborative vocational schools. The size of the survey population was 106 superintendents, principals, and CTE directors. David Ferreira, Executive Director of the Massachusetts Association of Vocational Administrators assisted with disseminating the survey and sending email reminders during the survey period. Reminder phone calls were placed to the administrators by Dukakis Center staff. A total of 74 administrators responded to the survey resulting in a response rate of 70 percent.

Number of Survey Respondents Among the Types of Career and Technical Education Schools

TABLE 7

Category of School	Number of Respondents	Percentage of Respondents
Regional Vocational School	55	74.3%
Comprehensive High School	9	12.2%
City Vocational School	6	8.1%
Agricultural Vocational School	3	4.1%
Independent/Collaborative Vocational School	1	1.4%
TOTAL	74	100%

The number of respondents and distribution of respondents by type of school is found in [Table 7](#).

Nearly three-quarters of the respondents were administrators at regional vocational schools with another 12 percent at comprehensive high schools offering vocational programs.

SOURCE: Dukakis Center Survey of Public High School Administrators

SECTION 5, TABLE 8

Survey Results - Curriculum Changes Under Current Funding

One of the first survey questions asked school administrators concerned what sources of information they use to gauge future labor demand which might affect future curriculum offerings at their schools. As **Table 8** reveals, by far, the factors rated “very important” were “projected industry growth” followed by “projected need for replacement for retiring workers.” Administrators also consider student demand in their calculations along with input from school advisory committees. These results suggest that vocational school administrators are keenly aware of expected changes in the labor market and seem prepared to respond to occupational need.

A second set of questions asked administrators what programs they would expect to expand enrollment, maintain enrollment, or reduce enrollment – assuming current funding levels. These questions were asked for each Occupational Cluster.

TABLE 8

Factors Vocational School Administrators Consider in Projecting Future Demand for Workers by Occupation and Training Program

Factors	Very Important	Important	Not Very Important	Not at all Important	Do Not Use
Projected industry growth	81.8%	18.2%	0.0%	0.0%	0.0%
Projected need for replacement of retiring workers	56.3%	40.6%	3.1%	0.0%	0.0%
Changes in student demand for specific programs	44.6%	52.3%	3.1%	0.0%	0.0%
Response to potential public-private partnerships with industry	40.9%	50.0%	9.1%	0.0%	0.0%
Response to input from school advisory committee	36.9%	58.5%	4.6%	0.0%	0.0%
Projected changes in occupational wages	32.3%	60.0%	7.7%	0.0%	0.0%
Response to existence of similar programs in your region	16.9%	63.1%	16.9%	1.5%	1.5%
Response to existence of similar programs in an adjacent region	12.3%	47.7%	38.5%	1.5%	0.0%
Response to need for greater gender balance across programs	9.1%	60.6%	22.7%	4.5%	3.0%

SOURCE: Dukakis Center Survey of Public High School Administrators

Natural Resources Occupation Cluster

Table 9 shows responses related to the Agricultural and Natural Resources Occupational Cluster. Of the 21 respondents hosting a Horticultural training program, 16 would expect to maintain enrollment, five would expect to expand it, and none would expect to reduce enrollment or eliminate the program under current funding. Of those not currently offering the program, only three of 53 would expect to add it at their schools. However, a larger number expect to increase enrollments in Environmental Science & Technology and ten respondents expect to add this program at their schools.

Animal Science also seems to garner support for expanded enrollment. All three respondents who rated Agricultural Mechanics expect to expand or maintain their programs.

TABLE 9

Expected Changes in Enrollment and Programming Over the Next 10 Years
Assuming Current Funding Levels: Natural Resources Occupation Cluster

Program	Number of Respondents Offering Program	In the next 10 years, the number of respondents who expect to...				Number of Respondents Not Offering Program	In the next 10 years, the number of respondents that have plans to add to the program.	
		Expand Enrollment	Maintain Enrollment	Reduce Enrollment	Eliminate the Program		Have Plans to Add	Do Not Have Plans to Add
Horticulture	21	5	16	0	0	53*	3	49
Environmental Science & Technology	17	9	7	1	0	57*	10	46
Animal Science	4	4	0	0	0	70	11	59
Agricultural Mechanics	3	1	2	0	0	71	4	67

* One or more respondents did not answer the question regarding plans to add to the program.

Arts & Communications Occupation Cluster

Table 10 (see next page) provides the same information for the Arts and Communications Cluster. Of the 50 respondents from schools offering Graphic Communications, 34 expect to maintain enrollment, but nine expect to expand it. Only seven expect to reduce enrollments or eliminate the program. No respondents in schools currently not offering Graphic Communications expect to expand enrollment over the next ten years.

There is a higher expectation about expanding enrollment in Design & Visual Communications. Here, nearly a third of respondents (15/46) expect to expand enrollment and no one expects to reduce enrollment or eliminate the program. Moreover, of the 23 respondents in schools not currently offering this program, nine expect to add it.

In Radio and Television Broadcasting, more than half (7/13) of those responding expect to expand enrollment in this field and 13 of those without the program are planning to add it sometime over the next ten years.

SECTION 5, TABLES 10-11

TABLE 10

Expected Changes in Enrollment and Programming Over the Next 10 Years
Assuming Current Funding Levels: Arts & Communications Occupation Cluster

Program	Number of Respondents Offering Program	In the next 10 years, the number of respondents who expect to...				Number of Respondents Not Offering Program	In the next 10 years, the number of respondents that have plans to add to the program.	
		Expand Enrollment	Maintain Enrollment	Reduce Enrollment	Eliminate the Program		Have Plans to Add	Do Not Have Plans to Add
Graphic Communications	50	9	34	3	4	24*	0	23
Design & Visual Communications	46	15	31	0	0	28	9	19
Radio & Television Broadcasting	13	7	6	0	0	61	13	48

* One or more respondents did not answer the question regarding plans to add to the program.

Business & Consumer Services Occupation Cluster

Table 11 contains the same information for the Business & Consumer Services Occupational Cluster. More than a quarter (14/48) of respondents expect to expand their Cosmetology enrollments and two respondents expect to add this program to their school's curriculum.

Even more respondents (12/28) expect to expand their Office Technology programs and four expect to add it.

Marketing is seen as a growing field with three-quarters of respondents (9/12) expecting to increase enrollments and six respondents expect to add it at their schools.

Fashion Technology may also see some expansion in two of the six schools offering it and three more respondents expect to see this curriculum added to their schools.

TABLE 11

Expected Changes in Enrollment and Programming Over the Next 10 Years
Assuming Current Funding Levels: Business & Consumer Services Occupation Cluster

Program	Number of Respondents Offering Program	In the next 10 years, the number of respondents who expect to...				Number of Respondents Not Offering Program	In the next 10 years, the number of respondents that have plans to add to the program.	
		Expand Enrollment	Maintain Enrollment	Reduce Enrollment	Eliminate the Program		Have Plans to Add	Do Not Have Plans to Add
Cosmetology	63	14	48	0	1	11	2	9
Office Technology	43	12	28	0	3	30	4	25
Marketing	27*	9	12	2	3	46	6	39
Fashion Technology	6	2	3	1	0	68	3	64

* One or more respondents did not answer the question regarding enrollment.

SOURCE: Dukakis Center Survey of Public High School Administrators

SECTION 5, TABLES 12-13

Construction Occupation Cluster

In line with the high job replacement needs in Construction, **Table 12** reveals that a large number of respondents expect to expand their programs in Carpentry, Electricity, HVAC, Plumbing, Sheet Metalworking, and Cabinet Making. There are a small number of schools that have plans to add programs in a number of these fields.

Expected Changes in Enrollment and Programming Over the Next 10 Years
Assuming Current Funding Levels: Construction Occupation Cluster

TABLE 12

Program	Number of Respondents Offering Program	In the next 10 years, the number of respondents who expect to...				Number of Respondents Not Offering Program	In the next 10 years, the number of respondents that have plans to add to the program.	
		Expand Enrollment	Maintain Enrollment	Reduce Enrollment	Eliminate the Program		Have Plans to Add	Do Not Have Plans to Add
Carpentry	70	22	48	0	0	2	0	2
Electricity	64	16	48	0	0	7	2	5
Heating, Ventilation, Air Conditioning, Refrigeration	45	14	29	1	1	26	5	21
Plumbing	43	8	35	0	0	28*	7	20
Sheet Metalworking	29	8	19	1	1	42	3	39
Plumbing Technology/Plumber	24	5	19	0	0	47*	5	41
Cabinetmaking	20	5	13	0	2	52	2	50
Facilities Management	10	1	6	2	1	61	2	59
Painting & Design Technologies	9	1	7	0	1	62	2	60
Masonry & Tile Setting	8	0	8	0	0	63	3	60
Construction Craft Laborer	5	3	2	0	0	67*	5	61

* One or more respondents did not answer the question regarding plans to add to the program.

Education Occupation Cluster

Table 13 suggests that more than half the respondents in schools offering Early Education and Care programs expect to see an expansion in enrollment in their programs. A small number of respondents in schools without such a program plan to add it sometime over the next ten years, assuming current funding levels.

Expected Changes in Enrollment and Programming Over the Next 10 Years
Assuming Current Funding Levels: Education Occupation Cluster

TABLE 13

Program	Number of Respondents Offering Program	In the next 10 years, the number of respondents who expect to...				Number of Respondents Not Offering Program	In the next 10 years, the number of respondents that have plans to add to the program.	
		Expand Enrollment	Maintain Enrollment	Reduce Enrollment	Eliminate the Program		Have Plans to Add	Do Not Have Plans to Add
Early Education and Care	37	12	23	1	1	34*	3	30

* One or more respondents did not answer the question regarding plans to add to the program.

SECTION 5, TABLES 14-15

Health Services Occupation Cluster

Not surprising, given the expected growth in the health sciences, a majority (34/65) of respondents with a Health Assisting program expect to expand their enrollments over the next ten years (see **Table 14**). Dental Assisting also appears as a field that will see expanded enrollments with 13 of 30 respondents suggesting this will likely occur in their schools. Seven respondents expect to add it to their school's curriculum. While respondents expect existing programs in Practical Nursing to hold their own with little enrollment expansion, nearly a quarter (11/47) of respondents in schools without such a program expect to add it sometime over the next decade. This is even more true for Medical Assisting programs. Twenty-two of 49 respondents expect to see such a program implemented in their schools. However, there is little current training in Operating Room Technology, no plans to expand the current single program, and only eight out of 70 respondents expect to add such a program

TABLE 14

Expected Changes in Enrollment and Programming Over the Next 10 Years
Assuming Current Funding Levels: Health Services Occupation Cluster

Program	Number of Respondents Offering Program	In the next 10 years, the number of respondents who expect to...				Number of Respondents Not Offering Program	In the next 10 years, the number of respondents that have plans to add to the program.	
		Expand Enrollment	Maintain Enrollment	Reduce Enrollment	Eliminate the Program		Have Plans to Add	Do Not Have Plans to Add
Health Assisting	65	34	30	1	0	6	2	4
Dental Assisting	30**	13	16	0	0	41	7	34
Practical Nursing LPN	24	2	22	0	0	47*	11	35
Medical Assisting	22	7	14	0	1	49	22	27
Operating Room Technology	1	0	1	0	0	70	8	62

* One or more respondents did not answer the question regarding plans to add to the program.

**One or more respondents did not answer the question regarding enrollment.

Hospitality & Tourism Occupation Cluster

In accord with the extensive increase in food service jobs and other hospitality industry occupations, 15 respondents in schools with a Culinary Arts program expect to expand their enrollments and none expect to reduce them. Moreover, nearly 30 percent (16/54) of respondents in schools without such a program expect to see their schools add a program in Hospitality Management as shown in **Table 15**.

TABLE 15

Expected Changes in Enrollment and Programming Over the Next 10 Years
Assuming Current Funding Levels: Hospitality & Tourism Occupation Cluster

Program	Number of Respondents Offering Program	In the next 10 years, the number of respondents who expect to...				Number of Respondents Not Offering Program	In the next 10 years, the number of respondents that have plans to add to the program.	
		Expand Enrollment	Maintain Enrollment	Reduce Enrollment	Eliminate the Program		Have Plans to Add	Do Not Have Plans to Add
Culinary Arts	68	15	53	0	0	3	1	2
Hospitality Management	17	7	9	0	1	54*	16	37

* One or more respondents did not answer the question regarding plans to add to the program.

SOURCE: Dukakis Center Survey of Public High School Administrators

SECTION 5, TABLES 16-17

Information Technology Occupation Cluster

Respondents also expect to expand enrollment in Information Support Services & Networking and in Programming & Web Development as shown in **Table 16**. Only three respondents thought their schools might reduce enrollment or eliminate the Information Support Services program. A large number of other respondents expect to add these fields to their schools. This is clearly a response to the growth in these industries, especially here in Massachusetts.

Expected Changes in Enrollment and Programming Over the Next 10 Years
Assuming Current Funding Levels: Information Technology Occupation Cluster

TABLE 16

Program	Number of Respondents Offering Program	In the next 10 years, the number of respondents who expect to...				Number of Respondents Not Offering Program	In the next 10 years, the number of respondents that have plans to add to the program.	
		Expand Enrollment	Maintain Enrollment	Reduce Enrollment	Eliminate the Program		Have Plans to Add	Do Not Have Plans to Add
Information Support Services & Networking	39	15	21	1	2	31*	7	23
Programming & Web Development	36	13	23	0	0	34	16	18

* One or more respondents did not answer the question regarding plans to add to the program.

Manufacturing, Engineering & Technological Occupation Cluster

Knowing what we now know about the need for replacement workers in manufacturing industries, it is encouraging to see that few respondents expect to reduce enrollment in these programs or eliminate them. Instead, there is strong support for expanding enrollment in Metal Fabrication, Machine Tool Technology, Drafting, Electronics, Biotechnology, and Robotics. Moreover, as **Table 17** reveals, a significant number of respondents expect to add programs, especially in Machine Tool, Engineering Technology, Biotech, and Robotics.

Expected Changes in Enrollment and Programming Over the Next 10 Years
Assuming Current Funding Levels: Manufacturing, Engineering & Technological Occupation Cluster

TABLE 17

Program	Number of Respondents Offering Program	In the next 10 years, the number of respondents who expect to...				Number of Respondents Not Offering Program	In the next 10 years, the number of respondents that have plans to add to the program.	
		Expand Enrollment	Maintain Enrollment	Reduce Enrollment	Eliminate the Program		Have Plans to Add	Do Not Have Plans to Add
Metal Fabrication & Joining Technologies	51	14	34	1	2	19	2	17
Machine Tool Technology	42	21	20	0	1	28	11	17
Drafting	42	9	31	0	2	28	7	21
Engineering Technology	33	22	11	0	0	36	14	22
Electronics	32	7	21	3	1	37	0	37
Biotechnology	13	7	6	0	0	57	24	33
Robotics and Automation Technology	12**	4	7	0	0	58*	17	40
Telecommunications - Fiber Optics	4	1	1	0	2	64	5	59
Stationary Engineering	3	1	2	0	0	67	0	67
Major Appliance Installation/Repairing	1	0	1	0	0	69	2	67

* One or more respondents did not answer the question regarding plans to add to the program.

**One or more respondents did not answer the question regarding enrollment.

SECTION 5, TABLES 18-19

Transportation Occupation Cluster

A similar story holds in the Transportation Cluster. Enrollments are expected to be maintained or expanded in Automotive Technology and Automotive Collision Repair and Refinishing, although there are few plans for schools to add these programs – with the possible exception of Diesel Technology (see **Table 18**).

TABLE 18

Expected Changes in Enrollment and Programming Over the Next 10 Years
Assuming Current Funding Levels: Transportation Occupation Cluster

Program	Number of Respondents Offering Program	In the next 10 years, the number of respondents who expect to...				Number of Respondents Not Offering Program	In the next 10 years, the number of respondents that have plans to add to the program.	
		Expand Enrollment	Maintain Enrollment	Reduce Enrollment	Eliminate the Program		Have Plans to Add	Do Not Have Plans to Add
Automotive Technology	65	11	54	0	0	5	0	5
Automotive Collision Repair & Refinishing	49	10	36	2	1	21	1	20
Marine Service Technology	4	2	1	0	1	66*	4	61
Diesel Technology	4	1	3	0	0	66	5	61
Power Equipment Technology	3	0	2	0	1	65	1	64

* One or more respondents did not answer the question regarding plans to add to the program.

Exploratory All Occupation Clusters

Finally, respondents expect to see expanded enrollments in Exploratory programs which provide students with a chance to learn about a variety of occupations before settling on one that they will concentrate in (see **Table 19**).

TABLE 19

Expected Changes in Enrollment and Programming Over the Next 10 Years
Assuming Current Funding Levels: Exploratory All Clusters

Program	Number of Respondents Offering Program	In the next 10 years, the number of respondents who expect to...				Number of Respondents Not Offering Program	In the next 10 years, the number of respondents that have plans to add to the program.	
		Expand Enrollment	Maintain Enrollment	Reduce Enrollment	Eliminate the Program		Have Plans to Add	Do Not Have Plans to Add
Exploratory	69	29	39	1	0	1	1	0

SOURCE: Dukakis Center Survey of Public High School Administrators

SECTION 5, SURVEY RESULTS

All in all, these results suggest that vocational school administrators and those in comprehensive schools with vocational programs seem well aware of where growing labor demand will be strongest and are positioned to maintain programs or expand programs in these critical areas.

Survey Results - Curriculum Changes Under Additional Funding

Finally, we asked respondents to consider which programs they would expect to expand and or add if additional funding were available. The results of this inquiry by occupational cluster are found in **Table 20** (see next two pages).

In the Agriculture & Natural Resources Cluster, a large majority of respondents would add or expand programs in Environmental Science and Technology.

In the Arts & Communication Services Cluster, there is a strong preference to add or expand programs in Radio & Television Broadcasting and Design & Visual Communications.

In the Business & Consumer Services Cluster, there is modest interest in adding to programs in Marketing, Office Technology, and Cosmetology, although a large majority would make no change in existing programs even with added funding.

In the Construction Cluster, there is modest interest in adding or expanding programs in Facilities Management,

Plumbing, HVAC, Electricity and Carpentry, but once again a large majority would maintain the programs they already have.

A small number of respondents would add or expand Early Education and Care Programs.

In the Transportation Cluster, there is some sentiment for adding or expanding Diesel Technology and Automotive Technology.

And finally, 28 of 61 respondents would expand their Exploratory Program.

Again, we find that respondents, relying on a range of information about expected occupational growth have selected for addition or expansion programs that will likely have strong future job demand. In this sense, additional funding for vocational education will be put to good use.

In Table 20, green indicates an expanding program.

Again, we find that respondents, relying on a range of information about expected occupational growth have selected for addition or expansion programs that will likely have strong future job demand. In this sense, additional funding for vocational education will be put to good use.

SECTION 5, TABLE 20

Adding or Expanding Programs if Additional Funding Available

	Add Program	Expand Program	No Change
Agriculture & Natural Resources Occupational Cluster			
Environmental Science & Technology	33	5	22
Animal Science	13	3	41
Horticulture	6	8	44
Agricultural Mechanics	4	1	49
Arts & Communication Services Occupational Cluster			
Radio & Television Broadcasting	20	5	36
Design & Visual Communications	14	15	35
Graphic Communications	3	11	46
Business & Consumer Services Occupational Cluster			
Marketing	10	6	42
Office Technology	5	9	43
Fashion Technology	4	2	48
Cosmetology	3	17	39
Construction Occupational Cluster			
Facilities Management	15	2	40
Plumbing	10	12	36
Construction Craft Laborer	10	1	44
Cabinetmaking	9	2	45
Heating, Ventilation, Air Conditioning, Refrigeration	8	17	33
Plumbing Technology/Plumber	5	5	45
Sheet Metalworking	5	4	48
Masonry & Tile Setting	5	0	51
Electricity	3	15	41
Painting & Design Technologies	3	1	51
Carpentry	0	18	41
Educational Occupational Cluster			
Early Education and Care	6	12	44
Health Services Occupational Cluster			
Medical Assisting	28	4	28
Practical Nursing LPN	22	6	30
Operating Room Technology	21	0	38
Dental Assisting	15	12	31
Health Assisting	4	27	28
Hospitality & Tourism Occupational Cluster			
Hospitality Management	20	6	32
Culinary Arts	1	15	39

SOURCE: Dukakis Center Survey of Public High School Administrators

SECTION 5, TABLES 20-21

Adding or Expanding Programs if Additional Funding Available (continued)

	Add Program	Expand Program	No Change
Information Technology Services Occupational Cluster			
Programming & Web Development	15	14	31
Information Support Services & Networking	15	14	29
Manufacturing, Engineering, & Technological Occupational Cluster			
Biotechnology	33	9	19
Robotics and Automation Technology	30	4	28
Engineering Technology	22	19	19
Telecommunications - Fiber Optics	14	0	43
Machine Tool Technology	12	18	32
Stationary Engineering	8	1	48
Drafting	7	10	42
Metal Fabrication & Joining Technologies	2	11	47
Electronics	2	8	50
Major Appliance Installation/Repairing	1	3	51
Transportation Occupational Cluster			
Diesel Technology	11	1	46
Power Equipment Technology	7	0	50
Marine Service Technology	6	3	48
Automotive Collision Repair & Refinishing	2	10	48
Automotive Technology	0	15	46
Exploratory All Clusters			
Exploratory	0	28	33

According to our survey results, administrators of comprehensive high schools with vocational programs also see a number of areas where they would consider expanding programs if additional funding were available. These are found in **Table 21**. Chief among these are Computer Science, Health Assisting, Dental, Engineering Technology, Culinary Arts, Bank Telling, Personal Finance, Drafting and Barbering.

TABLE 21

Expand	Maintain	Reduce	Eliminate
Computer Science (2)	Design & Visual	Hospitality	Post Graduate Bio-manufacturing (2)
Health Assisting	Fashion Technology (2)	Facilities Management	Post Graduate Construction Management
Dental	Business Management		Post Graduate Dental Assisting
Engineering Technology (2)	Business Technology (2)		Post Graduate Auto Technology
Culinary	Basic Home Repair		Post Graduate Cosmetology
Bank/Teller	Small Engine Repair		
Personal Finance	Culinary Foundations		
Drafting	Transitional Occupational Program		
Barbering (2)	General Shop (Special Needs Students only)		
	Extended Exploratory General Shop		

SOURCE: Dukakis Center Survey of Public High School Administrators

SECTION SIX

Summary and Conclusions

While it is in the interest of the Commonwealth to assure that every resident obtains as much education as they need to pursue the best job opportunities available, this research has revealed that nearly two-thirds of current jobs are held by workers who have no more than some college or an associates degree from a community college and fully one-third of the current workforce has no more than a high school diploma. This reflects the fact that despite common perceptions, a clear majority of the Commonwealth's jobs are in fields that require less than a college degree. While there may be some increase in job requirements between now and 2022, most of the job openings will be in fields that require no more than an associates degree, particularly since approximately two-thirds of all expected job openings will be available for new workers as replacements for those retiring, leaving the state, or transferring into other occupations. The top four broad occupation groups in terms of projected job openings are:

- Food Preparation and Servicing Related Occupations
- Office and Administrative Support Occupations
- Sales and Related Occupations
- Healthcare Practitioners and Technical Occupations

Altogether, these four broad occupations account for 43 percent of all expected job openings between 2012 and 2022 across all twenty-two broad occupation clusters in the Commonwealth.

In Food Preparation and Servicing Related Occupations, 55 percent of workers have no more than a high school degree along with on-the-job training and another 34 percent have some college or an associates degree. In Office and Administrative Support Occupations, the respective percentages are 36 and 41 percent. In Sales and Related Occupations, those with no more than high school account for 36 percent of all current workers with another 34 percent

with some college or an associates degree. In the Health Care field, an even larger proportion of workers have no more than an associates degree: 86 percent with 40 percent having no more than a high school degree.

There are other occupations where the net growth in employment will be negative or negligible, but the need for replacement workers is substantial. This is true in Production Occupations, Architecture and Engineering, Protective Services, and Installation and Repair jobs. More than 90 percent of the projected openings in Production and in Installation and Repair Services will require no more than an associates degree while the same is true of 74 percent of Protective Services jobs. Even 29 percent of Architecture and Engineering jobs will require no more education than this.

At current levels of enrollment, the graduates of regional vocational schools and vocational programs in comprehensive high schools are poised to fill about 12 percent of all the projected job openings between now and 2022. Their graduates, a majority of whom go on to further education, are expected to fill nearly one in six (15.7%) jobs requiring no more than high school; 11 percent of jobs requiring some college; and nearly 23 percent of jobs now filled by workers with an associates degree.

Our survey of administrators in the Commonwealth's regional vocational schools and in vocational programs within comprehensive schools suggests that, in general, they are well aware of the trend in future job openings based on projected industry demand and a knowledge of the need for replacement workers in critical industries. As such, their desire to expand current vocational programs or add new ones are generally in line with the occupational projections we have generated from U.S. Department of Labor employment projections.

All of this suggests that while the Commonwealth must continue to invest in its colleges and universities, it needs to recognize the important role of vocational education and community colleges and assure continued, if not increased funding, for these institutions that will continue to train the majority of the state's workforce.

APPENDIX A

Employment Projections 2012-2022

Data on Projected Net Employment Growth, Projected Replacements, and Total Job Growth for
All 675 Detailed 5-digit Occupation Codes

APPENDIX A

Employment Projections for 675 Detailed Occupations 2012-2022

SOC Code	Title	Employment 2012	Employment 2022	Change in Total		Replacements Per Year	Total Openings Per Year
				Employment 2012-2022	Net Employment Change Per Year		
111021	General and Operations Managers	55,959	62,608	6,649	665	1,047	1,712
112011	Advertising and Promotions Managers	934	1,020	86	9	29	38
112021	Marketing Managers	7,627	8,476	849	85	164	249
112022	Sales Managers	11,951	12,978	1,027	103	256	359
112031	Public Relations and Fundraising Managers	2,615	3,004	389	39	56	95
113011	Administrative Services Managers	10,799	12,103	1,304	130	176	306
113021	Computer and Information Systems Managers	16,460	19,003	2,543	254	229	483
113031	Financial Managers	21,964	24,166	2,202	220	412	632
113051	Industrial Production Managers	3,878	3,700	-178	0	70	70
113061	Purchasing Managers	2,304	2,362	58	6	50	56
113071	Transportation, Storage, and Distribution Managers	2,181	2,335	154	15	50	65
113111	Compensation and Benefits Managers	1,113	1,163	50	5	29	34
113121	Human Resources Managers	3,320	3,769	449	45	87	132
113131	Training and Development Managers	1,159	1,306	147	15	30	45
119021	Construction Managers	10,099	11,283	1,184	118	159	277
119031	Education Administrators, Preschool and Childcare Center/Program	2,263	2,624	361	36	60	96
119032	Education Administrators, Elementary and Secondary School	5,968	6,248	280	28	159	187
119033	Education Administrators, Postsecondary	7,588	8,604	1,016	102	202	304
119039	Education Administrators, All Other	1,209	1,391	182	18	32	50
119041	Architectural and Engineering Managers	6,466	6,680	214	21	159	180
119051	Food Service Managers	8,201	8,928	727	73	146	219
119061	Funeral Service Managers	273	340	67	7	6	13
119081	Lodging Managers	1,338	1,467	129	13	41	54
119111	Medical and Health Services Managers	10,459	12,672	2,213	221	254	475
119121	Natural Sciences Managers	2,627	2,952	325	32	55	87
119131	Postmasters and Mail Superintendents	357	290	-67	0	8	8
119141	Property, Real Estate, and Community Association Managers	7,783	8,707	924	92	176	268
119151	Social and Community Service Managers	5,724	6,996	1,272	127	118	245
119161	Emergency Management Directors	153	167	14	1	2	3
119199	Managers, All Other	10,002	10,678	676	68	219	287
131011	Agents and Business Managers of Artists, Performers, and Athletes	312	363	51	5	7	12
131021	Buyers and Purchasing Agents, Farm Products	291	312	21	2	6	8
131022	Wholesale and Retail Buyers, Except Farm Products	3,749	4,110	361	36	93	129
131023	Purchasing Agents, Except Wholesale, Retail, and Farm Products	6,898	6,997	99	10	125	135
131031	Claims Adjusters, Examiners, and Investigators	9,951	10,327	376	38	230	268

APPENDIX A

Employment Projections for 675 Detailed Occupations 2012-2022

SOC Code	Title	Employment 2012	Employment 2022	Change in Total			
				Employment 2012-2022	Net Employment Change Per Year	Replacements Per Year	Total Openings Per Year
131032	Insurance Appraisers, Auto Damage	681	645	-36	0	16	16
131041	Compliance Officers	6,218	6,801	583	58	115	173
131051	Cost Estimators	5,082	6,286	1,204	120	163	283
131071	Human Resources Specialists	10,976	11,794	818	82	200	282
131075	Labor Relations Specialists	2,269	2,558	289	29	42	71
131081	Logisticians	2,080	2,562	482	48	24	72
131111	Management Analysts	27,103	33,070	5,967	597	420	1,017
131121	Meeting, Convention, and Event Planners	2,296	3,099	803	80	32	112
131131	Fundraisers	2,856	3,487	631	63	56	119
131141	Compensation, Benefits, and Job Analysis Specialists	3,724	4,006	282	28	68	96
131151	Training and Development Specialists	5,353	6,205	852	85	98	183
131161	Market Research Analysts and Marketing Specialists	15,071	19,850	4,779	478	207	685
131199	Business Operations Specialists, All Other	13,931	15,497	1,566	157	191	348
132011	Accountants and Auditors	37,131	41,587	4,456	446	1,099	1,545
132021	Appraisers and Assessors of Real Estate	1,863	1,945	82	8	17	25
132031	Budget Analysts	1,897	2,016	119	12	76	88
132041	Credit Analysts	1,725	1,985	260	26	43	69
132051	Financial Analysts	15,160	17,464	2,304	230	369	599
132052	Personal Financial Advisors	8,122	9,863	1,741	174	131	305
132053	Insurance Underwriters	3,497	3,228	-269	0	95	95
132061	Financial Examiners	1,200	1,308	108	11	30	41
132071	Credit Counselors	724	876	152	15	13	28
132072	Loan Officers	5,172	5,870	698	70	95	165
132081	Tax Examiners and Collectors, and Revenue Agents	2,288	2,296	8	1	79	80
132082	Tax Preparers	1,965	2,095	130	13	40	53
132099	Financial Specialists, All Other	2,238	2,431	193	19	24	43
151111	Computer and Information Research Scientists	865	985	120	12	14	26
151121	Computer Systems Analysts	16,820	20,837	4,017	402	264	666
151122	Information Security Analysts	2,635	3,664	1,029	103	41	144
151131	Computer Programmers	8,511	9,095	584	58	222	280
151132	Software Developers, Applications	27,353	32,937	5,584	558	351	909
151133	Software Developers, Systems Software	30,032	36,293	6,261	626	385	1,011
151134	Web Developers	6,067	7,436	1,369	137	95	232
151141	Database Administrators	4,498	5,413	915	92	85	177
151142	Network and Computer Systems Administrators	10,019	11,279	1,260	126	157	283

APPENDIX A

Employment Projections for 675 Detailed Occupations 2012-2022

SOC Code	Title	Employment 2012	Employment 2022	Change in Total			
				Employment 2012-2022	Net Employment Change Per Year	Replacements Per Year	Total Openings Per Year
151143	Computer Network Architects	4,897	5,780	883	88	77	165
151151	Computer User Support Specialists	17,624	21,050	3,426	343	277	620
151152	Computer Network Support Specialists	5,106	5,714	608	61	80	141
151199	Computer Occupations, All Other	3,662	4,006	344	34	58	92
152011	Actuaries	968	1,206	238	24	28	52
152031	Operations Research Analysts	2,605	3,435	830	83	59	142
152041	Statisticians	1,704	2,270	566	57	54	111
171011	Architects, Except Landscape and Naval	4,400	5,038	638	64	104	168
171012	Landscape Architects	701	782	81	8	17	25
171022	Surveyors	671	723	52	5	14	19
172011	Aerospace Engineers	990	968	-22	0	23	23
172031	Biomedical Engineers	1,739	2,217	478	48	44	92
172041	Chemical Engineers	1,202	1,302	100	10	28	38
172051	Civil Engineers	6,552	7,740	1,188	119	159	278
172061	Computer Hardware Engineers	3,788	4,150	362	36	82	118
172071	Electrical Engineers	7,682	7,979	297	30	168	198
172072	Electronics Engineers, Except Computer	5,195	5,603	408	41	113	154
172081	Environmental Engineers	2,962	3,320	358	36	72	108
172111	Health and Safety Engineers, Except Mining Safety Engineers and Inspectors	484	509	25	2	14	16
172112	Industrial Engineers	6,102	6,027	-75	0	178	178
172121	Marine Engineers and Naval Architects	322	374	52	5	8	13
172131	Materials Engineers	1,222	1,211	-11	0	38	38
172141	Mechanical Engineers	8,315	8,402	87	9	284	293
172199	Engineers, All Other	1,730	1,792	62	6	32	38
173011	Architectural and Civil Drafters	2,174	2,099	-75	0	29	29
173012	Electrical and Electronics Drafters	604	611	7	1	8	9
173013	Mechanical Drafters	1,154	1,015	-139	0	15	15
173022	Civil Engineering Technicians	802	819	17	2	17	19
173023	Electrical and Electronics Engineering Technicians	6,062	5,769	-293	0	126	126
173024	Electro-Mechanical Technicians	1,525	1,534	9	1	32	33
173025	Environmental Engineering Technicians	518	619	101	10	11	21
173026	Industrial Engineering Technicians	3,004	2,814	-190	0	62	62
173027	Mechanical Engineering Technicians	1,252	1,242	-10	0	26	26
173029	Engineering Technicians, Except Drafters, All Other	1,222	1,156	-66	0	25	25
173031	Surveying and Mapping Technicians	614	707	93	9	11	20

APPENDIX A

Employment Projections for 675 Detailed Occupations 2012-2022

SOC Code	Title	Employment 2012	Employment 2022	Change in Total			
				Employment 2012-2022	Net Employment Change Per Year	Replacements Per Year	Total Openings Per Year
191012	Food Scientists and Technologists	232	279	47	5	8	13
191021	Biochemists and Biophysicists	3,233	3,917	684	68	92	160
191022	Microbiologists	1,684	1,889	205	20	48	68
191023	Zoologists and Wildlife Biologists	788	912	124	12	22	34
191029	Biological Scientists, All Other	1,072	1,179	107	11	31	42
191031	Conservation Scientists	553	627	74	7	16	23
191032	Foresters	133	153	20	2	4	6
191041	Epidemiologists	412	474	62	6	9	15
191042	Medical Scientists, Except Epidemiologists	9,352	10,533	1,181	118	197	315
191099	Life Scientists, All Other	626	679	53	5	13	18
192012	Physicists	471	529	58	6	12	18
192021	Atmospheric and Space Scientists	641	754	113	11	16	27
192031	Chemists	3,852	4,189	337	34	100	134
192032	Materials Scientists	507	521	14	1	13	14
192041	Environmental Scientists and Specialists, Including Health	2,430	2,931	501	50	72	122
192042	Geoscientists, Except Hydrologists and Geographers	220	247	27	3	6	9
192043	Hydrologists	156	184	28	3	5	8
193011	Economists	845	1,031	186	19	25	44
193022	Survey Researchers	520	616	96	10	7	17
193031	Clinical, Counseling, and School Psychologists	5,540	6,005	465	46	151	197
193032	Industrial-Organizational Psychologists	299	381	82	8	8	16
193039	Psychologists, All Other	475	536	61	6	13	19
193041	Sociologists	172	202	30	3	5	8
193051	Urban and Regional Planners	1,500	1,627	127	13	67	80
193099	Social Scientists and Related Workers, All Other	719	807	88	9	12	21
194011	Agricultural and Food Science Technicians	172	187	15	2	6	8
194021	Biological Technicians	5,637	6,543	906	91	169	260
194031	Chemical Technicians	2,211	2,449	238	24	54	78
194061	Social Science Research Assistants	1,862	2,110	248	25	73	98
194091	Environmental Science and Protection Technicians, Including Health	1,108	1,373	265	26	44	70
194093	Forest and Conservation Technicians	229	279	50	5	9	14
194099	Life, Physical, and Social Science Technicians, All Other	1,097	1,203	106	11	43	54
211011	Substance Abuse and Behavioral Disorder Counselors	3,531	4,556	1,025	102	75	177
211012	Educational, Guidance, School, and Vocational Counselors	6,425	7,128	703	70	137	207
211013	Marriage and Family Therapists	1,367	1,777	410	41	29	70

APPENDIX A

Employment Projections for 675 Detailed Occupations 2012-2022

SOC Code	Title	Employment 2012	Employment 2022	Change in Total			
				Employment 2012-2022	Net Employment Change Per Year	Replacements Per Year	Total Openings Per Year
211014	Mental Health Counselors	8,178	9,943	1,765	176	174	350
211015	Rehabilitation Counselors	4,406	5,073	667	67	94	161
211019	Counselors, All Other	475	588	113	11	10	21
211021	Child, Family, and School Social Workers	10,190	12,015	1,825	182	216	398
211022	Healthcare Social Workers	11,059	13,202	2,143	214	234	448
211023	Mental Health and Substance Abuse Social Workers	4,698	5,482	784	78	100	178
211029	Social Workers, All Other	724	815	91	9	15	24
211091	Health Educators	1,854	2,296	442	44	48	92
211092	Probation Officers and Correctional Treatment Specialists	414	418	4	0	11	11
211093	Social and Human Service Assistants	18,255	21,677	3,422	342	477	819
211094	Community Health Workers	1,301	1,588	287	29	34	63
211099	Community and Social Service Specialists, All Other	1,586	1,935	349	35	42	77
212011	Clergy	456	553	97	10	9	19
231011	Lawyers	22,637	24,593	1,956	196	362	558
231022	Arbitrators, Mediators, and Conciliators	238	277	39	4	4	8
232011	Paralegals and Legal Assistants	6,992	8,071	1,079	108	114	222
232091	Court Reporters	157	168	11	1	3	4
232093	Title Examiners, Abstractors, and Searchers	933	1,012	79	8	15	23
232099	Legal Support Workers, All Other	297	304	7	1	5	6
251011	Business Teachers, Postsecondary	2,042	2,303	261	26	31	57
251021	Computer Science Teachers, Postsecondary	763	851	88	9	12	21
251022	Mathematical Science Teachers, Postsecondary	1,346	1,485	139	14	20	34
251032	Engineering Teachers, Postsecondary	1,309	1,448	139	14	20	34
251042	Biological Science Teachers, Postsecondary	2,105	2,472	367	37	32	69
251051	Atmospheric, Earth, Marine, and Space Sciences Teachers, Postsecondary	300	331	31	3	4	7
251052	Chemistry Teachers, Postsecondary	643	723	80	8	10	18
251053	Environmental Science Teachers, Postsecondary	216	242	26	3	3	6
251054	Physics Teachers, Postsecondary	570	641	71	7	9	16
251061	Anthropology and Archeology Teachers, Postsecondary	146	163	17	2	2	4
251062	Area, Ethnic, and Cultural Studies Teachers, Postsecondary	459	525	66	7	7	14
251063	Economics Teachers, Postsecondary	684	774	90	9	10	19
251064	Geography Teachers, Postsecondary	111	121	10	1	2	3
251065	Political Science Teachers, Postsecondary	616	699	83	8	9	17
251066	Psychology Teachers, Postsecondary	1,157	1,309	152	15	17	32
251067	Sociology Teachers, Postsecondary	702	784	82	8	10	18

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				Employment 2012-2022	Net Employment Change Per Year	Replacements Per Year	Total Openings Per Year
251069	Social Sciences Teachers, Postsecondary, All Other	177	199	22	2	3	5
251071	Health Specialties Teachers, Postsecondary	2,669	3,597	928	93	40	133
251072	Nursing Instructors and Teachers, Postsecondary	1,078	1,448	370	37	16	53
251081	Education Teachers, Postsecondary	1,384	1,569	185	18	21	39
251111	Criminal Justice and Law Enforcement Teachers, Postsecondary	178	199	21	2	3	5
251112	Law Teachers, Postsecondary	1,023	1,191	168	17	15	32
251113	Social Work Teachers, Postsecondary	264	295	31	3	4	7
251121	Art, Drama, and Music Teachers, Postsecondary	4,930	5,659	729	73	74	147
251122	Communications Teachers, Postsecondary	635	709	74	7	10	17
251123	English Language and Literature Teachers, Postsecondary	1,966	2,182	216	22	30	52
251124	Foreign Language and Literature Teachers, Postsecondary	1,418	1,617	199	20	21	41
251125	History Teachers, Postsecondary	810	910	100	10	12	22
251126	Philosophy and Religion Teachers, Postsecondary	741	877	136	14	11	25
251191	Graduate Teaching Assistants	2,362	2,584	222	22	36	58
251193	Recreation and Fitness Studies Teachers, Postsecondary	421	467	46	5	6	11
251194	Vocational Education Teachers, Postsecondary	2,076	2,279	203	20	31	51
252011	Preschool Teachers, Except Special Education	15,162	17,740	2,578	258	426	684
252012	Kindergarten Teachers, Except Special Education	3,385	3,833	448	45	95	140
252021	Elementary School Teachers, Except Special Education	25,471	28,338	2,867	287	560	847
252022	Middle School Teachers, Except Special and Career/Technical Education	15,660	17,405	1,745	174	345	519
252023	Career/Technical Education Teachers, Middle School	330	344	14	1	7	8
252031	Secondary School Teachers, Except Special and Career/Technical Education	21,573	22,511	938	94	586	680
252032	Career/Technical Education Teachers, Secondary School	2,949	3,065	116	12	80	92
252051	Special Education Teachers, Preschool	497	536	39	4	8	12
252052	Special Education Teachers, Kindergarten and Elementary School	6,765	7,067	302	30	116	146
252053	Special Education Teachers, Middle School	3,875	4,038	163	16	66	82
252054	Special Education Teachers, Secondary School	4,383	4,534	151	15	75	90
252059	Special Education Teachers, All Other	1,471	1,755	284	28	25	53
253011	Adult Basic and Secondary Education and Literacy Teachers and Instructors	2,170	2,356	186	19	37	56
253021	Self-Enrichment Education Teachers	8,529	10,111	1,582	158	146	304
254011	Archivists	223	271	48	5	5	10
254012	Curators	565	644	79	8	12	20
254013	Museum Technicians and Conservators	471	528	57	6	10	16
254021	Librarians	4,549	4,890	341	34	103	137
254031	Library Technicians	3,465	3,767	302	30	187	217

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				Employment 2012-2022	Net Employment Change Per Year	Replacements Per Year	Total Openings Per Year
259011	Audio-Visual and Multimedia Collections Specialists	294	290	-4	0	2	2
259031	Instructional Coordinators	3,765	4,237	472	47	32	79
259041	Teacher Assistants	32,489	34,789	2,300	230	737	967
271011	Art Directors	2,768	2,682	-86	0	66	66
271012	Craft Artists	314	339	25	2	7	9
271013	Fine Artists, Including Painters, Sculptors, and Illustrators	762	786	24	2	18	20
271014	Multimedia Artists and Animators	1,398	1,542	144	14	33	47
271019	Artists and Related Workers, All Other	241	269	28	3	6	9
271021	Commercial and Industrial Designers	1,041	1,017	-24	0	28	28
271022	Fashion Designers	186	182	-4	0	5	5
271023	Floral Designers	1,593	1,571	-22	0	42	42
271024	Graphic Designers	6,812	7,119	307	31	180	211
271025	Interior Designers	1,516	1,714	198	20	40	60
271026	Merchandise Displayers and Window Trimmers	1,613	1,685	72	7	43	50
271027	Set and Exhibit Designers	175	194	19	2	5	7
272012	Producers and Directors	2,721	2,854	133	13	92	105
272021	Athletes and Sports Competitors	443	516	73	7	13	20
272022	Coaches and Scouts	6,928	8,209	1,281	128	205	333
272023	Umpires, Referees, and Other Sports Officials	332	368	36	4	10	14
272041	Music Directors and Composers	629	633	4	0	17	17
272042	Musicians and Singers	811	870	59	6	22	28
272099	Entertainers and Performers, Sports and Related Workers, All Other	144	164	20	2	2	4
273011	Radio and Television Announcers	884	816	-68	0	18	18
273021	Broadcast News Analysts	134	117	-17	0	5	5
273022	Reporters and Correspondents	1,349	1,219	-130	0	46	46
273031	Public Relations Specialists	8,086	9,280	1,194	119	111	230
273041	Editors	4,578	4,612	34	3	111	114
273042	Technical Writers	1,971	2,246	275	28	60	88
273043	Writers and Authors	2,727	2,798	71	7	59	66
273091	Interpreters and Translators	2,203	3,131	928	93	30	123
273099	Media and Communication Workers, All Other	131	140	9	1	2	3
274011	Audio and Video Equipment Technicians	2,145	2,481	336	34	39	73
274012	Broadcast Technicians	780	744	-36	0	14	14
274013	Radio Operators	216	226	10	1	4	5
274014	Sound Engineering Technicians	279	296	17	2	5	7

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				Employment 2012-2022	Net Employment Change Per Year	Replacements Per Year	Total Openings Per Year
274021	Photographers	3,550	3,567	17	2	37	39
274031	Camera Operators, Television, Video, and Motion Picture	579	605	26	3	4	7
274032	Film and Video Editors	340	365	25	2	3	5
291011	Chiropractors	726	747	21	2	14	16
291021	Dentists, General	4,673	4,907	234	23	114	137
291022	Oral and Maxillofacial Surgeons	484	508	24	2	12	14
291023	Orthodontists	326	341	15	2	8	10
291031	Dietitians and Nutritionists	1,987	2,406	419	42	24	66
291041	Optometrists	810	909	99	10	24	34
291051	Pharmacists	6,651	7,407	756	76	159	235
291061	Anesthesiologists	557	635	78	8	14	22
291062	Family and General Practitioners	1,068	1,133	65	6	27	33
291063	Internists, General	2,885	3,043	158	16	72	88
291064	Obstetricians and Gynecologists	609	640	31	3	15	18
291065	Pediatricians, General	3,123	3,314	191	19	78	97
291066	Psychiatrists	951	1,059	108	11	24	35
291067	Surgeons	1,162	1,325	163	16	29	45
291069	Physicians and Surgeons, All Other	9,483	10,812	1,329	133	237	370
291071	Physician Assistants	2,907	3,745	838	84	52	136
291081	Podiatrists	298	335	37	4	6	10
291122	Occupational Therapists	5,058	6,137	1,079	108	69	177
291123	Physical Therapists	7,335	9,318	1,983	198	180	378
291124	Radiation Therapists	498	598	100	10	10	20
291125	Recreational Therapists	1,113	1,249	136	14	23	37
291126	Respiratory Therapists	2,282	2,730	448	45	33	78
291127	Speech-Language Pathologists	4,053	4,649	596	60	61	121
291128	Exercise Physiologists	111	119	8	1	1	2
291129	Therapists, All Other	293	350	57	6	4	10
291131	Veterinarians	1,537	1,686	149	15	49	64
291141	Registered Nurses	78,750	93,307	14,557	1,456	1,527	2,983
291151	Nurse Anesthetists	437	511	74	7	8	15
291161	Nurse Midwives	182	227	45	4	4	8
291171	Nurse Practitioners	4,460	5,604	1,144	114	86	200
291181	Audiologists	286	361	75	8	6	14
291199	Health Diagnosing and Treating Practitioners, All Other	709	757	48	5	15	20

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292011	Medical and Clinical Laboratory Technologists	6,539	7,296	757	76	171	247
292012	Medical and Clinical Laboratory Technicians	5,302	6,575	1,273	127	139	266
292021	Dental Hygienists	5,846	7,007	1,161	116	150	266
292031	Cardiovascular Technologists and Technicians	1,193	1,550	357	36	17	53
292032	Diagnostic Medical Sonographers	1,464	2,080	616	62	21	83
292033	Nuclear Medicine Technologists	638	754	116	12	9	21
292034	Radiologic Technologists	5,493	6,493	1,000	100	77	177
292035	Magnetic Resonance Imaging Technologists	917	1,094	177	18	13	31
292041	Emergency Medical Technicians and Paramedics	6,922	8,193	1,271	127	189	316
292051	Dietetic Technicians	1,441	1,706	265	26	14	40
292052	Pharmacy Technicians	7,477	8,612	1,135	114	74	188
292054	Respiratory Therapy Technicians	219	251	32	3	2	5
292055	Surgical Technologists	2,356	3,033	677	68	23	91
292056	Veterinary Technologists and Technicians	2,539	3,182	643	64	25	89
292057	Ophthalmic Medical Technicians	1,374	1,625	251	25	14	39
292061	Licensed Practical and Licensed Vocational Nurses	17,725	21,324	3,599	360	433	793
292071	Medical Records and Health Information Technicians	6,068	7,193	1,125	112	160	272
292081	Opticians, Dispensing	1,539	1,721	182	18	44	62
292091	Orthotists and Prosthetists	157	203	46	5	2	7
292099	Health Technologists and Technicians, All Other	1,603	2,030	427	43	16	59
299011	Occupational Health and Safety Specialists	1,059	1,162	103	10	29	39
299012	Occupational Health and Safety Technicians	200	216	16	2	5	7
299091	Athletic Trainers	625	742	117	12	17	29
299092	Genetic Counselors	101	132	31	3	3	6
299099	Healthcare Practitioners and Technical Workers, All Other	424	471	47	5	12	17
311011	Home Health Aides	19,759	27,738	7,979	798	376	1,174
311013	Psychiatric Aides	3,817	4,159	342	34	73	107
311014	Nursing Assistants	39,174	45,942	6,768	677	745	1,422
311015	Orderlies	1,933	2,281	348	35	37	72
312011	Occupational Therapy Assistants	1,334	1,699	365	36	34	70
312012	Occupational Therapy Aides	765	993	228	23	19	42
312021	Physical Therapist Assistants	2,114	2,758	644	64	47	111
312022	Physical Therapist Aides	1,030	1,344	314	31	23	54
319011	Massage Therapists	3,990	4,974	984	98	42	140
319091	Dental Assistants	7,019	7,895	876	88	146	234

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319092	Medical Assistants	13,756	16,307	2,551	255	262	517
319093	Medical Equipment Preparers	1,251	1,468	217	22	24	46
319094	Medical Transcriptionists	1,511	1,518	7	1	29	30
319095	Pharmacy Aides	1,152	1,230	78	8	22	30
319096	Veterinary Assistants and Laboratory Animal Caretakers	2,197	2,432	235	24	42	66
319097	Phlebotomists	2,825	3,380	555	56	54	110
319099	Healthcare Support Workers, All Other	1,226	1,349	123	12	23	35
331012	First-Line Supervisors of Police and Detectives	4,252	4,517	265	26	126	152
331021	First-Line Supervisors of Fire Fighting and Prevention Workers	3,240	3,456	216	22	138	160
331099	First-Line Supervisors of Protective Service Workers, All Other	1,698	1,782	84	8	38	46
332011	Firefighters	11,699	12,478	779	78	319	397
333012	Correctional Officers and Jailers	6,261	6,560	299	30	166	196
333021	Detectives and Criminal Investigators	2,067	2,182	115	12	46	58
333031	Fish and Game Wardens	104	111	7	1	3	4
333041	Parking Enforcement Workers	724	722	-2	0	21	21
333051	Police and Sheriff's Patrol Officers	16,549	17,629	1,080	108	519	627
333052	Transit and Railroad Police	104	114	10	1	3	4
339011	Animal Control Workers	433	465	32	3	10	13
339032	Security Guards	19,479	20,740	1,261	126	298	424
339091	Crossing Guards	1,758	1,755	-3	0	27	27
339092	Lifeguards, Ski Patrol, and Other Recreational Protective Service Workers	3,043	3,783	740	74	208	282
339099	Protective Service Workers, All Other	1,235	1,383	148	15	84	99
351011	Chefs and Head Cooks	3,887	4,409	522	52	63	115
351012	First-Line Supervisors of Food Preparation and Serving Workers	19,706	23,901	4,195	420	556	976
352011	Cooks, Fast Food	10,034	10,793	759	76	198	274
352012	Cooks, Institution and Cafeteria	9,326	10,837	1,511	151	184	335
352014	Cooks, Restaurant	23,385	29,044	5,659	566	461	1,027
352015	Cooks, Short Order	4,970	5,385	415	42	98	140
352021	Food Preparation Workers	19,167	20,569	1,402	140	550	690
353011	Bartenders	18,199	22,402	4,203	420	673	1,093
353021	Combined Food Preparation and Serving Workers, Including Fast Food	58,254	70,746	12,492	1,249	2,224	3,473
353022	Counter Attendants, Cafeteria, Food Concession, and Coffee Shop	17,236	18,189	953	95	1,051	1,146
353031	Waiters and Waitresses	58,572	66,836	8,264	826	2,818	3,644
353041	Food Servers, Nonrestaurant	6,803	8,301	1,498	150	199	349
359011	Dining Room and Cafeteria Attendants and Bartender Helpers	8,524	9,823	1,299	130	374	504

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359021	Dishwashers	13,988	15,951	1,963	196	616	812
359031	Hosts and Hostesses, Restaurant, Lounge, and Coffee Shop	7,984	9,100	1,116	112	601	713
359099	Food Preparation and Serving Related Workers, All Other	672	764	92	9	36	45
371011	First-Line Supervisors of Housekeeping and Janitorial Workers	5,671	6,325	654	65	136	201
371012	First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	5,817	6,338	521	52	66	118
372011	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	55,460	59,566	4,106	411	1,044	1,455
372012	Maids and Housekeeping Cleaners	18,144	21,405	3,261	326	360	686
372019	Building Cleaning Workers, All Other	180	190	10	1	3	4
372021	Pest Control Workers	944	1,023	79	8	26	34
373011	Landscaping and Groundskeeping Workers	25,557	27,991	2,434	243	644	887
373012	Pesticide Handlers, Sprayers, and Applicators, Vegetation	467	495	28	3	12	15
392011	Animal Trainers	355	504	149	15	16	31
392021	Nonfarm Animal Caretakers	3,726	4,748	1,022	102	45	147
393021	Motion Picture Projectionists	202	164	-38	0	8	8
393031	Ushers, Lobby Attendants, and Ticket Takers	1,739	1,781	42	4	92	96
393091	Amusement and Recreation Attendants	5,780	7,385	1,605	160	290	450
393093	Locker Room, Coatroom, and Dressing Room Attendants	1,091	1,336	245	24	55	79
394021	Funeral Attendants	837	938	101	10	18	28
395012	Hairdressers, Hairstylists, and Cosmetologists	18,463	22,927	4,464	446	432	878
395092	Manicurists and Pedicurists	2,228	2,854	626	63	18	81
395093	Shampooers	355	387	32	3	3	6
395094	Skincare Specialists	2,517	3,842	1,325	132	21	153
396011	Baggage Porters and Bellhops	681	784	103	10	17	27
396012	Concierges	1,226	1,591	365	36	30	66
399011	Childcare Workers	16,598	19,679	3,081	308	488	796
399021	Personal Care Aides	21,688	29,943	8,255	826	155	981
399031	Fitness Trainers and Aerobics Instructors	10,678	13,828	3,150	315	126	441
399032	Recreation Workers	9,094	10,738	1,644	164	107	271
399041	Residential Advisors	4,005	4,608	603	60	173	233
399099	Personal Care and Service Workers, All Other	685	824	139	14	19	33
411011	First-Line Supervisors of Retail Sales Workers	36,540	37,669	1,129	113	795	908
411012	First-Line Supervisors of Non-Retail Sales Workers	9,881	9,722	-159	0	126	126
412011	Cashiers	72,580	75,191	2,611	261	3,138	3,399
412021	Counter and Rental Clerks	7,958	8,751	793	79	203	282
412022	Parts Salespersons	4,073	4,517	444	44	103	147

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412031	Retail Salespersons	109,827	119,163	9,336	934	3,756	4,690
413011	Advertising Sales Agents	3,187	3,194	7	1	98	99
413021	Insurance Sales Agents	8,195	8,834	639	64	193	257
413031	Securities, Commodities, and Financial Services Sales Agents	8,455	9,004	549	55	198	253
413041	Travel Agents	2,098	1,688	-410	0	32	32
413099	Sales Representatives, Services, All Other	15,097	17,589	2,492	249	412	661
414011	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	15,101	16,834	1,733	173	294	467
414012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	32,343	34,807	2,464	246	630	876
419021	Real Estate Brokers	1,702	1,883	181	18	16	34
419022	Real Estate Sales Agents	4,591	5,025	434	43	43	86
419031	Sales Engineers	3,621	4,009	388	39	63	102
419041	Telemarketers	3,869	4,216	347	35	80	115
419091	Door-to-Door Sales Workers, News and Street Vendors, and Related Workers	1,095	1,113	18	2	11	13
419099	Sales and Related Workers, All Other	1,168	1,302	134	13	23	36
431011	First-Line Supervisors of Office and Administrative Support Workers	35,429	39,488	4,059	406	841	1,247
432011	Switchboard Operators, Including Answering Service	3,450	2,940	-510	0	63	63
432021	Telephone Operators	342	314	-28	0	9	9
433011	Bill and Account Collectors	6,397	7,108	711	71	180	251
433021	Billing and Posting Clerks	11,557	13,034	1,477	148	213	361
433031	Bookkeeping, Accounting, and Auditing Clerks	41,191	45,731	4,540	454	378	832
433051	Payroll and Timekeeping Clerks	4,318	4,829	511	51	95	146
433061	Procurement Clerks	1,391	1,459	68	7	50	57
433071	Tellers	11,942	12,865	923	92	557	649
434011	Brokerage Clerks	1,729	1,650	-79	0	45	45
434021	Correspondence Clerks	232	246	14	1	6	7
434031	Court, Municipal, and License Clerks	1,927	2,158	231	23	30	53
434041	Credit Authorizers, Checkers, and Clerks	843	885	42	4	10	14
434051	Customer Service Representatives	50,089	55,743	5,654	565	1,363	1,928
434061	Eligibility Interviewers, Government Programs	1,480	1,645	165	16	30	46
434071	File Clerks	2,623	2,497	-126	0	60	60
434081	Hotel, Motel, and Resort Desk Clerks	3,874	4,788	914	91	184	275
434111	Interviewers, Except Eligibility and Loan	2,964	3,205	241	24	56	80
434121	Library Assistants, Clerical	2,787	3,198	411	41	122	163
434131	Loan Interviewers and Clerks	2,959	3,385	426	43	20	63
434141	New Accounts Clerks	1,536	1,552	16	2	40	42

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Employment Projections for 675 Detailed Occupations 2012-2022

SOC Code	Title	Employment 2012	Employment 2022	Change in Total			
				Employment 2012-2022	Net Employment Change Per Year	Replacements Per Year	Total Openings Per Year
434151	Order Clerks	4,612	4,462	-150	0	121	121
434161	Human Resources Assistants, Except Payroll and Timekeeping	3,302	3,273	-29	0	83	83
434171	Receptionists and Information Clerks	19,286	20,918	1,632	163	519	682
434181	Reservation and Transportation Ticket Agents and Travel Clerks	2,750	2,383	-367	0	36	36
434199	Information and Record Clerks, All Other	2,102	1,886	-216	0	45	45
435011	Cargo and Freight Agents	1,112	1,163	51	5	30	35
435021	Couriers and Messengers	2,974	2,691	-283	0	38	38
435031	Police, Fire, and Ambulance Dispatchers	2,714	2,945	231	23	78	101
435032	Dispatchers, Except Police, Fire, and Ambulance	3,759	4,068	309	31	108	139
435041	Meter Readers, Utilities	719	608	-111	0	18	18
435051	Postal Service Clerks	2,272	1,660	-612	0	34	34
435052	Postal Service Mail Carriers	7,924	6,212	-1,712	0	276	276
435053	Postal Service Mail Sorters, Processors, and Processing Machine Operators	3,794	2,855	-939	0	28	28
435061	Production, Planning, and Expediting Clerks	7,215	7,410	195	20	180	200
435071	Shipping, Receiving, and Traffic Clerks	17,836	18,066	230	23	469	492
435081	Stock Clerks and Order Fillers	46,851	45,872	-979	0	1,415	1,415
435111	Weighers, Measurers, Checkers, and Samplers, Recordkeeping	932	1,040	108	11	20	31
436011	Executive Secretaries and Executive Administrative Assistants	26,566	25,964	-602	0	320	320
436012	Legal Secretaries	5,640	5,288	-352	0	68	68
436013	Medical Secretaries	19,033	24,188	5,155	516	229	745
436014	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	46,118	50,453	4,335	434	555	989
439011	Computer Operators	1,995	1,630	-365	0	19	19
439021	Data Entry Keyers	3,800	2,823	-977	0	45	45
439022	Word Processors and Typists	1,267	955	-312	0	4	4
439031	Desktop Publishers	717	743	26	3	13	16
439041	Insurance Claims and Policy Processing Clerks	6,985	7,382	397	40	185	225
439051	Mail Clerks and Mail Machine Operators, Except Postal Service	2,372	2,144	-228	0	54	54
439061	Office Clerks, General	59,156	61,855	2,699	270	1,243	1,513
439071	Office Machine Operators, Except Computer	2,016	1,793	-223	0	48	48
439199	Office and Administrative Support Workers, All Other	2,073	2,127	54	5	58	63
451011	First-Line Supervisors of Farming, Fishing, and Forestry Workers	190	205	15	2	4	6
452092	Farmworkers and Laborers, Crop, Nursery, and Greenhouse	696	691	-5	0	21	21
452093	Farmworkers, Farm, Ranch, and Aquacultural Animals	268	321	53	5	8	13
471011	First-Line Supervisors of Construction Trades and Extraction Workers	10,193	12,396	2,203	220	110	330
472011	Boilermakers	371	395	24	2	17	19

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Employment Projections for 675 Detailed Occupations 2012-2022

SOC Code	Title	Employment 2012	Employment 2022	Change in Total			
				Employment 2012-2022	Net Employment Change Per Year	Replacements Per Year	Total Openings Per Year
472021	Brickmasons and Blockmasons	1,540	2,110	570	57	16	73
472022	Stonemasons	899	1,140	241	24	10	34
472031	Carpenters	22,231	26,620	4,389	439	274	713
472041	Carpet Installers	826	898	72	7	15	22
472042	Floor Layers, Except Carpet, Wood, and Hard Tiles	438	508	70	7	8	15
472043	Floor Sanders and Finishers	316	361	45	4	6	10
472044	Tile and Marble Setters	556	632	76	8	10	18
472051	Cement Masons and Concrete Finishers	1,225	1,533	308	31	14	45
472061	Construction Laborers	20,619	24,917	4,298	430	441	871
472071	Paving, Surfacing, and Tamping Equipment Operators	1,062	1,336	274	27	15	42
472073	Operating Engineers and Other Construction Equipment Operators	4,957	6,027	1,070	107	110	217
472081	Drywall and Ceiling Tile Installers	1,369	1,561	192	19	13	32
472082	Tapers	392	446	54	5	4	9
472111	Electricians	13,656	16,623	2,967	297	257	554
472121	Glaziers	1,090	1,259	169	17	26	43
472131	Insulation Workers, Floor, Ceiling, and Wall	596	754	158	16	8	24
472132	Insulation Workers, Mechanical	237	354	117	12	3	15
472141	Painters, Construction and Maintenance	6,379	7,593	1,214	121	97	218
472151	Pipelayers	460	547	87	9	6	15
472152	Plumbers, Pipefitters, and Steamfitters	9,164	11,266	2,102	210	114	324
472161	Plasterers and Stucco Masons	252	294	42	4	1	5
472181	Roofers	2,686	2,975	289	29	56	85
472211	Sheet Metal Workers	2,305	2,603	298	30	44	74
472221	Structural Iron and Steel Workers	725	874	149	15	24	39
473011	Helpers--Brickmasons, Blockmasons, Stonemasons, and Tile and Marble Setters	548	789	241	24	9	33
473012	Helpers--Carpenters	1,229	1,522	293	29	19	48
473013	Helpers--Electricians	922	1,270	348	35	14	49
473014	Helpers--Painters, Paperhangers, Plasterers, and Stucco Masons	237	275	38	4	4	8
473015	Helpers--Pipelayers, Plumbers, Pipefitters, and Steamfitters	520	659	139	14	8	22
473016	Helpers--Roofers	149	175	26	3	2	5
473019	Helpers, Construction Trades, All Other	544	609	65	6	8	14
474011	Construction and Building Inspectors	2,282	2,437	155	16	54	70
474021	Elevator Installers and Repairers	328	417	89	9	5	14
474031	Fence Erectors	231	309	78	8	5	13
474041	Hazardous Materials Removal Workers	1,205	1,277	72	7	26	33

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Employment Projections for 675 Detailed Occupations 2012-2022

SOC Code	Title	Employment 2012	Employment 2022	Change in Total			
				Employment 2012-2022	Net Employment Change Per Year	Replacements Per Year	Total Openings Per Year
474051	Highway Maintenance Workers	2,311	2,524	213	21	34	55
474061	Rail-Track Laying and Maintenance Equipment Operators	326	362	36	4	7	11
474071	Septic Tank Servicers and Sewer Pipe Cleaners	901	1,110	209	21	19	40
475021	Earth Drillers, Except Oil and Gas	134	174	40	4	4	8
491011	First-Line Supervisors of Mechanics, Installers, and Repairers	9,043	9,737	694	69	245	314
492011	Computer, Automated Teller, and Office Machine Repairers	2,603	2,664	61	6	54	60
492021	Radio, Cellular, and Tower Equipment Installers and Repairs	142	152	10	1	2	3
492022	Telecommunications Equipment Installers and Repairers, Except Line Installers	4,522	4,685	163	16	62	78
492092	Electric Motor, Power Tool, and Related Repairers	294	280	-14	0	5	5
492093	Electrical and Electronics Installers and Repairers, Transportation Equipment	114	119	5	0	2	2
492094	Electrical and Electronics Repairers, Commercial and Industrial Equipment	1,575	1,588	13	1	32	33
492096	Electronic Equipment Installers and Repairers, Motor Vehicles	116	112	-4	0	1	1
492097	Electronic Home Entertainment Equipment Installers and Repairers	572	612	40	4	20	24
492098	Security and Fire Alarm Systems Installers	1,026	1,117	91	9	21	30
493011	Aircraft Mechanics and Service Technicians	1,280	1,176	-104	0	34	34
493021	Automotive Body and Related Repairers	3,817	3,921	104	10	73	83
493022	Automotive Glass Installers and Repairers	526	534	8	1	13	14
493023	Automotive Service Technicians and Mechanics	16,227	17,029	802	80	410	490
493031	Bus and Truck Mechanics and Diesel Engine Specialists	3,308	3,563	255	26	70	96
493041	Farm Equipment Mechanics and Service Technicians	183	196	13	1	5	6
493042	Mobile Heavy Equipment Mechanics, Except Engines	999	1,125	126	13	29	42
493051	Motorboat Mechanics and Service Technicians	484	530	46	5	10	15
493052	Motorcycle Mechanics	149	153	4	0	3	3
493053	Outdoor Power Equipment and Other Small Engine Mechanics	677	741	64	6	14	20
493091	Bicycle Repairers	312	372	60	6	11	17
493093	Tire Repairers and Changers	1,248	1,406	158	16	44	60
499011	Mechanical Door Repairers	236	279	43	4	8	12
499012	Control and Valve Installers and Repairers, Except Mechanical Door	996	1,032	36	4	34	38
499021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	7,914	9,410	1,496	150	200	350
499031	Home Appliance Repairers	1,004	1,065	61	6	31	37
499041	Industrial Machinery Mechanics	3,916	4,589	673	67	113	180
499043	Maintenance Workers, Machinery	1,452	1,609	157	16	18	34
499044	Millwrights	520	600	80	8	8	16
499051	Electrical Power-Line Installers and Repairers	2,072	2,439	367	37	72	109
499052	Telecommunications Line Installers and Repairers	5,567	5,648	81	8	137	145

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Employment Projections for 675 Detailed Occupations 2012-2022

SOC Code	Title	Employment 2012	Employment 2022	Change in Total		Replacements Per Year	Total Openings Per Year
				Employment 2012-2022	Net Employment Change Per Year		
499062	Medical Equipment Repairers	992	1,259	267	27	28	55
499063	Musical Instrument Repairers and Tuners	271	268	-3	0	8	8
499069	Precision Instrument and Equipment Repairers, All Other	190	202	12	1	5	6
499071	Maintenance and Repair Workers, General	21,860	24,276	2,416	242	420	662
499091	Coin, Vending, and Amusement Machine Servicers and Repairers	678	726	48	5	7	12
499094	Locksmiths and Safe Repairers	555	564	9	1	18	19
499096	Riggers	220	286	66	7	5	12
499097	Signal and Track Switch Repairers	101	108	7	1	2	3
499098	Helpers—Installation, Maintenance, and Repair Workers	1,340	1,528	188	19	40	59
499099	Installation, Maintenance, and Repair Workers, All Other	2,981	3,238	257	26	50	76
511011	First-Line Supervisors of Production and Operating Workers	11,603	11,100	-503	0	163	163
512021	Coil Winders, Tapers, and Finishers	272	216	-56	0	3	3
512022	Electrical and Electronic Equipment Assemblers	6,566	5,591	-975	0	80	80
512023	Electromechanical Equipment Assemblers	2,891	2,653	-238	0	35	35
512031	Engine and Other Machine Assemblers	425	447	22	2	7	9
512041	Structural Metal Fabricators and Fitters	1,699	1,654	-45	0	68	68
512092	Team Assemblers	16,282	16,207	-75	0	257	257
512099	Assemblers and Fabricators, All Other	4,567	4,962	395	40	72	112
513011	Bakers	3,879	4,236	357	36	94	130
513021	Butchers and Meat Cutters	2,033	2,147	114	11	50	61
513022	Meat, Poultry, and Fish Cutters and Trimmers	942	1,016	74	7	23	30
513092	Food Batchmakers	2,026	2,170	144	14	66	80
513093	Food Cooking Machine Operators and Tenders	306	334	28	3	8	11
513099	Food Processing Workers, All Other	387	432	45	4	10	14
514011	Computer-Controlled Machine Tool Operators, Metal and Plastic	2,556	2,669	113	11	72	83
514012	Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic	494	572	78	8	14	22
514021	Extruding and Drawing Machine Setters, Operators, and Tenders, Metal and Plastic	2,809	2,372	-437	0	54	54
514022	Forging Machine Setters, Operators, and Tenders, Metal and Plastic	470	368	-102	0	9	9
514023	Rolling Machine Setters, Operators, and Tenders, Metal and Plastic	672	622	-50	0	13	13
514031	Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	2,574	2,236	-338	0	22	22
514032	Drilling and Boring Machine Tool Setters, Operators, and Tenders, Metal and Plastic	382	269	-113	0	7	7
514033	Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic	1,807	1,400	-407	0	40	40
514034	Lathe and Turning Machine Tool Setters, Operators, and Tenders, Metal and Plastic	969	734	-235	0	19	19
514035	Milling and Planing Machine Setters, Operators, and Tenders, Metal and Plastic	783	620	-163	0	15	15
514041	Machinists	9,145	9,124	-21	0	210	210

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Employment Projections for 675 Detailed Occupations 2012-2022

SOC Code	Title	Employment 2012	Employment 2022	Change in Total		Replacements Per Year	Total Openings Per Year
				Employment 2012-2022	Net Employment Change Per Year		
514051	Metal-Refining Furnace Operators and Tenders	178	163	-15	0	2	2
514071	Foundry Mold and Coremakers	207	166	-41	0	2	2
514072	Molding, Coremaking, and Casting Machine Setters, Operators, and Tenders, Metal and Plastic	3,202	2,713	-489	0	39	39
514081	Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic	2,326	1,822	-504	0	45	45
514111	Tool and Die Makers	1,266	1,149	-117	0	8	8
514121	Welders, Cutters, Solderers, and Brazers	2,986	2,947	-39	0	73	73
514122	Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	536	571	35	4	13	17
514191	Heat Treating Equipment Setters, Operators, and Tenders, Metal and Plastic	342	305	-37	0	7	7
514192	Layout Workers, Metal and Plastic	124	110	-14	0	2	2
514193	Plating and Coating Machine Setters, Operators, and Tenders, Metal and Plastic	1,148	924	-224	0	22	22
514194	Tool Grinders, Filers, and Sharpeners	241	212	-29	0	5	5
514199	Metal Workers and Plastic Workers, All Other	371	377	6	1	4	5
515111	Prepress Technicians and Workers	1,103	934	-169	0	28	28
515112	Printing Press Operators	3,682	3,486	-196	0	65	65
515113	Print Binding and Finishing Workers	1,481	1,366	-115	0	26	26
516011	Laundry and Dry-Cleaning Workers	6,179	7,160	981	98	183	281
516021	Pressers, Textile, Garment, and Related Materials	613	677	64	6	6	12
516031	Sewing Machine Operators	3,229	2,956	-273	0	16	16
516041	Shoe and Leather Workers and Repairers	181	164	-17	0	3	3
516042	Shoe Machine Operators and Tenders	248	218	-30	0	4	4
516051	Sewers, Hand	396	396	0	0	4	4
516052	Tailors, Dressmakers, and Custom Sewers	1,402	1,303	-99	0	15	15
516061	Textile Bleaching and Dyeing Machine Operators and Tenders	264	190	-74	0	4	4
516062	Textile Cutting Machine Setters, Operators, and Tenders	391	286	-105	0	6	6
516063	Textile Knitting and Weaving Machine Setters, Operators, and Tenders	558	413	-145	0	9	9
516064	Textile Winding, Twisting, and Drawing Out Machine Setters, Operators, and Tenders	159	118	-41	0	3	3
516091	Extruding and Forming Machine Setters, Operators, and Tenders, Synthetic and Glass Fibers	226	218	-8	0	4	4
516093	Upholsterers	553	471	-82	0	15	15
516099	Textile, Apparel, and Furnishings Workers, All Other	105	82	-23	0	1	1
517011	Cabinetmakers and Bench Carpenters	1,881	1,762	-119	0	15	15
517021	Furniture Finishers	185	165	-20	0	3	3
517041	Sawing Machine Setters, Operators, and Tenders, Wood	148	155	7	1	4	5
517042	Woodworking Machine Setters, Operators, and Tenders, Except Sawing	322	312	-10	0	2	2
518012	Power Distributors and Dispatchers	265	292	27	3	8	11
518013	Power Plant Operators	568	573	5	0	18	18

APPENDIX A

Employment Projections for 675 Detailed Occupations 2012-2022

SOC Code	Title	Employment 2012	Employment 2022	Change in Total			
				Employment 2012-2022	Net Employment Change Per Year	Replacements Per Year	Total Openings Per Year
518021	Stationary Engineers and Boiler Operators	1,042	1,098	56	6	32	38
518031	Water and Wastewater Treatment Plant and System Operators	2,534	2,862	328	33	89	122
518091	Chemical Plant and System Operators	403	400	-3	0	15	15
518092	Gas Plant Operators	262	258	-4	0	10	10
519011	Chemical Equipment Operators and Tenders	773	776	3	0	27	27
519012	Separating, Filtering, Clarifying, Precipitating, and Still Machine Setters, Operators, and Tenders	261	273	12	1	9	10
519021	Crushing, Grinding, and Polishing Machine Setters, Operators, and Tenders	421	369	-52	0	12	12
519022	Grinding and Polishing Workers, Hand	569	522	-47	0	16	16
519023	Mixing and Blending Machine Setters, Operators, and Tenders	1,511	1,488	-23	0	43	43
519031	Cutters and Trimmers, Hand	205	171	-34	0	4	4
519032	Cutting and Slicing Machine Setters, Operators, and Tenders	1,387	1,228	-159	0	23	23
519041	Extruding, Forming, Pressing, and Compacting Machine Setters, Operators, and Tenders	702	616	-86	0	19	19
519051	Furnace, Kiln, Oven, Drier, and Kettle Operators and Tenders	218	189	-29	0	5	5
519061	Inspectors, Testers, Sorters, Samplers, and Weighers	8,524	8,614	90	9	187	196
519071	Jewelers and Precious Stone and Metal Workers	1,221	1,014	-207	0	25	25
519081	Dental Laboratory Technicians	692	645	-47	0	23	23
519082	Medical Appliance Technicians	599	563	-36	0	20	20
519083	Ophthalmic Laboratory Technicians	719	705	-14	0	24	24
519111	Packaging and Filling Machine Operators and Tenders	7,690	8,113	423	42	181	223
519121	Coating, Painting, and Spraying Machine Setters, Operators, and Tenders	1,365	1,226	-139	0	25	25
519122	Painters, Transportation Equipment	387	412	25	2	7	9
519123	Painting, Coating, and Decorating Workers	239	233	-6	0	4	4
519141	Semiconductor Processors	900	648	-252	0	21	21
519151	Photographic Process Workers and Processing Machine Operators	881	846	-35	0	26	26
519191	Adhesive Bonding Machine Operators and Tenders	248	265	17	2	6	8
519192	Cleaning, Washing, and Metal Pickling Equipment Operators and Tenders	566	569	3	0	13	13
519194	Etchers and Engravers	429	393	-36	0	10	10
519195	Molders, Shapers, and Casters, Except Metal and Plastic	1,403	1,449	46	5	46	51
519196	Paper Goods Machine Setters, Operators, and Tenders	2,051	1,949	-102	0	18	18
519198	Helpers--Production Workers	6,376	6,444	68	7	110	117
519199	Production Workers, All Other	2,462	2,406	-56	0	64	64
531011	Aircraft Cargo Handling Supervisors	174	182	8	1	5	6
531021	First-Line Supervisors of Helpers, Laborers, and Material Movers, Hand	2,978	3,282	304	30	82	112
531031	First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators	3,551	3,849	298	30	98	128
532011	Airline Pilots, Copilots, and Flight Engineers	659	647	-12	0	19	19

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Employment Projections for 675 Detailed Occupations 2012-2022

SOC Code	Title	Employment 2012	Employment 2022	Change in Total		Replacements Per Year	Total Openings Per Year
				Employment 2012-2022	Net Employment Change Per Year		
532012	Commercial Pilots	535	566	31	3	16	19
532021	Air Traffic Controllers	160	171	11	1	7	8
532031	Flight Attendants	1,937	1,895	-42	0	32	32
533011	Ambulance Drivers and Attendants, Except Emergency Medical Technicians	941	1,151	210	21	15	36
533021	Bus Drivers, Transit and Intercity	2,685	2,888	203	20	49	69
533022	Bus Drivers, School or Special Client	11,527	13,062	1,535	154	212	366
533031	Driver/Sales Workers	8,430	9,507	1,077	108	135	243
533032	Heavy and Tractor-Trailer Truck Drivers	22,429	24,796	2,367	237	359	596
533033	Light Truck or Delivery Services Drivers	24,301	25,948	1,647	165	389	554
533041	Taxi Drivers and Chauffeurs	8,949	9,993	1,044	104	106	210
533099	Motor Vehicle Operators, All Other	414	448	34	3	12	15
534011	Locomotive Engineers	875	933	58	6	26	32
534021	Railroad Brake, Signal, and Switch Operators	561	597	36	4	17	21
534031	Railroad Conductors and Yardmasters	692	738	46	5	21	26
535011	Sailors and Marine Oilers	489	545	56	6	22	28
535021	Captains, Mates, and Pilots of Water Vessels	507	543	36	4	24	28
535022	Motorboat Operators	159	186	27	3	7	10
535031	Ship Engineers	177	201	24	2	8	10
536021	Parking Lot Attendants	4,026	4,653	627	63	193	256
536031	Automotive and Watercraft Service Attendants	2,322	2,518	196	20	67	87
536061	Transportation Attendants, Except Flight Attendants	644	687	43	4	11	15
536099	Transportation Workers, All Other	620	607	-13	0	24	24
537011	Conveyor Operators and Tenders	207	217	10	1	6	7
537021	Crane and Tower Operators	345	430	85	8	12	20
537032	Excavating and Loading Machine and Dragline Operators	1,279	1,585	306	31	10	41
537041	Hoist and Winch Operators	101	118	17	2	3	5
537051	Industrial Truck and Tractor Operators	7,205	7,257	52	5	165	170
537061	Cleaners of Vehicles and Equipment	3,672	3,781	109	11	102	113
537062	Laborers and Freight, Stock, and Material Movers, Hand	28,527	31,131	2,604	260	884	1,144
537063	Machine Feeders and Offbearers	1,192	1,121	-71	0	24	24
537064	Packers and Packagers, Hand	13,879	14,344	465	46	364	410
537081	Refuse and Recyclable Material Collectors	1,628	1,846	218	22	34	56
537121	Tank Car, Truck, and Ship Loaders	117	126	9	1	3	4
537199	Material Moving Workers, All Other	641	649	8	1	18	19

APPENDIX B

Employment Projections 2012-2022

Data on Current Education Requirements for All 675 Detailed Occupations

Occupations in **BEIGE** are those in which 70 percent or more of the expected job openings between 2012 and 2022 will require no more than a high school degree.

Occupations in **GREEN** are those in which 70 percent or more of the expected job openings between 2012 and 2022 will require at least a Bachelor's Degree.

APPENDIX B

Occupation	High School or less	Some college or associates degree	BA or more
Helpers--Installation, Maintenance, and Repair Workers	100.00%	0.00%	0.00%
Forging Machine Setters, Operators, and Tenders, Metal and Plastic	100.00%	0.00%	0.00%
Rolling Machine Setters, Operators, and Tenders, Metal and Plastic	100.00%	0.00%	0.00%
Textile Winding, Twisting, and Drawing Out Machine Setters, Operators, and Tenders	100.00%	0.00%	0.00%
Automotive Glass Installers and Repairers	93.20%	6.80%	0.00%
Paving, Surfacing, and Tamping Equipment Operators	92.30%	4.30%	3.30%
Sawing Machine Setters, Operators, and Tenders, Wood	88.90%	9.50%	1.50%
Food Cooking Machine Operators and Tenders	88.50%	11.50%	0.00%
Adhesive Bonding Machine Operators and Tenders	88.10%	11.90%	0.00%
Engine and Other Machine Assemblers	88.00%	12.00%	0.00%
Plasterers and Stucco Masons	87.30%	12.70%	0.00%
Earth Drillers, Except Oil and Gas	87.10%	6.00%	7.00%
Laundry and Dry-Cleaning Workers	86.20%	8.40%	5.30%
Machine Feeders and Offbearers	85.70%	11.30%	3.00%
Insulation Workers, Floor, Ceiling, and Wall	85.40%	14.60%	0.00%
Insulation Workers, Mechanical	85.40%	14.60%	0.00%
Drywall and Ceiling Tile Installers	85.20%	14.60%	0.20%
Tapers	85.20%	14.60%	0.20%
Metal-Refining Furnace Operators and Tenders	85.00%	7.50%	7.50%
Helpers--Brickmasons, Blockmasons, Stonemasons, and Tile and Marble Setters	83.70%	10.80%	5.50%
Helpers--Carpenters	83.70%	10.80%	5.50%
Helpers--Electricians	83.70%	10.80%	5.50%
Helpers--Painters, Paperhangers, Plasterers, and Stucco Masons	83.70%	10.80%	5.50%
Helpers--Pipelayers, Plumbers, Pipefitters, and Steamfitters	83.70%	10.80%	5.50%
Helpers--Roofers	83.70%	10.80%	5.50%
Helpers, Construction Trades, All Other	83.70%	10.80%	5.50%
Septic Tank Servicers and Sewer Pipe Cleaners	83.30%	8.20%	8.50%
Crushing, Grinding, and Polishing Machine Setters, Operators, and Tenders	82.70%	15.00%	2.30%
Grinding and Polishing Workers, Hand	82.70%	15.00%	2.30%
Mixing and Blending Machine Setters, Operators, and Tenders	82.70%	15.00%	2.30%
Textile Knitting and Weaving Machine Setters, Operators, and Tenders	82.10%	0.00%	17.90%
Upholsterers	82.10%	17.90%	0.00%
Food Processing Workers, All Other	81.70%	15.10%	3.20%
Sewing Machine Operators	81.00%	15.10%	3.90%
Rail-Track Laying and Maintenance Equipment Operators	80.50%	15.00%	4.50%
Roofers	80.40%	16.10%	3.50%
Automotive Body and Related Repairers	80.00%	16.90%	3.10%
Extruding, Forming, Pressing, and Compacting Machine Setters, Operators, and Tenders	79.70%	20.30%	0.00%
Refuse and Recyclable Material Collectors	78.60%	13.60%	7.80%
Woodworking Machine Setters, Operators, and Tenders, Except Sawing	77.90%	1.80%	20.40%
Cement Masons and Concrete Finishers	77.80%	20.20%	2.00%
Pressers, Textile, Garment, and Related Materials	77.80%	20.30%	2.00%
Sheet Metal Workers	77.10%	19.00%	3.80%
Dishwashers	76.80%	18.50%	4.70%
Maids and Housekeeping Cleaners	76.80%	16.20%	7.00%
Paper Goods Machine Setters, Operators, and Tenders	76.70%	19.60%	3.70%
Welders, Cutters, Solderers, and Brazers	76.10%	21.80%	2.10%
Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders	76.10%	21.80%	2.10%
Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic	75.80%	20.90%	3.30%
Heat Treating Equipment Setters, Operators, and Tenders, Metal and Plastic	75.80%	20.90%	3.30%
Layout Workers, Metal and Plastic	75.80%	20.90%	3.30%
Plating and Coating Machine Setters, Operators, and Tenders, Metal and Plastic	75.80%	20.90%	3.30%

APPENDIX B

Occupation	High School or less	Some college or associates degree	BA or more
Tool Grinders, Filers, and Sharpeners	75.80%	20.90%	3.30%
Metal Workers and Plastic Workers, All Other	75.80%	20.90%	3.30%
Packers and Packagers, Hand	75.70%	16.70%	7.60%
Coating, Painting, and Spraying Machine Setters, Operators, and Tenders	75.60%	17.70%	6.70%
Painters, Transportation Equipment	75.60%	17.70%	6.70%
Painting, Coating, and Decorating Workers	75.60%	17.70%	6.70%
Industrial Truck and Tractor Operators	75.10%	19.80%	5.10%
Coil Winders, Tapers, and Finishers	74.80%	20.20%	5.00%
Electrical and Electronic Equipment Assemblers	74.80%	20.20%	5.00%
Electromechanical Equipment Assemblers	74.80%	20.20%	5.00%
Packaging and Filling Machine Operators and Tenders	74.40%	22.20%	3.30%
Hazardous Materials Removal Workers	74.20%	15.00%	10.80%
Counter Attendants, Cafeteria, Food Concession, and Coffee Shop	73.60%	22.80%	3.60%
Millwrights	73.50%	23.40%	3.10%
Machinists	73.20%	23.70%	3.10%
Janitors and Cleaners, Except Maids and Housekeeping Cleaners	73.20%	21.60%	5.20%
Building Cleaning Workers, All Other	73.20%	21.60%	5.20%
Fence Erectors	73.00%	23.20%	3.80%
Maintenance Workers, Machinery	72.50%	12.90%	14.60%
Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	72.20%	24.90%	2.90%
Drilling and Boring Machine Tool Setters, Operators, and Tenders, Metal and Plastic	72.20%	24.90%	2.90%
Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic	72.20%	24.90%	2.90%
Lathe and Turning Machine Tool Setters, Operators, and Tenders, Metal and Plastic	72.20%	24.90%	2.90%
Milling and Planing Machine Setters, Operators, and Tenders, Metal and Plastic	72.20%	24.90%	2.90%
Crane and Tower Operators	72.10%	27.90%	0.00%
Glaziers	71.90%	17.90%	10.30%
Print Binding and Finishing Workers	71.70%	15.40%	12.90%
Security and Fire Alarm Systems Installers	71.40%	25.60%	3.00%
Shoe and Leather Workers and Repairers	71.20%	12.10%	16.70%
Shoe Machine Operators and Tenders	71.20%	12.10%	16.70%
Semiconductor Processors	69.80%	22.60%	7.60%
Cleaning, Washing, and Metal Pickling Equipment Operators and Tenders	69.80%	22.60%	7.60%
Production Workers, All Other	69.80%	22.60%	7.60%
Transportation Workers, All Other	69.70%	22.80%	7.50%
Construction Laborers	69.60%	22.50%	7.90%
Operating Engineers and Other Construction Equipment Operators	69.20%	26.20%	4.50%
Crossing Guards	69.00%	27.30%	3.70%
Automotive Service Technicians and Mechanics	68.90%	27.60%	3.40%
Bus and Truck Mechanics and Diesel Engine Specialists	68.60%	27.00%	4.40%
Team Assemblers	68.30%	24.60%	7.10%
Assemblers and Fabricators, All Other	68.30%	24.60%	7.10%
Farm Equipment Mechanics and Service Technicians	67.80%	29.00%	3.10%
Mobile Heavy Equipment Mechanics, Except Engines	67.80%	29.00%	3.10%
Highway Maintenance Workers	67.70%	21.60%	10.70%
Carpet Installers	67.60%	28.60%	3.80%
Floor Layers, Except Carpet, Wood, and Hard Tiles	67.60%	28.60%	3.80%
Floor Sanders and Finishers	67.60%	28.60%	3.80%
Tile and Marble Setters	67.60%	28.60%	3.80%
Textile Bleaching and Dyeing Machine Operators and Tenders	67.60%	32.40%	0.00%
Textile Cutting Machine Setters, Operators, and Tenders	67.60%	32.40%	0.00%
Tool and Die Makers	67.50%	30.00%	2.50%
Dining Room and Cafeteria Attendants and Bartender Helpers	67.50%	27.00%	5.60%

APPENDIX B

Occupation	High School or less	Some college or associates degree	BA or more
Food Preparation and Serving Related Workers, All Other	67.50%	27.00%	5.60%
Farmworkers and Laborers, Crop, Nursery, and Greenhouse	67.30%	21.60%	11.10%
Farmworkers, Farm, Ranch, and Aquacultural Animals	67.30%	21.60%	11.10%
Pipelayers	67.20%	26.00%	6.90%
Plumbers, Pipefitters, and Steamfitters	67.20%	26.00%	6.90%
Cooks, Fast Food	66.90%	25.50%	7.60%
Cooks, Institution and Cafeteria	66.90%	25.50%	7.60%
Cooks, Restaurant	66.90%	25.50%	7.60%
Cooks, Short Order	66.90%	25.50%	7.60%
Brickmasons and Blockmasons	66.60%	27.90%	5.50%
Stonemasons	66.60%	27.90%	5.50%
Laborers and Freight, Stock, and Material Movers, Hand	66.60%	27.10%	6.30%
Cleaners of Vehicles and Equipment	66.60%	28.90%	4.50%
Foundry Mold and Coremakers	66.20%	11.90%	21.90%
Molding, Coremaking, and Casting Machine Setters, Operators, and Tenders, Metal and Plastic	66.20%	11.90%	21.90%
Printing Press Operators	66.20%	23.10%	10.80%
Driver/Sales Workers	66.20%	26.60%	7.20%
Heavy and Tractor-Trailer Truck Drivers	66.20%	26.60%	7.20%
Light Truck or Delivery Services Drivers	66.20%	26.60%	7.20%
Cutters and Trimmers, Hand	66.00%	28.20%	5.70%
Cutting and Slicing Machine Setters, Operators, and Tenders	66.00%	28.20%	5.70%
Butchers and Meat Cutters	66.00%	26.30%	7.60%
Meat, Poultry, and Fish Cutters and Trimmers	66.00%	26.30%	7.60%
Motorboat Mechanics and Service Technicians	65.90%	28.90%	5.30%
Motorcycle Mechanics	65.90%	28.90%	5.30%
Outdoor Power Equipment and Other Small Engine Mechanics	65.90%	28.90%	5.30%
Electrical and Electronics Installers and Repairers, Transportation Equipment	65.70%	33.30%	1.00%
Electrical and Electronics Repairers, Commercial and Industrial Equipment	65.70%	33.30%	1.00%
Hairdressers, Hairstylists, and Cosmetologists	65.50%	29.30%	5.20%
Food Preparation Workers	65.50%	27.30%	7.30%
Automotive and Watercraft Service Attendants	65.30%	29.80%	4.90%
Helpers--Production Workers	65.20%	29.80%	5.00%
Etchers and Engravers	65.00%	13.00%	22.00%
Shipping, Receiving, and Traffic Clerks	64.10%	26.10%	9.70%
Carpenters	63.90%	26.30%	9.80%
Parts Salespersons	63.80%	27.10%	9.10%
Weighers, Measurers, Checkers, and Samplers, Recordkeeping	63.20%	13.10%	23.70%
Landscaping and Groundskeeping Workers	61.80%	28.00%	10.20%
Pesticide Handlers, Sprayers, and Applicators, Vegetation	61.80%	28.00%	10.20%
Heating, Air Conditioning, and Refrigeration Mechanics and Installers	61.50%	33.70%	4.80%
Chemical Plant and System Operators	61.30%	25.00%	13.80%
Gas Plant Operators	61.30%	25.00%	13.80%
Railroad Conductors and Yardmasters	61.20%	32.00%	6.80%
Furniture Finishers	60.90%	29.20%	9.90%
Painters, Construction and Maintenance	60.50%	29.20%	10.30%
Excavating and Loading Machine and Dragline Operators	60.50%	24.50%	15.00%
Sewers, Hand	60.50%	22.20%	17.30%
Tailors, Dressmakers, and Custom Sewers	60.50%	22.20%	17.30%
First-Line Supervisors of Housekeeping and Janitorial Workers	60.40%	25.60%	14.00%
Computer-Controlled Machine Tool Operators, Metal and Plastic	60.40%	34.20%	5.40%
Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic	60.40%	34.20%	5.40%
Manicurists and Pedicurists	59.40%	29.90%	10.70%

Occupation	High School or less	Some college or associates degree	BA or more
Shampooers	59.40%	29.90%	10.70%
Skincare Specialists	59.40%	29.90%	10.70%
Maintenance and Repair Workers, General	59.00%	32.70%	8.30%
Structural Metal Fabricators and Fitters	58.80%	29.00%	12.20%
Bicycle Repairers	58.40%	26.80%	14.80%
Tire Repairers and Changers	58.40%	26.80%	14.80%
Combined Food Preparation and Serving Workers, Including Fast Food	58.40%	33.70%	8.00%
Furnace, Kiln, Oven, Drier, and Kettle Operators and Tenders	58.20%	41.80%	0.00%
Stock Clerks and Order Fillers	58.20%	32.20%	9.70%
Ambulance Drivers and Attendants, Except Emergency Medical Technicians	57.80%	28.50%	13.70%
Tank Car, Truck, and Ship Loaders	57.80%	31.60%	10.60%
Material Moving Workers, All Other	57.80%	31.60%	10.60%
Signal and Track Switch Repairers	57.60%	30.90%	11.60%
Installation, Maintenance, and Repair Workers, All Other	57.60%	30.90%	11.60%
Industrial Machinery Mechanics	57.30%	32.50%	10.20%
Food Batchmakers	57.20%	34.20%	8.60%
Motor Vehicle Operators, All Other	57.20%	24.10%	18.70%
Bus Drivers, Transit and Intercity	57.20%	34.40%	8.40%
Bus Drivers, School or Special Client	57.20%	34.40%	8.40%
Cashiers	56.20%	35.30%	8.50%
Electricians	56.20%	36.30%	7.60%
Extruding and Forming Machine Setters, Operators, and Tenders, Synthetic and Glass Fibers	56.00%	28.30%	15.70%
Textile, Apparel, and Furnishings Workers, All Other	56.00%	28.30%	15.70%
Bakers	55.70%	30.20%	14.00%
Dental Laboratory Technicians	55.10%	28.30%	16.60%
Medical Appliance Technicians	55.10%	28.30%	16.60%
Ophthalmic Laboratory Technicians	55.10%	28.30%	16.60%
Structural Iron and Steel Workers	54.70%	39.30%	6.10%
Prepress Technicians and Workers	54.70%	22.40%	22.90%
Captains, Mates, and Pilots of Water Vessels	54.00%	21.60%	24.40%
Motorboat Operators	54.00%	21.60%	24.40%
Amusement and Recreation Attendants	53.00%	36.10%	10.90%
Locker Room, Coatroom, and Dressing Room Attendants	53.00%	36.10%	10.90%
First-Line Supervisors of Mechanics, Installers, and Repairers	52.70%	30.00%	17.40%
First-Line Supervisors of Construction Trades and Extraction Workers	52.50%	30.70%	16.80%
First-Line Supervisors of Food Preparation and Serving Workers	51.80%	29.50%	18.70%
Transportation Attendants, Except Flight Attendants	51.80%	41.10%	7.10%
Taxi Drivers and Chauffeurs	51.60%	30.90%	17.50%
Aircraft Cargo Handling Supervisors	51.40%	32.20%	16.50%
First-Line Supervisors of Helpers, Laborers, and Material Movers, Hand	51.40%	32.20%	16.50%
First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators	51.40%	32.20%	16.50%
First-Line Supervisors of Production and Operating Workers	51.10%	28.90%	20.00%
Molders, Shapers, and Casters, Except Metal and Plastic	50.70%	19.70%	29.60%
Pest Control Workers	50.60%	28.80%	20.60%
Electrical Power-Line Installers and Repairers	50.60%	41.80%	7.70%
Switchboard Operators, Including Answering Service	50.50%	44.30%	5.20%
Door-to-Door Sales Workers, News and Street Vendors, and Related Workers	50.50%	36.40%	13.10%
Counter and Rental Clerks	50.20%	35.20%	14.60%
Medical Equipment Preparers	50.00%	37.90%	12.10%
Healthcare Support Workers, All Other	50.00%	37.90%	12.10%
Home Health Aides	49.30%	38.30%	12.40%
Psychiatric Aides	49.30%	38.30%	12.40%

APPENDIX B

Occupation	High School or less	Some college or associates degree	BA or more
Nursing Assistants	49.30%	38.30%	12.40%
Orderlies	49.30%	38.30%	12.40%
Coin, Vending, and Amusement Machine Servicers and Repairers	49.30%	18.50%	32.20%
Lifeguards, Ski Patrol, and Other Recreational Protective Service Workers	48.90%	39.70%	11.40%
Protective Service Workers, All Other	48.90%	39.70%	11.40%
Chemical Equipment Operators and Tenders	48.90%	26.80%	24.30%
Separating, Filtering, Clarifying, Precipitating, and Still Machine Setters, Operators, and Tenders	48.90%	26.80%	24.30%
Inspectors, Testers, Sorters, Samplers, and Weighers	48.70%	32.20%	19.10%
Couriers and Messengers	48.60%	37.00%	14.30%
Chefs and Head Cooks	48.60%	38.30%	13.20%
Mail Clerks and Mail Machine Operators, Except Postal Service	48.40%	38.30%	13.30%
Nonfarm Animal Caretakers	48.30%	31.10%	20.60%
Personal Care Aides	48.00%	38.50%	13.50%
Food Servers, Nonrestaurant	47.90%	40.40%	11.80%
Elevator Installers and Repairers	47.40%	43.70%	8.80%
Library Technicians	47.20%	36.10%	16.70%
Boilermakers	46.90%	48.30%	4.80%
Stationary Engineers and Boiler Operators	46.80%	35.60%	17.60%
Parking Lot Attendants	46.30%	40.30%	13.40%
Fish and Game Wardens	45.70%	30.30%	23.90%
Parking Enforcement Workers	45.70%	30.30%	23.90%
Locksmiths and Safe Repairers	45.70%	49.20%	5.10%
Jewelers and Precious Stone and Metal Workers	45.30%	22.10%	32.50%
First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	45.00%	32.10%	22.80%
Statistical Assistants	44.30%	33.90%	21.70%
Home Appliance Repairers	43.40%	50.10%	6.40%
Cargo and Freight Agents	43.10%	42.30%	14.60%
Office Machine Operators, Except Computer	43.10%	42.00%	14.90%
Telecommunications Line Installers and Repairers	43.00%	45.20%	11.90%
Childcare Workers	42.50%	38.70%	18.80%
Extruding and Drawing Machine Setters, Operators, and Tenders, Metal and Plastic	42.50%	57.50%	0.00%
Electronic Equipment Installers and Repairers, Motor Vehicles	42.40%	57.60%	0.00%
Waiters and Waitresses	42.10%	43.50%	14.40%
First-Line Supervisors of Farming, Fishing, and Forestry Workers	41.80%	32.90%	25.20%
Cabinetmakers and Bench Carpenters	41.80%	30.40%	27.80%
Water and Wastewater Treatment Plant and System Operators	41.70%	45.30%	13.00%
File Clerks	41.20%	34.90%	23.90%
Baggage Porters and Bellhops	41.20%	42.20%	16.60%
Concierges	41.20%	42.20%	16.60%
Telemarketers	40.80%	34.60%	24.60%
Receptionists and Information Clerks	40.30%	42.50%	17.30%
Hosts and Hostesses, Restaurant, Lounge, and Coffee Shop	40.20%	44.70%	15.00%
Postal Service Clerks	40.00%	44.40%	15.60%
Demonstrators and Product Promoters	39.90%	41.80%	18.30%
Electric Motor, Power Tool, and Related Repairers	39.60%	44.20%	16.20%
Food Service Managers	39.40%	31.30%	29.30%
Police, Fire, and Ambulance Dispatchers	39.30%	43.00%	17.70%
Dispatchers, Except Police, Fire, and Ambulance	39.30%	43.00%	17.70%
Bill and Account Collectors	39.00%	40.60%	20.40%
Ushers, Lobby Attendants, and Ticket Takers	38.90%	50.60%	10.50%
Railroad Brake, Signal, and Switch Operators	38.80%	61.20%	0.00%
Riggers	38.20%	45.10%	16.70%

APPENDIX B

Occupation	High School or less	Some college or associates degree	BA or more
Personal Care and Service Workers, All Other	37.50%	45.50%	17.00%
Billing and Posting Clerks	37.20%	43.30%	19.50%
Animal Trainers	36.80%	37.00%	26.20%
Postal Service Mail Sorters, Processors, and Processing Machine Operators	36.40%	42.60%	21.00%
Human Resources Assistants, Except Payroll and Timekeeping	36.30%	28.20%	35.50%
Correspondence Clerks	35.60%	43.40%	21.00%
Order Clerks	35.60%	43.40%	21.00%
Telephone Operators	35.60%	49.80%	14.60%
Office Clerks, General	35.40%	41.80%	22.80%
Bartenders	35.30%	38.30%	26.30%
First-Line Supervisors of Personal Service Workers	35.20%	31.60%	33.10%
Retail Salespersons	35.00%	38.00%	26.90%
Aircraft Mechanics and Service Technicians	35.00%	49.80%	15.30%
Orthotists and Prosthetists	34.70%	39.00%	26.30%
Health Technologists and Technicians, All Other	34.70%	39.00%	26.30%
Postal Service Mail Carriers	34.50%	42.60%	22.90%
Customer Service Representatives	34.50%	41.30%	24.20%
Payroll and Timekeeping Clerks	34.40%	43.10%	22.50%
Fitness Trainers and Aerobics Instructors	34.30%	37.60%	28.10%
Recreation Workers	34.30%	37.60%	28.10%
Locomotive Engineers	34.10%	58.40%	7.50%
Hotel, Motel, and Resort Desk Clerks	33.80%	39.20%	27.00%
Radio, Cellular, and Tower Equipment Installers and Repairs	33.80%	48.80%	17.40%
Telecommunications Equipment Installers and Repairers, Except Line Installers	33.80%	48.80%	17.40%
Opticians, Dispensing	33.70%	43.40%	22.90%
Information and Record Clerks, All Other	33.30%	32.50%	34.20%
Athletes and Sports Competitors	33.30%	30.50%	36.20%
Coaches and Scouts	33.30%	30.50%	36.20%
Umpires, Referees, and Other Sports Officials	33.30%	30.50%	36.20%
Court, Municipal, and License Clerks	33.00%	41.70%	25.20%
Conveyor Operators and Tenders	32.80%	37.30%	29.90%
Hoist and Winch Operators	32.80%	37.30%	29.90%
Funeral Attendants	32.40%	35.40%	32.20%
Photographic Process Workers and Processing Machine Operators	32.30%	39.40%	28.40%
Civil Engineering Technicians	32.10%	50.30%	17.60%
Electrical and Electronics Engineering Technicians	32.10%	50.30%	17.60%
Electro-Mechanical Technicians	32.10%	50.30%	17.60%
Environmental Engineering Technicians	32.10%	50.30%	17.60%
Industrial Engineering Technicians	32.10%	50.30%	17.60%
Mechanical Engineering Technicians	32.10%	50.30%	17.60%
Engineering Technicians, Except Drafters, All Other	32.10%	50.30%	17.60%
Correctional Officers and Jailers	32.00%	42.20%	25.80%
Security Guards	31.70%	43.20%	25.00%
First-Line Supervisors of Retail Sales Workers	31.70%	35.90%	32.40%
Meter Readers, Utilities	31.70%	67.40%	0.90%
Word Processors and Typists	31.40%	50.10%	18.50%
Teacher Assistants	31.40%	36.50%	32.10%
Tellers	31.40%	45.00%	23.60%
Insurance Claims and Policy Processing Clerks	31.10%	37.20%	31.70%
Production, Planning, and Expediting Clerks	30.90%	33.80%	35.20%
Dental Assistants	30.70%	62.00%	7.30%
Transportation, Storage, and Distribution Managers	30.20%	37.40%	32.30%

APPENDIX B

Occupation	High School or less	Some college or associates degree	BA or more
Construction and Building Inspectors	29.70%	33.50%	36.70%
Executive Secretaries and Executive Administrative Assistants	29.70%	45.20%	25.10%
Legal Secretaries	29.70%	45.20%	25.10%
Medical Secretaries	29.70%	45.20%	25.10%
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	29.70%	45.20%	25.10%
Bookkeeping, Accounting, and Auditing Clerks	29.60%	44.60%	25.80%
Mechanical Door Repairers	29.10%	60.10%	10.80%
Control and Valve Installers and Repairers, Except Mechanical Door	29.10%	60.10%	10.80%
Medical Equipment Repairers	29.00%	52.20%	18.80%
Musical Instrument Repairers and Tuners	29.00%	52.20%	18.80%
Precision Instrument and Equipment Repairers, All Other	29.00%	52.20%	18.80%
Agricultural and Food Science Technicians	28.50%	21.90%	49.50%
Computer Operators	28.50%	48.20%	23.30%
Data Entry Keyers	28.30%	47.10%	24.60%
Credit Authorizers, Checkers, and Clerks	27.50%	32.90%	39.50%
Electronic Home Entertainment Equipment Installers and Repairers	27.20%	43.90%	28.90%
Construction Managers	27.10%	28.90%	43.90%
Medical Records and Health Information Technicians	27.00%	59.90%	13.10%
Medical Assistants	26.90%	63.50%	9.50%
Veterinary Assistants and Laboratory Animal Caretakers	26.80%	55.50%	17.70%
Wholesale and Retail Buyers, Except Farm Products	26.80%	36.00%	37.20%
Animal Control Workers	26.10%	53.10%	20.70%
Brokerage Clerks	25.30%	40.10%	34.60%
Desktop Publishers	25.20%	34.20%	40.60%
Office and Administrative Support Workers, All Other	25.20%	34.20%	40.60%
Residential Advisors	25.10%	52.50%	22.50%
First-Line Supervisors of Protective Service Workers, All Other	25.00%	36.40%	38.60%
Sales and Related Workers, All Other	24.90%	21.90%	53.20%
Dietetic Technicians	24.60%	52.60%	22.80%
Pharmacy Technicians	24.60%	52.60%	22.80%
Respiratory Therapy Technicians	24.60%	52.60%	22.80%
Surgical Technologists	24.60%	52.60%	22.80%
Veterinary Technologists and Technicians	24.60%	52.60%	22.80%
Ophthalmic Medical Technicians	24.60%	52.60%	22.80%
Industrial Production Managers	24.50%	22.00%	53.50%
Chemical Technicians	24.10%	27.40%	48.50%
First-Line Supervisors of Office and Administrative Support Workers	24.10%	38.00%	37.90%
Purchasing Agents, Except Wholesale, Retail, and Farm Products	23.80%	35.20%	41.00%
Medical Transcriptionists	23.60%	54.10%	22.30%
Emergency Medical Technicians and Paramedics	23.50%	52.50%	23.90%
Reservation and Transportation Ticket Agents and Travel Clerks	23.50%	37.20%	39.30%
Administrative Services Managers	23.40%	33.50%	43.10%
Appraisers and Assessors of Real Estate	23.00%	26.90%	50.10%
Cost Estimators	22.60%	32.60%	44.80%
First-Line Supervisors of Non-Retail Sales Workers	22.60%	28.40%	49.00%
Loan Interviewers and Clerks	22.20%	44.90%	32.90%
First-Line Supervisors of Fire Fighting and Prevention Workers	22.00%	54.10%	24.00%
Claims Adjusters, Examiners, and Investigators	21.70%	31.00%	47.40%
Insurance Appraisers, Auto Damage	21.70%	31.00%	47.40%
Property, Real Estate, and Community Association Managers	21.60%	26.70%	51.70%
Computer, Automated Teller, and Office Machine Repairers	21.30%	52.10%	26.50%
Massage Therapists	20.80%	43.50%	35.70%

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Occupation	High School or less	Some college or associates degree	BA or more
Motion Picture Projectionists	20.60%	57.50%	21.90%
Architectural and Civil Drafters	20.50%	50.60%	28.80%
Electrical and Electronics Drafters	20.50%	50.60%	28.80%
Mechanical Drafters	20.50%	50.60%	28.80%
Social and Human Service Assistants	20.20%	36.30%	43.50%
Radio and Television Announcers	20.00%	28.20%	51.80%
Eligibility Interviewers, Government Programs	20.00%	40.90%	39.10%
Photographers	19.90%	28.50%	51.60%
Social Science Research Assistants	19.70%	41.10%	39.20%
Environmental Science and Protection Technicians, Including Health	19.70%	41.10%	39.20%
Forest and Conservation Technicians	19.70%	41.10%	39.20%
Life, Physical, and Social Science Technicians, All Other	19.70%	41.10%	39.20%
Firefighters	19.70%	56.00%	24.30%
Interviewers, Except Eligibility and Loan	19.60%	43.50%	36.90%
Licensed Practical and Licensed Vocational Nurses	19.40%	76.40%	4.20%
Power Distributors and Dispatchers	19.40%	52.50%	28.20%
Power Plant Operators	19.40%	52.50%	28.20%
New Accounts Clerks	19.30%	54.90%	25.80%
Meeting, Convention, and Event Planners	19.10%	26.00%	54.90%
Surveying and Mapping Technicians	19.10%	78.30%	2.60%
Phlebotomists	19.00%	68.10%	12.90%
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	18.30%	25.60%	56.10%
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	18.30%	25.60%	56.10%
Sailors and Marine Oilers	17.50%	45.20%	37.30%
Ship Engineers	17.50%	45.20%	37.30%
Procurement Clerks	17.50%	73.40%	9.10%
Pharmacy Aides	17.40%	58.00%	24.60%
Logisticians	17.40%	34.40%	48.30%
Private Detectives and Investigators	16.30%	9.10%	74.60%
Travel Agents	15.60%	40.50%	43.90%
Adult Basic and Secondary Education and Literacy Teachers and Instructors	15.40%	27.30%	57.40%
Self-Enrichment Education Teachers	15.40%	27.30%	57.40%
Teachers and Instructors, All Other	15.40%	27.30%	57.40%
Health Educators	15.20%	31.30%	53.50%
Community Health Workers	15.20%	31.30%	53.50%
Community and Social Service Specialists, All Other	15.20%	31.30%	53.50%
Transportation Security Screeners	15.20%	53.00%	31.80%
Tax Examiners and Collectors, and Revenue Agents	15.10%	46.60%	38.20%
Audio and Video Equipment Technicians	14.60%	44.10%	41.30%
Broadcast Technicians	14.60%	44.10%	41.30%
Radio Operators	14.60%	44.10%	41.30%
Sound Engineering Technicians	14.60%	44.10%	41.30%
Library Assistants, Clerical	14.60%	45.70%	39.70%
Human Resources Managers	14.40%	20.70%	64.90%
Entertainers and Performers, Sports and Related Workers, All Other	14.30%	45.30%	40.40%
Computer User Support Specialists	14.10%	38.00%	47.90%
Computer Network Support Specialists	14.10%	38.00%	47.90%
Art Directors	13.90%	26.90%	59.20%
Craft Artists	13.90%	26.90%	59.20%
Fine Artists, Including Painters, Sculptors, and Illustrators	13.90%	26.90%	59.20%
Multimedia Artists and Animators	13.90%	26.90%	59.20%
Artists and Related Workers, All Other	13.90%	26.90%	59.20%

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Occupation	High School or less	Some college or associates degree	BA or more
Sales Representatives, Services, All Other	13.80%	27.00%	59.20%
Insurance Sales Agents	13.80%	21.90%	64.30%
Police and Sheriff's Patrol Officers	13.60%	34.50%	52.00%
Transit and Railroad Police	13.60%	34.50%	52.00%
Dietitians and Nutritionists	13.50%	5.80%	80.70%
Training and Development Specialists	13.30%	20.50%	66.20%
Lodging Managers	13.20%	39.40%	47.40%
General and Operations Managers	13.00%	24.70%	62.20%
Substance Abuse and Behavioral Disorder Counselors	13.00%	19.80%	67.20%
Educational, Guidance, School, and Vocational Counselors	13.00%	19.80%	67.20%
Marriage and Family Therapists	13.00%	19.80%	67.20%
Mental Health Counselors	13.00%	19.80%	67.20%
Rehabilitation Counselors	13.00%	19.80%	67.20%
Counselors, All Other	13.00%	19.80%	67.20%
Materials Engineers	12.90%	13.20%	73.90%
Funeral Service Managers	12.90%	21.10%	66.00%
Postmasters and Mail Superintendents	12.90%	21.10%	66.00%
Managers, All Other	12.90%	21.10%	66.00%
Credit Counselors	12.80%	32.30%	54.90%
Loan Officers	12.80%	32.30%	54.90%
Commercial and Industrial Designers	12.30%	22.10%	65.60%
Fashion Designers	12.30%	22.10%	65.60%
Floral Designers	12.30%	22.10%	65.60%
Graphic Designers	12.30%	22.10%	65.60%
Interior Designers	12.30%	22.10%	65.60%
Merchandise Displayers and Window Trimmers	12.30%	22.10%	65.60%
Set and Exhibit Designers	12.30%	22.10%	65.60%
Occupational Health and Safety Specialists	12.20%	23.60%	64.20%
Occupational Health and Safety Technicians	12.20%	23.60%	64.20%
Athletic Trainers	12.20%	23.60%	64.20%
Genetic Counselors	12.20%	23.60%	64.20%
Healthcare Practitioners and Technical Workers, All Other	12.20%	23.60%	64.20%
Music Directors and Composers	11.70%	27.40%	60.90%
Musicians and Singers	11.70%	27.40%	60.90%
Flight Attendants	11.60%	37.30%	51.00%
Court Reporters	11.30%	25.20%	63.50%
Title Examiners, Abstractors, and Searchers	11.30%	25.20%	63.50%
Legal Support Workers, All Other	11.30%	25.20%	63.50%
Real Estate Brokers	11.20%	32.80%	56.00%
Real Estate Sales Agents	11.20%	32.80%	56.00%
Network and Computer Systems Administrators	11.00%	33.00%	56.00%
Interpreters and Translators	10.80%	36.20%	53.00%
Media and Communication Workers, All Other	10.80%	36.20%	53.00%
Social and Community Service Managers	10.80%	16.80%	72.30%
Paralegals and Legal Assistants	10.60%	34.50%	54.80%
Camera Operators, Television, Video, and Motion Picture	10.60%	25.10%	64.30%
Film and Video Editors	10.60%	25.10%	64.30%
Preschool Teachers, Except Special Education	10.40%	44.40%	45.20%
Kindergarten Teachers, Except Special Education	10.40%	44.40%	45.20%
Operations Research Analysts	10.20%	7.70%	82.10%
Compliance Officers	10.10%	15.90%	74.10%
Information Security Analysts	10.00%	16.40%	73.50%

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Occupation	High School or less	Some college or associates degree	BA or more
Medical and Clinical Laboratory Technologists	9.70%	23.60%	66.70%
Medical and Clinical Laboratory Technicians	9.70%	23.60%	66.70%
Computer and Information Research Scientists	9.50%	14.90%	75.60%
Computer Occupations, All Other	9.50%	35.60%	54.90%
Financial Managers	9.50%	20.00%	70.50%
Physical Therapist Assistants	9.50%	63.70%	26.80%
Physical Therapist Aides	9.50%	63.70%	26.80%
Fundraisers	9.40%	16.70%	73.90%
Medical and Health Services Managers	9.20%	25.40%	65.30%
Insurance Underwriters	9.20%	27.60%	63.20%
Computer Hardware Engineers	9.10%	13.20%	77.70%
Compensation, Benefits, and Job Analysis Specialists	9.10%	34.90%	56.00%
Human Resources Specialists	8.90%	19.10%	72.00%
Labor Relations Specialists	8.90%	19.10%	72.00%
Recreational Therapists	8.80%	71.00%	20.20%
Technical Writers	8.80%	19.40%	71.80%
Purchasing Managers	8.80%	26.30%	64.90%
Business Operations Specialists, All Other	8.70%	22.80%	68.50%
Clergy	8.70%	10.00%	81.30%
Tax Preparers	8.20%	33.30%	58.50%
Compensation and Benefits Managers	7.90%	20.20%	72.00%
Broadcast News Analysts	7.80%	19.40%	72.80%
Reporters and Correspondents	7.80%	19.40%	72.80%
Training and Development Managers	7.60%	11.60%	80.80%
Chemical Engineers	7.60%	13.50%	78.90%
Computer Programmers	7.40%	17.70%	74.90%
Agents and Business Managers of Artists, Performers, and Athletes	7.30%	21.70%	71.10%
Health and Safety Engineers, Except Mining Safety Engineers and Inspectors	7.10%	27.10%	65.80%
Industrial Engineers	7.10%	27.10%	65.80%
Airline Pilots, Copilots, and Flight Engineers	7.10%	14.70%	78.20%
Commercial Pilots	7.10%	14.70%	78.20%
Advertising Sales Agents	7.00%	30.50%	62.50%
Web Developers	6.40%	11.80%	81.80%
Child, Family, and School Social Workers	6.20%	14.40%	79.50%
Healthcare Social Workers	6.20%	14.40%	79.50%
Mental Health and Substance Abuse Social Workers	6.20%	14.40%	79.50%
Social Workers, All Other	6.20%	14.40%	79.50%
Aerospace Engineers	6.00%	14.20%	79.80%
Physician Assistants	5.80%	21.60%	72.60%
Securities, Commodities, and Financial Services Sales Agents	5.70%	14.90%	79.50%
First-Line Supervisors of Police and Detectives	5.70%	25.00%	69.40%
Detectives and Criminal Investigators	5.60%	17.10%	77.30%
Mechanical Engineers	5.50%	22.60%	71.90%
Archivists	5.30%	12.20%	82.50%
Curators	5.30%	12.20%	82.50%
Museum Technicians and Conservators	5.30%	12.20%	82.50%
Marketing Managers	5.20%	13.00%	81.80%
Sales Managers	5.20%	13.00%	81.80%
Air Traffic Controllers	5.10%	20.50%	74.40%
Credit Analysts	5.00%	21.40%	73.60%
Market Research Analysts and Marketing Specialists	5.00%	11.80%	83.30%
Education Administrators, Preschool and Childcare Center/Program	4.90%	11.00%	84.20%

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Occupation	High School or less	Some college or associates degree	BA or more
Education Administrators, Elementary and Secondary School	4.90%	11.00%	84.20%
Education Administrators, Postsecondary	4.90%	11.00%	84.20%
Education Administrators, All Other	4.90%	11.00%	84.20%
Producers and Directors	4.60%	21.00%	74.50%
Cardiovascular Technologists and Technicians	4.50%	68.60%	26.90%
Diagnostic Medical Sonographers	4.50%	68.60%	26.90%
Nuclear Medicine Technologists	4.50%	68.60%	26.90%
Radiologic Technologists	4.50%	68.60%	26.90%
Magnetic Resonance Imaging Technologists	4.50%	68.60%	26.90%
Computer Network Architects	4.40%	29.40%	66.20%
Biological Technicians	4.40%	9.10%	86.50%
Statisticians	3.90%	3.30%	92.80%
Management Analysts	3.90%	9.80%	86.30%
Financial Specialists, All Other	3.90%	17.10%	79.10%
Personal Financial Advisors	3.80%	10.90%	85.30%
Civil Engineers	3.60%	12.20%	84.20%
Physical Therapists	3.50%	4.90%	91.60%
Architectural and Engineering Managers	3.30%	7.70%	89.00%
Computer Systems Analysts	3.30%	22.20%	74.50%
Public Relations Specialists	3.10%	16.50%	80.30%
Budget Analysts	3.10%	16.90%	80.00%
Sales Engineers	3.10%	16.80%	80.10%
Accountants and Auditors	3.00%	13.90%	83.10%
Special Education Teachers, Preschool	2.90%	7.30%	89.80%
Special Education Teachers, Kindergarten and Elementary School	2.90%	7.30%	89.80%
Special Education Teachers, Middle School	2.90%	7.30%	89.80%
Special Education Teachers, Secondary School	2.90%	7.30%	89.80%
Special Education Teachers, All Other	2.90%	7.30%	89.80%
Writers and Authors	2.80%	13.70%	83.50%
Surveyors	2.60%	20.60%	76.80%
Computer and Information Systems Managers	2.60%	16.50%	80.90%
Audio-Visual and Multimedia Collections Specialists	2.60%	17.80%	79.60%
Instructional Coordinators	2.60%	17.80%	79.60%
Education, Training, and Library Workers, All Other	2.60%	17.80%	79.60%
Editors	2.40%	8.90%	88.60%
Electrical Engineers	2.20%	12.40%	85.40%
Electronics Engineers, Except Computer	2.20%	12.40%	85.40%
Software Developers, Applications	2.10%	10.50%	87.30%
Software Developers, Systems Software	2.10%	10.50%	87.30%
Nuclear Engineers	2.10%	10.80%	87.20%
Engineers, All Other	2.10%	10.80%	87.20%
Database Administrators	2.00%	24.60%	73.50%
Natural Sciences Managers	1.60%	3.00%	95.30%
Dental Hygienists	1.40%	69.20%	29.30%
Registered Nurses	1.30%	35.90%	62.80%
Exercise Physiologists	1.30%	8.10%	90.70%
Therapists, All Other	1.30%	8.10%	90.70%
Occupational Therapy Assistants	1.30%	73.60%	25.20%
Occupational Therapy Aides	1.30%	73.60%	25.20%
Veterinarians	1.20%	0.00%	98.80%
Architects, Except Landscape and Naval	1.20%	7.80%	91.00%
Landscape Architects	1.20%	7.80%	91.00%

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Occupation	High School or less	Some college or associates degree	BA or more
Financial Analysts	1.10%	10.50%	88.40%
Probation Officers and Correctional Treatment Specialists	0.90%	9.60%	89.40%
Survey Researchers	0.80%	10.40%	88.80%
Sociologists	0.80%	10.40%	88.80%
Social Scientists and Related Workers, All Other	0.80%	10.40%	88.80%
Secondary School Teachers, Except Special and Career/Technical Education	0.70%	6.50%	92.80%
Career/Technical Education Teachers, Secondary School	0.70%	6.50%	92.80%
Epidemiologists	0.70%	1.00%	98.40%
Medical Scientists, Except Epidemiologists	0.70%	1.00%	98.40%
Life Scientists, All Other	0.70%	1.00%	98.40%
Librarians	0.50%	13.60%	85.90%
Elementary School Teachers, Except Special Education	0.50%	5.10%	94.40%
Middle School Teachers, Except Special and Career/Technical Education	0.50%	5.10%	94.40%
Career/Technical Education Teachers, Middle School	0.50%	5.10%	94.40%
Advertising and Promotions Managers	0.40%	10.50%	89.00%
Anesthesiologists	0.40%	0.20%	99.40%
Family and General Practitioners	0.40%	0.20%	99.40%
Internists, General	0.40%	0.20%	99.40%
Obstetricians and Gynecologists	0.40%	0.20%	99.40%
Pediatricians, General	0.40%	0.20%	99.40%
Psychiatrists	0.40%	0.20%	99.40%
Surgeons	0.40%	0.20%	99.40%
Physicians and Surgeons, All Other	0.40%	0.20%	99.40%
Speech-Language Pathologists	0.40%	0.70%	98.90%
Lawyers	0.40%	0.70%	98.90%
Arbitrators, Mediators, and Conciliators	0.40%	0.70%	98.90%
Business Teachers, Postsecondary	0.30%	6.10%	93.60%
Computer Science Teachers, Postsecondary	0.30%	6.10%	93.60%
Mathematical Science Teachers, Postsecondary	0.30%	6.10%	93.60%
Engineering Teachers, Postsecondary	0.30%	6.10%	93.60%
Biological Science Teachers, Postsecondary	0.30%	6.10%	93.60%
Atmospheric, Earth, Marine, and Space Sciences Teachers, Postsecondary	0.30%	6.10%	93.60%
Chemistry Teachers, Postsecondary	0.30%	6.10%	93.60%
Environmental Science Teachers, Postsecondary	0.30%	6.10%	93.60%
Physics Teachers, Postsecondary	0.30%	6.10%	93.60%
Anthropology and Archeology Teachers, Postsecondary	0.30%	6.10%	93.60%
Area, Ethnic, and Cultural Studies Teachers, Postsecondary	0.30%	6.10%	93.60%
Economics Teachers, Postsecondary	0.30%	6.10%	93.60%
Geography Teachers, Postsecondary	0.30%	6.10%	93.60%
Political Science Teachers, Postsecondary	0.30%	6.10%	93.60%
Psychology Teachers, Postsecondary	0.30%	6.10%	93.60%
Sociology Teachers, Postsecondary	0.30%	6.10%	93.60%
Social Sciences Teachers, Postsecondary, All Other	0.30%	6.10%	93.60%
Health Specialties Teachers, Postsecondary	0.30%	6.10%	93.60%
Nursing Instructors and Teachers, Postsecondary	0.30%	6.10%	93.60%
Education Teachers, Postsecondary	0.30%	6.10%	93.60%
Criminal Justice and Law Enforcement Teachers, Postsecondary	0.30%	6.10%	93.60%
Law Teachers, Postsecondary	0.30%	6.10%	93.60%
Social Work Teachers, Postsecondary	0.30%	6.10%	93.60%
Art, Drama, and Music Teachers, Postsecondary	0.30%	6.10%	93.60%
Communications Teachers, Postsecondary	0.30%	6.10%	93.60%
English Language and Literature Teachers, Postsecondary	0.30%	6.10%	93.60%

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Occupation	High School or less	Some college or associates degree	BA or more
Foreign Language and Literature Teachers, Postsecondary	0.30%	6.10%	93.60%
History Teachers, Postsecondary	0.30%	6.10%	93.60%
Philosophy and Religion Teachers, Postsecondary	0.30%	6.10%	93.60%
Graduate Teaching Assistants	0.30%	6.10%	93.60%
Recreation and Fitness Studies Teachers, Postsecondary	0.30%	6.10%	93.60%
Vocational Education Teachers, Postsecondary	0.30%	6.10%	93.60%
Postsecondary Teachers, All Other	0.30%	6.10%	93.60%
Public Relations and Fundraising Managers	0.30%	6.00%	93.70%
Pharmacists	0.20%	7.50%	92.30%
Clinical, Counseling, and School Psychologists	0.20%	0.40%	99.40%
Industrial-Organizational Psychologists	0.20%	0.40%	99.40%
Psychologists, All Other	0.20%	0.40%	99.40%
Emergency Management Directors	0.00%	5.10%	94.90%
Buyers and Purchasing Agents, Farm Products	0.00%	40.50%	59.50%
Financial Examiners	0.00%	5.00%	95.00%
Actuaries	0.00%	2.10%	97.90%
Biomedical Engineers	0.00%	11.10%	88.90%
Environmental Engineers	0.00%	12.30%	87.70%
Marine Engineers and Naval Architects	0.00%	30.00%	70.00%
Food Scientists and Technologists	0.00%	31.10%	68.90%
Biochemists and Biophysicists	0.00%	1.40%	98.60%
Microbiologists	0.00%	1.40%	98.60%
Zoologists and Wildlife Biologists	0.00%	1.40%	98.60%
Biological Scientists, All Other	0.00%	1.40%	98.60%
Conservation Scientists	0.00%	17.10%	82.90%
Foresters	0.00%	17.10%	82.90%
Astronomers	0.00%	0.00%	100.00%
Physicists	0.00%	0.00%	100.00%
Atmospheric and Space Scientists	0.00%	0.00%	100.00%
Chemists	0.00%	7.60%	92.40%
Materials Scientists	0.00%	7.60%	92.40%
Environmental Scientists and Specialists, Including Health	0.00%	3.70%	96.30%
Geoscientists, Except Hydrologists and Geographers	0.00%	3.70%	96.30%
Hydrologists	0.00%	3.70%	96.30%
Physical Scientists, All Other	0.00%	1.70%	98.30%
Economists	0.00%	0.00%	100.00%
Urban and Regional Planners	0.00%	6.00%	94.00%
Chiropractors	0.00%	0.00%	100.00%
Dentists, General	0.00%	0.00%	100.00%
Oral and Maxillofacial Surgeons	0.00%	0.00%	100.00%
Orthodontists	0.00%	0.00%	100.00%
Optometrists	0.00%	1.10%	98.90%
Podiatrists	0.00%	0.00%	100.00%
Occupational Therapists	0.00%	7.50%	92.50%
Radiation Therapists	0.00%	57.90%	42.10%
Respiratory Therapists	0.00%	67.40%	32.60%
Nurse Anesthetists	0.00%	15.40%	84.60%
Nurse Midwives	0.00%	2.20%	97.80%
Nurse Practitioners	0.00%	2.20%	97.80%
Audiologists	0.00%	0.00%	100.00%
Health Diagnosing and Treating Practitioners, All Other	0.00%	5.40%	94.60%

APPENDIX C

Regional Vocational Technical School Districts

Data on Programmatic Offerings for Each of the Regional Vocational Technical Schools in the Commonwealth

SOURCE: Massachusetts Department of Elementary and Secondary Education, "Chapter 74 Vocational Technical Education: Program Directory," November 2014.

APPENDIX C - Program Offerings by School

	Animal Science	Automotive Collision Repair & Refinishing	Automotive Technology	Biotechnology	Building & Property Maintenance	Business Technology	Cabinetmaking	Carpentry	Construction Craft Laborer	Cosmetology	Criminal Justice	Culinary Arts	Dental Assisting	Design & Visual Communications	Diesel Technology	Drafting	Early Education & Care	Electricity
Assabet Valley Regional Vocational Technical School		X	X	X		X		X		X		X		X		X		X
Bay Path Regional Vocational Technical School		X	X		X	X	X	X		X		X				X		X
Blue Hills Regional Technical School		X	X					X		X		X		X		X	X	X
Blackstone Valley Regional Vocational Technical School		X	X			X		X		X		X	X	X		X		X
Bristol-Plymouth Regional Technical School		X	X	X		X		X		X		X	X	X		X	X	X
Cape Cod Regional Technical School*		X	X					X		X		X	X				X	X
C.H. McCann Regional Technical School			X			X		X				X				X		X
Diman Regional Vocational Technical School		X	X		X	X		X				X	X			X		X
Essex Technical School*	X	X	X	X				X		X		X	X	X				X
Franklin County Regional Technical School*		X	X			X		X		X		X						X
Greater Lawrence Regional Technical School		X	X	X		X		X		X		X	X					X
Greater New Bedford Regional Vocational Technical School		X	X		X	X		X		X	X	X	X	X	X	X	X	X
Greater Lowell Regional Technical School		X	X			X		X		X		X				X	X	X
J.P. Keefe Regional Technical School*		X				X		X		X		X		X			X	X
Montachusett Regional Vocational Technical School		X	X		X	X	X	X		X		X	X			X	X	X
Minuteman Regional School*			X	X				X		X		X		X			X	X
Nashoba Valley Regional Technical School		X	X					X		X		X	X		X		X	X
Northeast Metro Regional Vocational Technical School		X	X			X		X		X		X	X	X		X	X	X
Old Colony Regional Vocational Technical School			X			X		X		X		X				X		X
Pathfinder Regional Vocational Technical School*		X	X			X		X		X		X				X		X
Shawsheen Valley Regional Technical School		X	X			X		X		X		X	X	X		X		X
Southeastern Regional Vocational Technical School		X	X			X	X	X		X	X	X	X	X			X	X
South Shore Regional Vocational Technical School		X	X					X		X		X				X		X
Tri-County Regional Vocational Technical School		X	X					X	X	X	X	X	X				X	X
Upper Cape Cod Regional Technical School*		X	X					X		X		X						X
Whittier Regional Vocational Technical School		X	X			X		X		X		X		X		X	X	X

*Cape Cod RVT - Horticulture Concentrations: Greenhouse Management, Landscaping, Turf Management

*Essex TS - Horticulture Concentrations: Arboriculture, Greenhouse Management - Floriculture, Landscaping & Turf Management, Natural Resources - Park Management

*Franklin County RTS - Horticulture Concentrations: Arboriculture, Landscaping

*J.P. Keefe RTS - Horticulture Concentration: Landscaping

APPENDIX C - Program Offerings by School

Electronics	Engineering Technology	Environmental Science & Technology	Exploratory	Fashion Technology	Graphic Communications	Health Assisting	HVAC-Refrigeration	Horticulture*	Hospitality Management	Information Support Services & Networking	Machine Tool Technology	Marine Service Technology	Marketing	Masonry & Tile Setting	Medical Assisting	Metal Fabrication & Joining Technologies	Painting & Design Technology	Plumbing	Power Equipment Technology	Programming & Web Development	Radio & Television Broadcasting	Robotics & Automation Technology	Stationary Engineering	Telecommunications-Fiber Optics	Automotive Technology (postsecondary)	Cosmetology (postsecondary)	Culinary Arts (postsecondary)	Dental Assisting (postsecondary)	HVAC-Refrigeration (postsecondary)	Medical Assisting (postsecondary)	Operating Room Technology (Postsecondary)	Practical Nurse (LPN) (postsecondary)			
			X			X	X				X					X	X	X		X												X			
X			X		X	X	X				X		X	X		X		X	X	X															
X	X		X		X	X	X			X						X		X															X		
X			X		X	X	X			X	X					X		X															X		
	X		X		X	X	X	X		X		X				X		X											X				X		
			X							X	X					X		X									X	X			X	X	X		
X			X		X	X	X			X	X					X		X																X	
		X	X		X	X	X	X		X	X			X		X		X																	
	X	X	X		X	X	X			X	X					X		X																	
			X		X	X		X		X						X		X																	
	X		X		X	X				X						X		X																	
	X	X	X	X		X	X	X	X							X		X																	
			X		X	X	X			X						X		X																	
X			X		X	X				X						X		X																	
X			X		X	X	X	X	X							X		X																	
	X	X	X		X	X	X			X		X	X	X	X	X	X	X									X	X	X	X	X	X	X	X	
X			X		X	X	X			X		X				X		X																	
	X		X		X	X	X			X						X		X									X							X	
	X	X	X		X		X			X		X				X		X																	X
X			X		X	X	X		X	X			X	X		X		X							X										

*Minuteman RS - Horticulture Concentrations: Arboriculture, Landscaping

*Pathfinder Regional - Horticulture Concentrations: Arboriculture, Greenhouse Management - Floriculture, Landscaping, Turf Management

*Upper Cape Cod RTSD - Horticulture Concentrations: Landscaping, Turf Management

APPENDIX C - Index of Districts

Assabet Valley Regional Technical School District
Assabet Valley Regional Vocational Technical School
215 Fitchburg Street, Marlborough, MA 01752
508-485-9430
<http://www.assabettech.com>

Blue Hills Regional Technical School District
Blue Hills Regional Technical School
800 Randolph Street, Canton, MA 02021
781-828-5800
<http://www.bluehills.org>

Blackstone Valley Regional Technical School District
Blackstone Valley Regional Vocational Technical School
65 Pleasant Street, Upton, MA 01568
508-529-7758
<http://www.valleytech.k12.ma.us>

Bristol-Plymouth Regional Technical School District
Bristol-Plymouth Regional Technical School
940 County Street, Taunton, MA 02780
508-823-5151
<http://www.bpotech.org>

Cape Cod Regional Technical School District
Cape Cod Regional Technical School
351 Pleasant Lake Avenue, Harwich, MA 02645
508-432-4500
<http://www.capetech.us>

Franklin County Regional Technical School District
Franklin County Regional Technical School
82 Industrial Boulevard, Turners Falls, MA 01376
413-863-4239
<http://www.fcts.org>

Essex North Shore Agricultural & Technical School District
Essex Technical School
P.O. Box 346, 565 Maple Street, Hathorne, MA 01937
978-304-4700
<http://www.essextech.net>

Greater Fall River Regional Vocational Technical School District
Diman Regional Vocational Technical School
251 Stonehaven Road, Fall River, MA 02723
508-678-2891
<http://www.dimanregional.org>

Greater Lawrence Regional Technical School District
Greater Lawrence Regional Technical School
57 River Road, Andover, MA 01810
978-686-0194
<http://www.glts.net/>

Greater New Bedford Regional Vocational Technical School District
Greater New Bedford Regional Vocational Technical School
1121 Ashley Boulevard, New Bedford, MA 02745
508-998-3321
<http://www.gnbvt.edu>

Greater Lowell Regional Technical School District
Greater Lowell Regional Technical School
250 Pawtucket Boulevard, Tyngsborough, MA 01879
978-441-4800
<http://www.gltech.org>

Montachusett Regional Vocational Technical School District
Montachusett Regional Vocational Technical School
1050 Westminster Street, Fitchburg, MA 01420
978-345-9200
<http://www.montytech.net>

Minuteman Regional Technical School District
Minuteman Regional School
758 Marrett Road, Lexington, MA 02421
781-861-6500
<http://www.minuteman.org>

Nashoba Valley Regional Technical School District
Nashoba Valley Regional Technical School
100 Littleton Road, Westford, MA 01886
978-692-4711
<http://www.nashobatech.net/>

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Northern Berkshire Regional Technical School District

C.H. McCann Regional Technical School

70 Hodges Cross Road, North Adams, MA 01247
413-663-5383

<http://www.mccanntech.org>

Old Colony Regional Vocational Technical School District

Old Colony Regional Vocational Technical School

476 North Avenue, Rochester, MA 02770
508-763-8011

<http://www.oldcolony.us>

Northeast Metropolitan Regional Vocational Technical High School

Northeast Metro Regional Vocational Technical School

100 Hemlock Road, Wakefield, MA 01880
781-246-0810

<http://www.northeastmetrotech.com>

Pathfinder Regional Vocational Technical School District

Pathfinder Regional Vocational Technical School

240 Sykes Street Palmer, MA 01069
413-283-9701

<http://www.pathfindertech.org>

Shawsheen Valley Regional Technical School District

Shawsheen Valley Regional Technical School

100 Cook Street, Billerica, MA 01821
978-667-2111

<http://www.shawsheentech.org>

Southeastern Regional Vocational Technical School District

Southeastern Regional Vocational Technical School

250 Foundry Street, South Easton, MA 02375
508-230-1200

<http://www.sersd.org>

South Middlesex Regional Technical School District

J.P. Keefe Regional Technical School

750 Winter Street, Framingham, MA 01702
508-416-2250

<http://www.keefetech.org>

South Shore Regional Vocational Technical School District

South Shore Regional Vocational Technical School

476 Webster Street, Hanover, MA 02339
781-878-8822

<http://www.ssvotech.org>

Southern Worcester County Regional Vocational Technical School District

Bay Path Regional Vocational Technical School

57 Old Muggett Hill Road, Charlton, MA 01507
508-248-5971

<http://www.baypath.tec.ma.us>

Tri-County Regional Vocational Technical School District

Tri-County Regional Vocational Technical School

147 Pond Street, Franklin, MA 02038
508-528-5400

<http://www.tri-county.tc>

Upper Cape Cod Regional Technical School District

Upper Cape Cod Regional Technical School

220 Sandwich Road, Bourne, MA 02532
508-759-7711

<http://www.uppercapetech.com>

Whittier Regional Vocational Technical School District

Whittier Regional Vocational Technical School

115 Amesbury Line Road, Haverhill, MA 01830
978-373-4101

<http://www.whittiertech.org>

APPENDIX D

Annual Supply of Vocational Trained Students and Job Openings through 2022 by Workforce Investment Area

Data on the Supply of Students and Job Openings for the 22 Two-digit Occupations for Each of the
State's 16 Workforce Investment Areas (WIAs)

APPENDIX D

BERKSHIRE WORKFORCE INVESTMENT AREA

SOC	Title	SUPPLY					OPENINGS					SUPPLY AS PERCENT OF OPENINGS				
		High School	Some college	Associates degree	BA	Total	High School	Some College	Associates degree	BA	Total	High School	Some college	Associates degree	BA	Total
110000	Management Occupations	29	8	6	16	58	10	13	6	29	58	291.3%	59.0%	95.8%	55.9%	101.0%
130000	Business and Financial Operations Occupations	12	4	3	7	25	5	7	4	24	41	214.6%	56.9%	62.2%	27.1%	60.5%
150000	Computer and Mathematical Occupations	19	14	11	17	61	1	4	2	11	17	1411.7%	410.4%	707.8%	159.5%	359.8%
170000	Architecture and Engineering Occupations	12	9	8	11	39	1	2	2	5	10	798.0%	373.8%	478.0%	225.0%	380.8%
190000	Life, Physical, and Social Science Occupations	2	1	1	1	5	0	0	0	0	0		4554.9%		369.9%	1753.7%
210000	Community and Social Service Occupations	0	0	0	0	1	7	12	6	19	44	4.0%	2.7%	2.8%	1.9%	2.6%
230000	Legal Occupations	0	0	0	0	0	0	0	0	0	0					
250000	Education, Training, and Library Occupations	4	3	2	6	16	9	15	6	26	56	44.4%	20.7%	34.1%	24.5%	27.8%
270000	Arts, Design, Entertainment, Sports, and Media Occupations	5	3	2	2	12	0	1	0	3	3	5259.7%	409.4%	1499.0%	90.8%	346.0%
290000	Healthcare Practitioners and Technical Occupations	2	2	4	4	12	7	20	22	36	85	29.0%	7.7%	20.1%	11.9%	14.4%
310000	Healthcare Support Occupations	3	2	1	1	7	35	32	11	9	86	8.0%	5.9%	13.2%	8.7%	7.9%
330000	Protective Service Occupations	0	0	0	0	0	4	5	3	6	17	0.0%	0.0%	0.0%	0.0%	0.0%
350000	Food Preparation and Serving Related Occupations	20	8	3	4	34	125	100	20	35	280	15.7%	7.6%	16.2%	10.6%	12.2%
370000	Building and Grounds Cleaning and Maintenance Occupations	4	2	1	0	7	48	21	5	8	83	8.7%	7.8%	13.6%	5.5%	8.5%
390000	Personal Care and Service Occupations	5	2	1	0	8	39	35	8	16	98	12.2%	4.6%	10.3%	3.1%	7.8%
410000	Sales and Related Occupations	10	5	4	4	22	74	75	16	45	210	13.1%	6.4%	21.9%	9.5%	10.6%
430000	Office and Administrative Support Occupations	5	3	1	2	11	78	81	28	50	237	6.0%	3.6%	5.1%	4.8%	4.8%
450000	Farming, Fishing, and Forestry Occupations	0	0	0	0	0	0	0	0	0	0					
470000	Construction and Extraction Occupations	13	4	2	2	21	50	21	5	8	84	26.3%	18.8%	38.9%	22.6%	24.9%
490000	Installation, Maintenance, and Repair Occupations	27	9	5	2	43	27	13	5	4	49	97.1%	67.0%	119.0%	56.5%	87.9%
510000	Production Occupations	19	5	3	2	28	14	5	2	3	24	134.5%	87.2%	167.6%	61.3%	117.6%
530000	Transportation and Material Moving Occupations	2	1	0	0	3	29	14	3	4	51	6.1%	5.9%	7.2%	2.6%	5.8%
TOTAL	ALL OCCUPATIONS	190	83	58	82	413	564	476	153	340	1,534	33.7%	17.4%	37.7%	24.2%	26.9%

APPENDIX D

FRANKLIN-HAMPSHIRE WORKFORCE INVESTMENT AREA

SOC	Title	SUPPLY					OPENINGS					SUPPLY AS PERCENT OF OPENINGS				
		High School	Some college	Associates degree	BA	Total	High School	Some College	Associates degree	BA	Total	High School	Some college	Associates degree	BA	Total
110000	Management Occupations	11	3	3	3	19	14	19	9	50	91	76.3%	13.2%	33.9%	6.1%	20.9%
130000	Business and Financial Operations Occupations	4	1	1	1	8	8	11	6	41	65	57.2%	10.7%	20.0%	3.3%	12.3%
150000	Computer and Mathematical Occupations	16	5	4	7	32	3	7	3	19	32	565.1%	63.8%	125.0%	37.7%	99.0%
170000	Architecture and Engineering Occupations	8	2	3	1	14	0	1	1	3	6	1751.1%	161.7%	331.2%	38.5%	238.4%
190000	Life, Physical, and Social Science Occupations	0	0	0	0	0	0	0	0	0	0		215.3%		6.5%	78.9%
210000	Community and Social Service Occupations	1	1	0	0	2	7	11	6	22	46	16.1%	4.9%	5.2%	1.8%	5.1%
230000	Legal Occupations	0	0	0	0	0	0	1	1	2	4	0.0%	0.0%	0.0%	0.0%	0.0%
250000	Education, Training, and Library Occupations	11	4	4	5	24	21	36	15	71	143	53.7%	12.1%	24.3%	6.5%	16.7%
270000	Arts, Design, Entertainment, Sports, and Media Occupations	6	3	2	3	14	2	5	1	16	25	267.2%	51.6%	178.4%	21.0%	57.3%
290000	Healthcare Practitioners and Technical Occupations	7	2	5	1	16	11	29	31	43	115	59.6%	7.4%	17.4%	3.4%	13.7%
310000	Healthcare Support Occupations	6	2	2	0	10	40	37	12	10	100	15.1%	5.5%	16.8%	2.6%	10.5%
330000	Protective Service Occupations	0	0	0	0	0	4	7	5	9	26	5.6%	0.6%	2.5%	0.1%	1.6%
350000	Food Preparation and Serving Related Occupations	14	4	2	1	21	144	118	25	42	328	10.0%	3.4%	9.9%	1.4%	6.5%
370000	Building and Grounds Cleaning and Maintenance Occupations	13	3	2	0	19	43	20	5	7	75	30.9%	16.7%	46.9%	5.3%	25.9%
390000	Personal Care and Service Occupations	14	3	2	0	20	38	34	8	15	96	36.7%	8.6%	25.8%	2.6%	20.4%
410000	Sales and Related Occupations	2	1	1	1	3	88	88	20	62	258	1.7%	0.7%	2.9%	1.1%	1.3%
430000	Office and Administrative Support Occupations	0	0	0	0	1	102	105	35	66	307	0.4%	0.3%	0.5%	0.2%	0.3%
450000	Farming, Fishing, and Forestry Occupations	1	0	0	0	1	0	0	0	0	0					
470000	Construction and Extraction Occupations	25	7	5	1	38	41	17	4	6	68	60.3%	41.8%	127.8%	18.3%	56.0%
490000	Installation, Maintenance, and Repair Occupations	24	6	5	0	36	30	14	5	4	53	80.3%	42.3%	97.9%	11.7%	66.8%
510000	Production Occupations	28	7	7	2	43	41	21	6	6	74	67.0%	32.0%	112.4%	35.6%	58.2%
530000	Transportation and Material Moving Occupations	1	0	0	0	2	50	23	6	7	86	2.3%	1.4%	2.6%	0.2%	1.9%
TOTAL	ALL OCCUPATIONS	192	53	50	29	324	688	605	203	500	1,997	27.9%	8.8%	24.6%	5.7%	16.2%

APPENDIX D

HAMDEN WORKFORCE INVESTMENT AREA

SOC	Title	SUPPLY					OPENINGS					SUPPLY AS PERCENT OF OPENINGS				
		High School	Some college	Associates degree	BA	Total	High School	Some College	Associates degree	BA	Total	High School	Some college	Associates degree	BA	Total
110000	Management Occupations	17	8	7	13	45	36	47	22	118	223	47.6%	16.0%	31.1%	11.2%	20.0%
130000	Business and Financial Operations Occupations	7	2	2	6	17	17	28	15	103	162	38.6%	8.9%	12.0%	6.2%	10.6%
150000	Computer and Mathematical Occupations	27	13	9	35	84	5	14	7	33	59	515.5%	94.2%	139.6%	103.4%	142.0%
170000	Architecture and Engineering Occupations	26	15	19	22	81	5	8	5	25	44	551.5%	187.0%	343.8%	84.9%	186.7%
190000	Life, Physical, and Social Science Occupations	0	0	0	0	1	1	1	1	3	6	18.8%	19.5%	13.0%	4.3%	11.2%
210000	Community and Social Service Occupations	1	1	1	1	4	23	39	19	75	155	6.4%	2.9%	3.2%	1.5%	2.8%
230000	Legal Occupations	0	0	0	0	0	1	3	3	7	14	0.0%	0.0%	0.0%	0.0%	0.0%
250000	Education, Training, and Library Occupations	13	7	5	15	39	30	49	24	114	217	42.5%	13.6%	20.8%	12.7%	17.9%
270000	Arts, Design, Entertainment, Sports, and Media Occupations	11	6	5	13	36	6	13	3	30	52	189.0%	47.8%	200.2%	42.2%	68.4%
290000	Healthcare Practitioners and Technical Occupations	9	8	19	14	49	33	83	106	171	393	25.8%	10.1%	17.5%	8.1%	12.5%
310000	Healthcare Support Occupations	13	8	6	2	30	77	82	40	26	226	17.3%	10.1%	15.6%	8.2%	13.3%
330000	Protective Service Occupations	0	0	0	0	0	23	35	13	26	97	0.0%	0.0%	0.0%	0.0%	0.0%
350000	Food Preparation and Serving Related Occupations	40	16	7	5	68	314	250	48	88	700	12.7%	6.4%	15.5%	5.2%	9.7%
370000	Building and Grounds Cleaning and Maintenance Occupations	27	11	5	3	45	84	35	9	13	141	31.6%	29.6%	60.4%	22.1%	32.1%
390000	Personal Care and Service Occupations	33	12	6	2	52	116	106	24	44	290	28.6%	11.0%	23.6%	4.7%	18.1%
410000	Sales and Related Occupations	2	1	1	2	5	202	206	47	156	611	0.9%	0.4%	1.3%	1.3%	0.9%
430000	Office and Administrative Support Occupations	11	8	5	4	29	257	257	88	160	761	4.4%	3.2%	5.4%	2.7%	3.8%
450000	Farming, Fishing, and Forestry Occupations	1	0	0	0	1	0	0	0	0	0					
470000	Construction and Extraction Occupations	39	13	9	3	63	101	42	10	15	169	38.4%	30.6%	84.0%	19.4%	37.5%
490000	Installation, Maintenance, and Repair Occupations	75	26	18	4	123	101	50	18	16	185	74.6%	51.7%	98.4%	27.1%	66.7%
510000	Production Occupations	49	13	10	3	74	109	46	15	15	185	44.6%	28.2%	62.7%	17.9%	39.9%
530000	Transportation and Material Moving Occupations	6	3	1	0	11	149	74	18	24	264	4.2%	3.9%	5.6%	2.0%	4.0%
TOTAL	ALL OCCUPATIONS	407	172	133	146	858	1,689	1,471	533	1,260	4,954	24.1%	11.7%	25.0%	11.6%	17.3%

APPENDIX D

NORTH CENTRAL WORKFORCE INVESTMENT AREA

SOC	Title	SUPPLY					OPENINGS					SUPPLY AS PERCENT OF OPENINGS				
		High School	Some college	Associates degree	BA	Total	High School	Some College	Associates degree	BA	Total	High School	Some college	Associates degree	BA	Total
110000	Management Occupations	16	6	5	14	42	13	16	7	36	72	127.3%	40.2%	70.0%	39.7%	58.4%
130000	Business and Financial Operations Occupations	5	3	2	4	15	5	6	4	23	38	116.4%	46.9%	53.5%	19.4%	39.3%
150000	Computer and Mathematical Occupations	29	14	10	28	82	1	3	1	8	13	2676.3%	517.0%	797.6%	340.1%	609.3%
170000	Architecture and Engineering Occupations	14	12	13	11	50	1	2	1	5	8	2162.6%	811.8%	1006.9%	233.3%	609.4%
190000	Life, Physical, and Social Science Occupations	0	0	0	0	1	0	0	0	0	0		710.7%		46.8%	226.7%
210000	Community and Social Service Occupations	1	1	0	1	3	9	16	8	28	61	9.6%	5.1%	4.7%	2.7%	4.6%
230000	Legal Occupations	0	0	0	0	0	0	0	0	0	0					
250000	Education, Training, and Library Occupations	8	6	4	9	27	17	25	11	53	105	49.9%	23.2%	40.3%	16.4%	25.9%
270000	Arts, Design, Entertainment, Sports, and Media Occupations	4	2	2	4	11	2	4	1	8	15	164.3%	48.4%	151.1%	46.6%	71.8%
290000	Healthcare Practitioners and Technical Occupations	3	4	14	5	25	7	22	33	51	113	38.0%	18.2%	42.2%	9.4%	22.5%
310000	Healthcare Support Occupations	7	6	5	1	19	29	32	11	10	82	24.2%	19.2%	41.0%	12.5%	23.2%
330000	Protective Service Occupations	0	0	0	0	0	3	4	3	6	15	0.0%	0.0%	0.0%	0.0%	0.0%
350000	Food Preparation and Serving Related Occupations	19	9	4	2	34	124	105	20	40	289	15.6%	8.3%	17.6%	6.1%	11.8%
370000	Building and Grounds Cleaning and Maintenance Occupations	2	1	0	0	3	35	17	5	7	63	6.3%	4.6%	6.3%	1.7%	5.3%
390000	Personal Care and Service Occupations	12	4	2	1	19	15	19	4	10	48	76.2%	22.9%	47.9%	7.5%	38.8%
410000	Sales and Related Occupations	1	0	0	1	2	94	94	21	61	270	0.9%	0.4%	2.4%	1.0%	0.9%
430000	Office and Administrative Support Occupations	0	0	0	0	1	104	102	35	62	302	0.2%	0.2%	0.3%	0.2%	0.2%
450000	Farming, Fishing, and Forestry Occupations	0	0	0	0	0	0	0	0	0	0					
470000	Construction and Extraction Occupations	35	13	7	3	58	46	19	4	8	78	74.9%	67.1%	158.2%	42.0%	74.4%
490000	Installation, Maintenance, and Repair Occupations	31	13	7	2	53	28	13	5	4	50	109.2%	97.0%	150.0%	59.1%	106.1%
510000	Production Occupations	28	9	6	2	46	67	30	10	11	118	42.5%	31.0%	62.4%	20.7%	39.2%
530000	Transportation and Material Moving Occupations	1	1	0	0	2	68	31	8	10	117	2.0%	2.4%	2.5%	0.8%	2.1%
TOTAL	ALL OCCUPATIONS	217	105	82	89	494	668	558	192	439	1,858	32.5%	18.9%	42.6%	20.3%	26.6%

APPENDIX D

CENTRAL WORKFORCE INVESTMENT AREA

SOC	Title	SUPPLY					OPENINGS					SUPPLY AS PERCENT OF OPENINGS				
		High School	Some college	Associates degree	BA	Total	High School	Some College	Associates degree	BA	Total	High School	Some college	Associates degree	BA	Total
110000	Management Occupations	71	23	18	48	161	41	58	27	149	275	173.1%	40.5%	65.9%	32.6%	58.6%
130000	Business and Financial Operations Occupations	35	12	7	23	78	25	41	22	155	243	138.9%	29.3%	32.8%	15.0%	32.0%
150000	Computer and Mathematical Occupations	66	35	27	77	204	10	32	14	107	163	632.6%	108.4%	191.6%	71.7%	124.7%
170000	Architecture and Engineering Occupations	37	32	28	43	141	10	15	9	39	73	384.3%	220.2%	303.4%	109.8%	193.6%
190000	Life, Physical, and Social Science Occupations	4	1	1	3	9	1	2	2	22	28	308.3%	67.1%	35.2%	11.4%	30.7%
210000	Community and Social Service Occupations	4	3	2	2	11	23	40	20	84	167	16.4%	7.7%	7.8%	2.9%	6.5%
230000	Legal Occupations	0	0	0	0	0	1	2	2	6	12	5.9%	0.5%	1.1%	0.9%	1.4%
250000	Education, Training, and Library Occupations	32	19	17	26	94	40	70	32	155	297	79.6%	27.3%	53.1%	16.7%	31.6%
270000	Arts, Design, Entertainment, Sports, and Media Occupations	72	34	19	43	168	10	23	5	39	78	715.4%	148.4%	357.8%	108.6%	215.4%
290000	Healthcare Practitioners and Technical Occupations	14	16	31	22	83	50	127	149	238	565	28.0%	12.8%	20.4%	9.4%	14.7%
310000	Healthcare Support Occupations	24	19	11	5	58	106	107	43	33	290	22.6%	17.3%	26.0%	14.4%	20.2%
330000	Protective Service Occupations	0	0	0	0	0	31	43	18	41	132	0.3%	0.3%	1.4%	0.0%	0.4%
350000	Food Preparation and Serving Related Occupations	37	17	6	6	67	313	215	50	77	655	11.9%	8.1%	11.8%	7.9%	10.2%
370000	Building and Grounds Cleaning and Maintenance Occupations	2	1	0	0	3	114	48	12	17	192	1.6%	1.1%	1.8%	0.6%	1.4%
390000	Personal Care and Service Occupations	31	14	5	3	53	100	86	22	38	246	31.4%	15.8%	22.4%	7.9%	21.5%
410000	Sales and Related Occupations	26	13	9	13	61	258	263	60	199	779	10.1%	4.8%	15.3%	6.6%	7.8%
430000	Office and Administrative Support Occupations	16	14	7	7	43	331	331	112	205	979	4.7%	4.1%	6.2%	3.5%	4.4%
450000	Farming, Fishing, and Forestry Occupations	0	0	0	0	1	1	1	0	0	2	25.9%	17.9%	68.0%	11.7%	24.6%
470000	Construction and Extraction Occupations	58	23	10	6	97	144	58	22	22	246	40.6%	38.7%	46.2%	28.2%	39.6%
490000	Installation, Maintenance, and Repair Occupations	83	34	18	6	141	114	56	21	17	209	72.7%	60.7%	82.8%	36.4%	67.5%
510000	Production Occupations	49	15	8	4	76	128	55	17	20	219	38.5%	27.4%	46.5%	19.1%	34.6%
530000	Transportation and Material Moving Occupations	6	3	1	0	11	177	84	19	25	306	3.5%	3.8%	4.6%	1.7%	3.5%
TOTAL	ALL OCCUPATIONS	668	329	224	338	1,559	2,029	1,757	681	1,689	6,156	32.9%	18.7%	32.9%	20.0%	25.3%

APPENDIX D

GREATER LOWELL WORKFORCE INVESTMENT AREA

SOC	Title	SUPPLY					OPENINGS					SUPPLY AS PERCENT OF OPENINGS				
		High School	Some college	Associates degree	BA	Total	High School	Some College	Associates degree	BA	Total	High School	Some college	Associates degree	BA	Total
110000	Management Occupations	65	21	18	32	136	20	29	13	83	145	321.7%	72.0%	140.8%	38.9%	94.2%
130000	Business and Financial Operations Occupations	40	11	7	21	79	15	24	12	87	138	271.1%	46.5%	57.1%	24.2%	57.5%
150000	Computer and Mathematical Occupations	42	22	15	46	126	8	28	12	96	144	501.7%	79.6%	132.3%	48.2%	87.7%
170000	Architecture and Engineering Occupations	31	26	28	27	113	13	18	12	54	97	244.5%	142.7%	235.4%	51.0%	116.6%
190000	Life, Physical, and Social Science Occupations	0	0	0	0	1	1	2	1	8	12	28.8%	22.3%	13.8%	2.9%	9.3%
210000	Community and Social Service Occupations	2	2	1	1	7	6	10	6	15	37	41.6%	18.2%	17.0%	8.3%	17.7%
230000	Legal Occupations	0	0	0	0	0	1	2	2	5	9	20.7%	1.8%	4.5%	2.2%	4.5%
250000	Education, Training, and Library Occupations	25	11	9	17	61	14	25	12	57	108	176.1%	43.1%	76.3%	29.1%	56.7%
270000	Arts, Design, Entertainment, Sports, and Media Occupations	38	20	10	29	97	4	8	2	12	26	913.5%	247.9%	649.6%	240.3%	375.7%
290000	Healthcare Practitioners and Technical Occupations	16	17	36	21	90	12	35	39	54	139	132.6%	49.4%	93.8%	38.5%	64.6%
310000	Healthcare Support Occupations	21	17	13	3	54	29	28	10	7	74	71.5%	62.8%	129.7%	42.7%	73.1%
330000	Protective Service Occupations	0	0	0	0	0	12	18	8	15	53	0.0%	0.0%	0.0%	0.0%	0.0%
350000	Food Preparation and Serving Related Occupations	37	18	7	4	67	135	109	21	35	300	27.6%	16.3%	35.0%	11.8%	22.2%
370000	Building and Grounds Cleaning and Maintenance Occupations	0	0	0	0	0	34	14	4	6	57	0.0%	0.0%	0.0%	0.0%	0.0%
390000	Personal Care and Service Occupations	33	12	5	2	52	51	45	10	19	125	64.1%	26.1%	54.0%	9.7%	41.4%
410000	Sales and Related Occupations	28	11	8	12	59	100	102	24	91	317	28.1%	11.1%	32.4%	13.1%	18.7%
430000	Office and Administrative Support Occupations	8	7	5	4	24	122	120	38	73	353	6.9%	6.1%	12.6%	5.6%	6.9%
450000	Farming, Fishing, and Forestry Occupations	0	0	0	0	0	0	0	0	0	0					
470000	Construction and Extraction Occupations	72	26	15	6	119	82	34	10	10	137	87.2%	76.6%	154.6%	54.9%	86.9%
490000	Installation, Maintenance, and Repair Occupations	77	30	17	5	129	41	22	8	7	79	186.6%	136.7%	206.1%	65.2%	164.0%
510000	Production Occupations	50	16	11	4	81	38	15	5	5	64	131.0%	109.2%	206.0%	69.6%	126.9%
530000	Transportation and Material Moving Occupations	4	2	1	0	7	84	39	9	12	143	5.0%	5.5%	7.5%	2.0%	5.1%
TOTAL	ALL OCCUPATIONS	591	271	208	235	1,304	823	727	256	751	2,557	71.8%	37.2%	81.1%	31.2%	51.0%

APPENDIX D

LOWER MERRIMACK VALLEY WORKFORCE INVESTMENT AREA

SOC	Title	SUPPLY					OPENINGS					SUPPLY AS PERCENT OF OPENINGS				
		High School	Some college	Associates degree	BA	Total	High School	Some College	Associates degree	BA	Total	High School	Some college	Associates degree	BA	Total
110000	Management Occupations	24	10	9	15	58	24	32	14	84	154	101.1%	31.4%	60.4%	17.8%	37.5%
130000	Business and Financial Operations Occupations	22	7	5	12	46	16	24	12	73	125	137.8%	30.5%	38.5%	16.7%	37.0%
150000	Computer and Mathematical Occupations	15	9	7	13	43	7	21	9	66	104	213.6%	40.4%	70.3%	19.1%	41.4%
170000	Architecture and Engineering Occupations	13	14	17	17	60	8	14	10	33	65	156.1%	104.3%	174.0%	49.7%	92.8%
190000	Life, Physical, and Social Science Occupations	6	1	2	3	12	0	0	0	4	4		187.2%	807.4%	93.8%	295.9%
210000	Community and Social Service Occupations	2	2	1	1	7	10	17	9	35	71	19.3%	12.6%	12.7%	4.0%	9.3%
230000	Legal Occupations	0	0	0	0	0	1	2	2	4	8	0.0%	0.0%	0.0%	0.0%	0.0%
250000	Education, Training, and Library Occupations	16	13	11	12	51	23	38	19	85	166	66.7%	33.1%	56.4%	14.2%	30.8%
270000	Arts, Design, Entertainment, Sports, and Media Occupations	6	4	2	6	17	3	5	1	9	18	229.1%	68.0%	203.9%	59.3%	94.2%
290000	Healthcare Practitioners and Technical Occupations	3	9	29	13	53	20	56	70	109	255	16.4%	16.0%	40.9%	11.5%	20.9%
310000	Healthcare Support Occupations	12	12	10	3	37	40	41	15	11	107	30.3%	30.5%	67.9%	23.5%	35.0%
330000	Protective Service Occupations	0	0	0	0	0	4	5	3	7	19	0.0%	0.0%	0.0%	0.0%	0.0%
350000	Food Preparation and Serving Related Occupations	28	15	7	4	54	196	161	30	53	439	14.1%	9.5%	22.9%	8.4%	12.3%
370000	Building and Grounds Cleaning and Maintenance Occupations	0	0	0	0	0	27	13	3	6	48	0.0%	0.0%	0.0%	0.0%	0.0%
390000	Personal Care and Service Occupations	20	9	4	1	34	56	52	13	24	145	35.3%	16.5%	34.4%	5.5%	23.6%
410000	Sales and Related Occupations	14	6	4	7	31	99	101	23	81	304	14.2%	6.3%	18.3%	8.3%	10.3%
430000	Office and Administrative Support Occupations	4	3	2	1	10	163	165	57	104	489	2.2%	2.0%	4.2%	0.8%	2.1%
450000	Farming, Fishing, and Forestry Occupations	0	0	0	0	0	0	0	0	0	0					
470000	Construction and Extraction Occupations	38	17	11	3	69	74	30	7	11	122	50.7%	57.0%	151.2%	30.9%	56.6%
490000	Installation, Maintenance, and Repair Occupations	45	23	15	3	86	43	20	7	6	77	104.9%	113.3%	199.7%	58.5%	112.6%
510000	Production Occupations	29	12	8	3	51	72	33	9	10	123	40.9%	35.7%	85.0%	27.7%	41.7%
530000	Transportation and Material Moving Occupations	2	1	0	0	4	77	35	8	11	131	2.8%	4.0%	5.3%	1.0%	3.1%
TOTAL	ALL OCCUPATIONS	299	167	143	117	726	962	866	322	825	2,975	31.0%	19.3%	44.5%	14.1%	24.4%

APPENDIX D

NORTH SHORE WORKFORCE INVESTMENT AREA

SOC	Title	SUPPLY					OPENINGS					SUPPLY AS PERCENT OF OPENINGS				
		High School	Some college	Associates degree	BA	Total	High School	Some College	Associates degree	BA	Total	High School	Some college	Associates degree	BA	Total
110000	Management Occupations	28	10	9	19	67	35	49	22	124	230	79.5%	20.7%	41.7%	15.7%	29.0%
130000	Business and Financial Operations Occupations	17	5	4	14	40	14	22	11	87	134	125.9%	24.0%	35.2%	16.0%	30.1%
150000	Computer and Mathematical Occupations	23	11	8	19	62	3	9	4	28	44	669.4%	125.0%	221.7%	67.7%	138.9%
170000	Architecture and Engineering Occupations	11	6	8	15	41	8	12	8	22	50	134.8%	53.9%	106.9%	68.7%	81.9%
190000	Life, Physical, and Social Science Occupations	0	2	1	8	12	1	1	1	9	12	48.2%	160.1%	121.7%	93.1%	98.8%
210000	Community and Social Service Occupations	2	2	1	2	7	19	31	18	61	128	12.8%	6.0%	6.2%	2.5%	5.3%
230000	Legal Occupations	0	0	0	0	0	1	1	1	3	6	23.1%	2.1%	6.1%	4.2%	6.1%
250000	Education, Training, and Library Occupations	32	20	19	26	98	26	41	20	87	174	123.2%	49.6%	95.5%	30.5%	56.2%
270000	Arts, Design, Entertainment, Sports, and Media Occupations	36	18	11	28	92	6	14	3	30	53	566.2%	126.7%	359.4%	92.4%	172.8%
290000	Healthcare Practitioners and Technical Occupations	6	9	11	9	35	21	61	78	127	287	30.0%	14.4%	14.4%	6.9%	12.2%
310000	Healthcare Support Occupations	5	7	5	2	19	82	78	27	25	211	6.5%	8.4%	19.7%	6.4%	8.9%
330000	Protective Service Occupations	2	2	4	2	11	22	38	14	32	107	10.6%	6.2%	27.7%	5.8%	9.9%
350000	Food Preparation and Serving Related Occupations	94	43	24	10	171	322	281	50	98	751	29.1%	15.4%	48.5%	10.2%	22.8%
370000	Building and Grounds Cleaning and Maintenance Occupations	15	10	5	4	34	53	24	7	9	93	29.1%	40.5%	76.5%	47.4%	37.2%
390000	Personal Care and Service Occupations	25	13	7	7	51	84	72	16	32	205	29.3%	17.3%	41.0%	20.8%	24.7%
410000	Sales and Related Occupations	14	6	5	10	35	230	235	53	169	686	6.0%	2.5%	10.4%	6.0%	5.1%
430000	Office and Administrative Support Occupations	2	1	1	1	5	222	222	69	131	644	0.9%	0.6%	1.2%	0.5%	0.7%
450000	Farming, Fishing, and Forestry Occupations	1	1	1	0	3	0	0	0	0	0					
470000	Construction and Extraction Occupations	27	10	7	2	47	84	37	9	14	145	32.6%	27.8%	76.3%	16.2%	32.6%
490000	Installation, Maintenance, and Repair Occupations	45	17	12	2	76	57	28	11	7	104	78.9%	60.2%	106.1%	34.7%	73.6%
510000	Production Occupations	14	4	3	1	22	89	37	13	13	152	15.9%	10.4%	20.2%	6.5%	14.2%
530000	Transportation and Material Moving Occupations	3	1	0	0	5	110	53	13	17	192	2.7%	2.7%	3.6%	0.7%	2.6%
TOTAL	ALL OCCUPATIONS	404	199	148	182	932	1,490	1,347	449	1,123	4,410	27.1%	14.8%	32.9%	16.2%	21.1%

APPENDIX D

BOSTON WORKFORCE INVESTMENT AREA

SOC	Title	SUPPLY					OPENINGS					SUPPLY AS PERCENT OF OPENINGS				
		High School	Some college	Associates degree	BA	Total	High School	College	Associates degree	BA	Total	High School	Some college	Associates degree	BA	Total
110000	Management Occupations	19	6	5	12	42	151	209	100	574	1,034	12.5%	3.0%	5.1%	2.0%	4.1%
130000	Business and Financial Operations Occupations	17	5	3	12	36	114	228	109	1,068	1,519	14.8%	2.2%	2.5%	1.1%	2.4%
150000	Computer and Mathematical Occupations	31	15	8	22	76	47	136	58	436	677	65.8%	10.9%	14.5%	5.1%	11.3%
170000	Architecture and Engineering Occupations	10	6	6	5	26	9	22	14	114	160	102.3%	25.1%	39.4%	4.3%	16.0%
190000	Life, Physical, and Social Science Occupations	0	0	0	0	1	18	37	16	113	185	1.4%	0.6%	0.5%	0.1%	0.4%
210000	Community and Social Service Occupations	1	1	0	1	3	40	74	41	170	325	2.8%	1.2%	1.0%	0.3%	0.9%
230000	Legal Occupations	0	0	0	0	0	9	17	18	49	93	0.0%	0.0%	0.0%	0.0%	0.0%
250000	Education, Training, and Library Occupations	6	2	1	4	14	39	75	32	111	257	14.7%	3.3%	3.8%	3.9%	5.3%
270000	Arts, Design, Entertainment, Sports, and Media Occupations	27	13	8	18	66	32	79	26	202	338	85.1%	16.6%	32.1%	8.7%	19.6%
290000	Healthcare Practitioners and Technical Occupations	15	10	24	13	62	107	255	381	674	1,417	14.1%	3.9%	6.2%	1.9%	4.4%
310000	Healthcare Support Occupations	14	11	8	2	34	137	168	67	46	419	10.1%	6.6%	11.3%	3.8%	8.2%
330000	Protective Service Occupations	0	0	0	0	0	78	119	28	79	304	0.0%	0.0%	0.0%	0.0%	0.0%
350000	Food Preparation and Serving Related Occupations	11	5	2	1	19	778	652	119	230	1,778	1.4%	0.8%	1.7%	0.4%	1.1%
370000	Building and Grounds Cleaning and Maintenance Occupations	2	1	0	0	3	98	36	9	17	161	2.3%	2.1%	3.1%	0.5%	2.1%
390000	Personal Care and Service Occupations	10	4	2	1	16	167	158	32	63	421	5.8%	2.7%	4.9%	0.8%	3.8%
410000	Sales and Related Occupations	15	6	4	9	33	338	373	94	433	1,238	4.4%	1.5%	3.8%	2.0%	2.7%
430000	Office and Administrative Support Occupations	7	5	3	2	17	631	674	239	450	1,994	1.1%	0.8%	1.2%	0.4%	0.8%
450000	Farming, Fishing, and Forestry Occupations	0	0	0	0	0	0	0	0	0	0					
470000	Construction and Extraction Occupations	8	3	2	1	13	183	79	22	30	315	4.5%	3.7%	7.5%	1.7%	4.3%
490000	Installation, Maintenance, and Repair Occupations	24	10	5	1	39	139	87	30	28	284	17.0%	11.1%	17.0%	3.9%	13.9%
510000	Production Occupations	21	7	4	1	33	60	31	10	13	114	34.2%	22.3%	41.2%	7.7%	28.6%
530000	Transportation and Material Moving Occupations	10	5	2	1	18	296	175	45	76	592	3.5%	2.7%	3.6%	1.5%	3.0%
TOTAL	ALL OCCUPATIONS	247	115	86	104	551	3,472	3,685	1,491	4,976	13,623	7.1%	3.1%	5.8%	2.1%	4.0%

APPENDIX D

METRO NORTH WORKFORCE INVESTMENT AREA

SOC	Title	SUPPLY					OPENINGS					SUPPLY AS PERCENT OF OPENINGS				
		High School	Some college	Associates degree	BA	Total	High School	Some College	Associates degree	BA	Total	High School	Some college	Associates degree	BA	Total
110000	Management Occupations	19	7	6	13	45	97	139	62	397	695	19.6%	5.0%	9.4%	3.2%	6.4%
130000	Business and Financial Operations Occupations	13	4	3	10	30	56	95	48	390	590	22.5%	4.3%	5.6%	2.6%	5.0%
150000	Computer and Mathematical Occupations	23	12	8	22	65	50	134	57	435	675	45.1%	8.8%	14.5%	5.1%	9.6%
170000	Architecture and Engineering Occupations	25	17	19	19	79	29	48	30	178	284	86.4%	35.1%	62.6%	10.4%	27.7%
190000	Life, Physical, and Social Science Occupations	3	0	1	3	8	13	23	12	125	173	25.6%	1.7%	9.1%	2.2%	4.3%
210000	Community and Social Service Occupations	1	1	0	1	3	23	40	19	76	158	5.3%	2.3%	2.4%	1.1%	2.2%
230000	Legal Occupations	0	0	0	0	0	1	2	2	7	12	6.8%	0.7%	2.1%	1.4%	1.9%
250000	Education, Training, and Library Occupations	14	7	5	13	39	43	81	38	152	315	32.7%	8.4%	13.5%	8.6%	12.4%
270000	Arts, Design, Entertainment, Sports, and Media Occupations	12	6	4	9	31	18	41	13	100	173	64.7%	14.0%	32.4%	9.4%	18.1%
290000	Healthcare Practitioners and Technical Occupations	7	6	18	10	41	55	133	134	254	576	13.0%	4.4%	13.3%	4.1%	7.1%
310000	Healthcare Support Occupations	11	8	6	2	26	94	99	51	31	276	11.6%	7.8%	11.1%	5.5%	9.5%
330000	Protective Service Occupations	0	0	0	0	0	45	74	31	55	205	0.0%	0.0%	0.0%	0.0%	0.0%
350000	Food Preparation and Serving Related Occupations	31	14	6	3	54	557	475	87	168	1,287	5.5%	2.9%	7.4%	1.9%	4.2%
370000	Building and Grounds Cleaning and Maintenance Occupations	0	0	0	0	0	138	60	15	19	233	0.0%	0.0%	0.0%	0.0%	0.0%
390000	Personal Care and Service Occupations	22	7	3	1	34	154	130	30	54	369	14.4%	5.5%	10.8%	2.6%	9.2%
410000	Sales and Related Occupations	5	2	2	3	12	383	395	92	346	1,215	1.4%	0.5%	1.8%	1.0%	1.0%
430000	Office and Administrative Support Occupations	10	8	5	4	27	487	481	162	300	1,430	2.2%	1.6%	3.0%	1.3%	1.9%
450000	Farming, Fishing, and Forestry Occupations	0	0	0	0	0	0	0	0	0	0					
470000	Construction and Extraction Occupations	46	15	8	4	73	233	99	27	37	396	19.6%	15.4%	30.4%	10.5%	18.5%
490000	Installation, Maintenance, and Repair Occupations	60	22	12	3	97	162	81	29	24	296	36.8%	26.8%	41.9%	13.8%	32.7%
510000	Production Occupations	24	8	5	2	39	137	58	22	20	237	17.7%	13.2%	23.7%	10.6%	16.6%
530000	Transportation and Material Moving Occupations	4	2	1	0	7	239	115	28	36	418	1.8%	1.8%	2.2%	0.8%	1.7%
TOTAL	ALL OCCUPATIONS	330	145	112	123	710	3,014	2,804	992	3,204	10,013	10.9%	5.2%	11.3%	3.8%	7.1%

APPENDIX D

METRO SOUTH WEST WORKFORCE INVESTMENT AREA

SOC	Title	SUPPLY					OPENINGS					SUPPLY AS PERCENT OF OPENINGS				
		High School	Some college	Associates degree	BA	Total	High School	Some College	Associates degree	BA	Total	High School	Some college	Associates degree	BA	Total
110000	Management Occupations	82	25	18	55	179	121	172	78	498	869	67.5%	14.3%	22.6%	11.0%	20.5%
130000	Business and Financial Operations Occupations	54	17	10	29	110	88	150	73	611	921	61.6%	11.3%	13.2%	4.7%	11.9%
150000	Computer and Mathematical Occupations	68	46	30	69	214	62	182	76	643	964	109.6%	25.0%	39.6%	10.8%	22.2%
170000	Architecture and Engineering Occupations	34	34	32	38	139	41	66	46	210	363	83.0%	52.1%	70.2%	18.3%	38.3%
190000	Life, Physical, and Social Science Occupations	4	3	2	18	28	7	15	7	76	104	59.6%	23.8%	36.6%	23.4%	26.8%
210000	Community and Social Service Occupations	3	3	1	3	10	29	50	25	93	198	11.2%	6.0%	5.5%	2.9%	5.3%
230000	Legal Occupations	1	0	0	0	2	3	5	5	13	27	36.1%	3.2%	7.5%	3.5%	7.7%
250000	Education, Training, and Library Occupations	65	31	24	48	167	84	154	75	318	630	77.3%	19.9%	32.1%	15.1%	26.5%
270000	Arts, Design, Entertainment, Sports, and Media Occupations	54	31	19	37	142	24	52	15	131	222	221.8%	59.9%	126.9%	28.6%	63.8%
290000	Healthcare Practitioners and Technical Occupations	19	15	24	34	92	55	141	164	264	625	34.2%	10.8%	14.7%	12.7%	14.7%
310000	Healthcare Support Occupations	19	15	8	6	49	173	175	65	58	470	11.2%	8.7%	12.6%	10.7%	10.4%
330000	Protective Service Occupations	1	1	1	0	2	57	93	35	62	247	1.1%	0.6%	2.0%	0.7%	0.9%
350000	Food Preparation and Serving Related Occupations	60	26	9	8	104	748	612	115	206	1,681	8.0%	4.3%	8.3%	4.0%	6.2%
370000	Building and Grounds Cleaning and Maintenance Occupations	23	11	3	8	45	267	119	31	44	461	8.6%	8.9%	11.2%	17.1%	9.7%
390000	Personal Care and Service Occupations	42	20	7	19	87	279	235	58	108	681	15.0%	8.4%	11.6%	17.4%	12.8%
410000	Sales and Related Occupations	16	9	7	7	40	540	579	145	575	1,839	3.0%	1.6%	4.8%	1.3%	2.2%
430000	Office and Administrative Support Occupations	11	8	4	5	28	657	666	225	417	1,965	1.7%	1.1%	1.6%	1.3%	1.4%
450000	Farming, Fishing, and Forestry Occupations	3	2	1	3	9	0	0	0	0	0					
470000	Construction and Extraction Occupations	60	19	9	6	94	287	125	32	46	490	20.9%	15.2%	27.2%	12.7%	19.1%
490000	Installation, Maintenance, and Repair Occupations	93	34	16	7	150	222	116	44	36	418	41.9%	29.3%	37.6%	18.6%	35.9%
510000	Production Occupations	46	14	7	5	72	173	70	24	26	293	26.9%	19.5%	28.5%	20.0%	24.6%
530000	Transportation and Material Moving Occupations	5	2	1	0	8	237	112	27	35	411	2.1%	2.0%	2.2%	1.0%	2.0%
TOTAL	ALL OCCUPATIONS	765	365	234	406	1,770	4,156	3,889	1,363	4,470	13,879	18.4%	9.4%	17.1%	9.1%	12.8%

APPENDIX D

SOUTH SHORE WORKFORCE INVESTMENT AREA

SOC	Title	SUPPLY					OPENINGS					SUPPLY AS PERCENT OF OPENINGS				
		High School	Some college	Associates degree	BA	Total	High School	Some College	Associates degree	BA	Total	High School	Some college	Associates degree	BA	Total
110000	Management Occupations	34	10	8	25	77	46	59	28	149	282	74.6%	17.6%	28.2%	16.4%	27.3%
130000	Business and Financial Operations Occupations	8	2	1	6	18	31	49	26	186	292	25.1%	5.1%	5.7%	3.5%	6.2%
150000	Computer and Mathematical Occupations	25	14	10	24	73	10	25	11	62	108	265.5%	56.0%	84.9%	38.1%	67.3%
170000	Architecture and Engineering Occupations	27	17	18	18	80	1	3	2	13	20	2197.4%	593.0%	756.8%	133.1%	401.1%
190000	Life, Physical, and Social Science Occupations	0	0	0	0	1	0	0	0	0	0		839.3%		43.2%	232.2%
210000	Community and Social Service Occupations	4	3	1	2	11	12	20	9	33	74	33.8%	14.1%	14.9%	7.5%	14.4%
230000	Legal Occupations	0	0	0	0	1	0	1	1	3	5	73.1%	5.7%	11.6%	10.9%	16.1%
250000	Education, Training, and Library Occupations	34	19	16	26	96	26	39	19	94	178	134.0%	50.1%	83.9%	27.3%	53.7%
270000	Arts, Design, Entertainment, Sports, and Media Occupations	15	7	4	11	37	6	13	3	27	49	243.9%	52.2%	137.8%	41.7%	75.4%
290000	Healthcare Practitioners and Technical Occupations	13	9	18	12	53	27	68	68	129	292	48.2%	13.9%	26.2%	9.7%	18.1%
310000	Healthcare Support Occupations	16	9	6	2	34	46	50	24	16	137	34.7%	18.8%	25.8%	14.4%	24.9%
330000	Protective Service Occupations	8	4	5	4	21	7	12	8	15	43	106.7%	37.4%	58.4%	27.2%	49.7%
350000	Food Preparation and Serving Related Occupations	32	12	5	3	52	349	282	59	96	785	9.1%	4.3%	8.3%	3.6%	6.7%
370000	Building and Grounds Cleaning and Maintenance Occupations	11	4	2	1	19	40	17	4	6	68	27.9%	25.4%	45.7%	17.6%	27.5%
390000	Personal Care and Service Occupations	22	7	3	1	33	112	83	21	36	252	19.8%	7.9%	14.5%	3.5%	13.1%
410000	Sales and Related Occupations	6	2	2	4	14	269	271	61	205	806	2.1%	0.9%	2.7%	2.0%	1.7%
430000	Office and Administrative Support Occupations	11	6	3	4	25	318	320	107	201	946	3.4%	2.0%	3.3%	1.9%	2.6%
450000	Farming, Fishing, and Forestry Occupations	0	0	0	0	0	0	0	0	0	0					
470000	Construction and Extraction Occupations	36	11	6	3	56	161	70	20	24	275	22.5%	15.8%	30.9%	11.5%	20.4%
490000	Installation, Maintenance, and Repair Occupations	55	19	11	3	88	88	41	15	10	154	62.3%	46.8%	71.6%	28.9%	57.0%
510000	Production Occupations	24	7	4	2	37	56	21	7	8	92	42.8%	33.1%	55.2%	30.9%	40.5%
530000	Transportation and Material Moving Occupations	3	2	0	0	5	104	49	11	15	180	3.0%	3.1%	3.8%	1.2%	3.0%
TOTAL	ALL OCCUPATIONS	386	167	124	153	830	1,711	1,492	505	1,330	5,038	22.6%	11.2%	24.5%	11.5%	16.5%

APPENDIX D

BROCKTON WORKFORCE INVESTMENT AREA

SOC	Title	SUPPLY					OPENINGS					SUPPLY AS PERCENT OF OPENINGS				
		High School	Some college	Associates degree	BA	Total	High School	Some College	Associates degree	BA	Total	High School	Some college	Associates degree	BA	Total
110000	Management Occupations	20	6	4	16	47	21	26	12	63	123	98.0%	23.1%	36.3%	24.7%	37.9%
130000	Business and Financial Operations Occupations	9	2	1	7	18	6	9	6	36	57	139.7%	23.2%	17.2%	18.4%	32.4%
150000	Computer and Mathematical Occupations	15	9	6	13	43	1	2	1	3	8	1436.1%	428.8%	564.0%	369.9%	555.1%
170000	Architecture and Engineering Occupations	12	7	7	9	35	0	0	0	2	3	5961.4%	1372.4%	1604.2%	466.9%	1110.8%
190000	Life, Physical, and Social Science Occupations	3	2	1	3	8	0	0	0	0	0		5188.1%		851.9%	2324.1%
210000	Community and Social Service Occupations	2	2	1	1	6	7	11	6	24	48	34.2%	14.9%	11.4%	5.2%	12.3%
230000	Legal Occupations	0	0	0	0	0	0	0	0	0	0					
250000	Education, Training, and Library Occupations	13	6	5	10	34	11	21	12	51	96	113.8%	29.4%	40.0%	20.5%	35.9%
270000	Arts, Design, Entertainment, Sports, and Media Occupations	9	5	4	8	25	1	2	1	9	13	1053.4%	201.8%	437.8%	84.8%	191.7%
290000	Healthcare Practitioners and Technical Occupations	18	13	20	14	65	14	42	69	82	208	125.9%	30.1%	29.5%	17.0%	31.4%
310000	Healthcare Support Occupations	20	13	7	3	42	37	37	14	10	98	53.7%	34.8%	49.9%	26.3%	43.3%
330000	Protective Service Occupations	0	0	0	0	0	8	13	7	13	41	0.0%	0.0%	0.0%	0.0%	0.0%
350000	Food Preparation and Serving Related Occupations	13	6	3	2	24	140	114	20	32	307	9.6%	5.7%	13.3%	4.7%	7.9%
370000	Building and Grounds Cleaning and Maintenance Occupations	0	0	0	0	0	30	13	3	5	51	0.0%	0.0%	0.0%	0.0%	0.0%
390000	Personal Care and Service Occupations	7	3	1	0	11	40	28	8	12	87	17.1%	9.4%	16.5%	3.2%	12.7%
410000	Sales and Related Occupations	5	2	1	3	10	106	109	25	81	321	4.3%	1.7%	4.0%	3.7%	3.3%
430000	Office and Administrative Support Occupations	0	0	0	0	1	122	117	38	70	347	0.4%	0.2%	0.4%	0.2%	0.3%
450000	Farming, Fishing, and Forestry Occupations	0	0	0	0	0	0	0	0	0	0					
470000	Construction and Extraction Occupations	19	7	4	2	31	57	25	7	8	96	32.8%	28.8%	56.6%	18.3%	32.2%
490000	Installation, Maintenance, and Repair Occupations	31	13	7	2	53	47	22	8	6	82	66.8%	59.7%	85.9%	27.3%	64.0%
510000	Production Occupations	7	2	2	0	12	38	16	5	6	65	19.5%	15.3%	34.6%	8.3%	18.6%
530000	Transportation and Material Moving Occupations	2	1	0	0	4	106	50	12	15	183	2.2%	2.4%	2.7%	1.1%	2.2%
TOTAL	ALL OCCUPATIONS	206	99	73	92	470	792	658	254	529	2,232	26.0%	15.1%	28.7%	17.3%	21.0%

APPENDIX D

BRISTOL WORKFORCE INVESTMENT AREA

SOC	Title	SUPPLY					OPENINGS					SUPPLY AS PERCENT OF OPENINGS				
		High School	Some college	Associates degree	BA	Total	High School	Some College	Associates degree	BA	Total	High School	Some college	Associates degree	BA	Total
110000	Management Occupations	45	16	13	26	100	25	33	15	79	151	176.7%	48.3%	92.1%	33.4%	66.2%
130000	Business and Financial Operations Occupations	24	8	6	14	52	12	19	10	63	103	192.9%	45.4%	60.0%	22.5%	50.2%
150000	Computer and Mathematical Occupations	52	25	17	46	140	4	10	5	27	47	1153.3%	240.0%	343.0%	169.7%	297.9%
170000	Architecture and Engineering Occupations	30	25	29	24	109	4	7	5	21	37	757.8%	374.1%	550.8%	114.7%	292.2%
190000	Life, Physical, and Social Science Occupations	0	3	2	7	12	0	0	0	0	0		9274.3%		2484.0%	3723.6%
210000	Community and Social Service Occupations	3	2	1	2	9	16	28	16	63	123	18.2%	8.6%	8.4%	3.0%	7.0%
230000	Legal Occupations	0	0	0	0	0	1	1	1	3	6	1.4%	0.1%	0.3%	0.2%	0.3%
250000	Education, Training, and Library Occupations	35	22	19	30	106	19	30	16	58	123	183.9%	72.6%	118.7%	52.4%	86.6%
270000	Arts, Design, Entertainment, Sports, and Media Occupations	39	19	12	28	98	4	7	1	12	24	1098.3%	275.2%	852.3%	233.8%	412.4%
290000	Healthcare Practitioners and Technical Occupations	12	14	34	18	79	22	59	71	109	261	56.3%	23.1%	48.3%	16.8%	30.1%
310000	Healthcare Support Occupations	14	15	12	3	45	38	36	15	12	101	36.8%	42.0%	84.4%	28.5%	44.6%
330000	Protective Service Occupations	0	0	1	0	1	12	19	8	16	55	0.8%	1.5%	7.9%	1.1%	2.2%
350000	Food Preparation and Serving Related Occupations	60	27	12	6	106	269	219	42	77	607	22.3%	12.4%	28.4%	8.2%	17.4%
370000	Building and Grounds Cleaning and Maintenance Occupations	26	15	7	11	59	35	16	4	6	61	73.6%	94.3%	168.3%	199.7%	97.4%
390000	Personal Care and Service Occupations	19	10	5	7	40	66	55	14	25	160	28.4%	17.4%	33.1%	29.3%	25.2%
410000	Sales and Related Occupations	15	6	5	7	33	200	207	48	151	605	7.4%	3.0%	10.1%	4.9%	5.5%
430000	Office and Administrative Support Occupations	9	7	5	3	24	199	190	62	114	564	4.5%	3.6%	7.4%	2.9%	4.2%
450000	Farming, Fishing, and Forestry Occupations	3	2	1	2	8	0	0	0	0	0					
470000	Construction and Extraction Occupations	66	24	15	5	110	64	28	7	10	109	102.2%	88.5%	214.0%	48.5%	100.9%
490000	Installation, Maintenance, and Repair Occupations	82	35	21	5	143	60	28	11	8	106	138.0%	127.2%	197.3%	65.5%	135.8%
510000	Production Occupations	61	20	14	4	99	68	32	10	12	121	90.4%	62.2%	142.7%	37.9%	82.1%
530000	Transportation and Material Moving Occupations	4	2	1	0	6	151	71	17	21	259	2.4%	2.7%	3.5%	0.9%	2.5%
TOTAL	ALL OCCUPATIONS	598	298	232	251	1,379	1,269	1,094	376	885	3,624	47.1%	27.2%	61.7%	28.4%	38.1%

APPENDIX D

GREATER NEW BEDFORD WORKFORCE INVESTMENT AREA

SOC	Title	SUPPLY					OPENINGS					SUPPLY AS PERCENT OF OPENINGS				
		High School	Some college	Associates degree	BA	Total	High School	College	Associates degree	BA	Total	High School	Some college	Associates degree	BA	Total
110000	Management Occupations	29	11	8	23	71	10	13	6	27	56	281.8%	83.0%	148.7%	85.5%	128.0%
130000	Business and Financial Operations Occupations	11	4	3	7	25	4	5	3	22	34	289.9%	83.9%	76.4%	34.1%	74.2%
150000	Computer and Mathematical Occupations	20	12	8	21	61	0	1	1	1	3	3949.1%	1292.6%	1451.4%	1396.3%	1739.1%
170000	Architecture and Engineering Occupations	30	23	23	21	97	1	2	1	8	11	4262.9%	1404.4%	1767.1%	277.2%	858.9%
190000	Life, Physical, and Social Science Occupations	2	1	0	2	6	0	0	0	0	0		6104.0%		1097.3%	2842.8%
210000	Community and Social Service Occupations	2	1	1	1	5	7	11	6	21	45	29.2%	12.8%	10.7%	5.8%	11.7%
230000	Legal Occupations	0	0	0	0	1	0	0	0	0	0	7450.8%	691.0%	1065.2%	404.0%	799.2%
250000	Education, Training, and Library Occupations	21	12	9	16	58	13	19	9	44	84	165.3%	62.2%	94.7%	37.7%	68.6%
270000	Arts, Design, Entertainment, Sports, and Media Occupations	14	8	5	11	38	1	2	0	3	7	1333.2%	388.4%	1025.6%	336.5%	549.7%
290000	Healthcare Practitioners and Technical Occupations	13	11	30	13	66	13	36	39	60	148	99.2%	29.1%	77.3%	21.1%	44.8%
310000	Healthcare Support Occupations	13	13	10	2	38	44	41	16	13	114	30.2%	32.5%	59.7%	16.4%	33.7%
330000	Protective Service Occupations	11	7	7	6	31	10	17	6	12	44	105.8%	39.0%	122.2%	55.7%	69.7%
350000	Food Preparation and Serving Related Occupations	33	14	5	4	56	125	79	18	29	251	26.4%	17.3%	29.9%	12.5%	22.2%
370000	Building and Grounds Cleaning and Maintenance Occupations	2	1	0	0	3	32	13	3	5	54	6.2%	5.3%	7.3%	1.8%	5.6%
390000	Personal Care and Service Occupations	19	7	3	1	31	41	35	9	15	100	46.9%	19.6%	37.0%	7.5%	30.6%
410000	Sales and Related Occupations	7	4	3	3	17	93	93	20	53	259	7.3%	3.9%	13.9%	6.4%	6.4%
430000	Office and Administrative Support Occupations	8	6	4	3	21	109	104	37	68	318	7.5%	6.1%	11.1%	4.0%	6.7%
450000	Farming, Fishing, and Forestry Occupations	0	0	0	0	0	0	0	0	0	0					
470000	Construction and Extraction Occupations	40	14	8	3	64	32	14	3	5	55	121.9%	101.8%	237.1%	51.0%	117.2%
490000	Installation, Maintenance, and Repair Occupations	46	20	10	3	79	27	12	5	4	48	167.7%	161.7%	226.9%	72.5%	164.5%
510000	Production Occupations	41	13	8	3	65	51	22	7	6	85	80.6%	58.8%	120.1%	55.7%	76.5%
530000	Transportation and Material Moving Occupations	4	2	1	0	7	54	23	6	7	90	7.1%	8.0%	12.1%	4.6%	7.5%
TOTAL	ALL OCCUPATIONS	366	183	147	145	840	668	542	195	402	1,807	54.8%	33.7%	75.4%	36.1%	46.5%

APPENDIX D

CAPE & ISLANDS WORKFORCE INVESTMENT AREA

SOC	Title	SUPPLY					OPENINGS					SUPPLY AS PERCENT OF OPENINGS				
		High School	Some college	Associates degree	BA	Total	High School	Some College	Associates degree	BA	Total	High School	Some college	Associates degree	BA	Total
110000	Management Occupations	11	3	3	6	23	19	24	11	50	104	56.6%	13.0%	26.0%	12.2%	21.9%
130000	Business and Financial Operations Occupations	1	0	0	0	2	10	13	8	47	78	8.3%	1.5%	1.7%	0.9%	2.1%
150000	Computer and Mathematical Occupations	11	4	3	5	24	1	3	1	7	12	994.8%	129.8%	250.5%	75.4%	189.8%
170000	Architecture and Engineering Occupations	13	4	4	9	31	1	4	1	10	16	952.8%	112.6%	403.2%	92.6%	195.4%
190000	Life, Physical, and Social Science Occupations	3	1	1	3	8	0	0	1	13	14	2208.1%	299.0%	86.3%	24.0%	60.7%
210000	Community and Social Service Occupations	2	1	1	1	5	7	12	7	24	49	32.5%	9.6%	7.5%	4.3%	9.8%
230000	Legal Occupations	0	0	0	0	0	1	1	1	3	6	1.0%	0.1%	0.2%	0.3%	0.3%
250000	Education, Training, and Library Occupations	18	8	6	11	43	15	23	10	48	97	121.2%	33.2%	55.4%	23.7%	44.5%
270000	Arts, Design, Entertainment, Sports, and Media Occupations	2	0	0	1	3	2	6	1	15	24	73.4%	7.4%	37.2%	3.5%	12.6%
290000	Healthcare Practitioners and Technical Occupations	9	5	13	6	32	13	36	41	64	155	66.1%	14.1%	30.9%	9.1%	20.9%
310000	Healthcare Support Occupations	11	6	4	1	23	49	45	15	13	122	23.5%	13.2%	29.3%	9.7%	18.9%
330000	Protective Service Occupations	0	0	0	0	1	18	25	13	22	78	1.1%	0.4%	0.7%	0.6%	0.7%
350000	Food Preparation and Serving Related Occupations	28	10	5	4	47	271	218	43	81	612	10.4%	4.6%	12.4%	4.7%	7.7%
370000	Building and Grounds Cleaning and Maintenance Occupations	19	7	4	2	33	88	41	11	17	157	21.9%	17.2%	38.0%	13.6%	20.9%
390000	Personal Care and Service Occupations	9	3	1	0	14	69	66	14	27	176	13.7%	3.8%	9.8%	1.5%	7.8%
410000	Sales and Related Occupations	1	0	1	1	3	150	152	34	98	434	0.9%	0.2%	1.5%	1.0%	0.7%
430000	Office and Administrative Support Occupations	7	4	2	2	15	153	159	55	100	467	4.8%	2.3%	4.3%	1.7%	3.2%
450000	Farming, Fishing, and Forestry Occupations	0	0	0	0	1	0	0	0	0	0					
470000	Construction and Extraction Occupations	16	4	3	1	24	88	38	9	15	150	18.2%	11.4%	32.3%	7.1%	16.3%
490000	Installation, Maintenance, and Repair Occupations	35	10	7	2	53	53	26	9	7	95	65.6%	37.9%	78.0%	22.2%	55.8%
510000	Production Occupations	6	2	1	0	9	11	4	1	2	18	57.9%	42.4%	97.7%	15.9%	52.8%
530000	Transportation and Material Moving Occupations	2	1	0	0	4	64	34	8	14	120	3.7%	3.3%	2.8%	1.7%	3.3%
TOTAL	ALL OCCUPATIONS	208	73	60	56	398	1,083	931	295	676	2,984	19.2%	7.9%	20.4%	8.3%	13.3%

REFERENCES & ENDNOTES

REFERENCES

- Projections of employment and job openings, 2012-2022, statewide and by Workforce Investment Area (*U.S. Bureau of Labor Statistics*) (675 detailed occupations, 16 WIA's)
- Educational attainment by occupation, 2010-2013 (*American Community Survey, U.S. Census Bureau*) (479 occupations)
- Senior enrollment by school and vocational education program (2013-14) (*Massachusetts Department of Elementary and Secondary Education*)
- The search tool of O*NET (ononline.org) to build the alignment of vocational education programs to occupations. (*U.S. Department of Labor, Employment & Training Administration*)
- Higher education attendance of seniors, by school district (2011-2012) (*Massachusetts Department of Elementary and Secondary Education*)
- 6-year completion rates for Massachusetts community and 4-year colleges (*Massachusetts Board of Higher Education*)
- U.S. Bureau of Statistics Projections Series
- Dukakis Center Survey of Public High School Administrators
- American Community Survey, U.S. Census Bureau
- Massachusetts Department of Elementary and Secondary Education, "Chapter 74 Vocational Technical Education: Program Directory," November 2014.

ENDNOTES

1. U.S. Department of Labor, Bureau of Labor Statistics, Employment Statistics for States and Local Areas, <http://data.bls.gov/cgi-bin/surveymost>.
2. See Barry Bluestone, et.al., *Staying Power II: A Report Card on Manufacturing in Massachusetts 2012* (*Dukakis Center for Urban and Regional Policy, September 2012*).
3. Data on the distribution of education for the current Massachusetts workforce is derived from the U.S. Census Bureau's American Community Survey for Massachusetts from 2010-2013.

For more information on the
Massachusetts School Building Authority,
please visit <http://www.MassSchoolBuildings.org>