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Labor Market Analysis

Computer Graphics



Prepared by Central Valley/Mother Lode Center of Excellence



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Summary

The Central Valley/Mother Lode Center of Excellence developed this report for Modesto Junior College to determine whether there is demand in the local labor market that is not being met by the supply from postsecondary programs. This report summarizes labor market demand, wages, skills, and postsecondary supply for *Computer Graphics*, which includes:

- Web and Digital Interface Designers (SOC 15-1255)
- Special Effects Artists and Animators (SOC 27-1014)
- Graphic Designers (SOC 27-1024)
- Prepress Technicians and Workers (SOC 51-5111)

Key Findings

- **Occupational Demand** — Occupations related to *Computer Graphics* have a labor market demand of 122 annual job openings in the North Central Valley/Northern Mother Lode (NCV/NML) subregion. Between 2022 and 2027, graphic designers are projected to have the most demand with 321 annual job openings with a growth projection of 4%.
- **Wages** — Average entry-level earnings of \$21.81/hour for *Computer Graphics* occupations are higher than the living wage in the NCV/NML subregion, which is \$12.65/hour for a single adult.¹ Special effects artists and animators earn the highest entry-level wage, \$25.27/hour.
- **Employers and Occupational Titles** — Employers in the NCV/NML subregion include Creative Circle, Total Wine & More, and Vineyard Vines. The most common job title is graphic designers.
- **Skills and Certifications** — The top baseline skill is communication, the top specialized skill is graphic design, and the top software skill is Adobe Photoshop. The most in-demand certification is an English Learner Authorization.
- **Education** — A postsecondary nondegree is typically required for prepress technicians and workers. A bachelor's degree is typically required for the remaining three occupations contained in this report.
- **Supply and Demand Analysis** — An analysis of supply and demand revealed that there are 122 annual openings (i.e., demand) and zero average annual postsecondary degrees awarded (i.e., supply) in the NCV/NML subregion. This suggests an undersupply of 122 workers. In the CVML region, there are 274 annual openings and two awards were conferred suggesting an undersupply of 272 workers.

Recommendation

Based on a comparison of demand and supply, there is an undersupply of trained workers in the NCV/NML subregion and the CVML region. The Center of Excellence recommends that Modesto Junior College work with the regional directors, the college's advisory board, and local industry in the development of programs to address the shortage of *Computer Graphics* workers.

¹ The term "living wage" in Center of Excellence reports is calculated by averaging the self-sufficiency wages from the Insight Center's California Family Needs Calculator for each county in the subregion: <https://insightccd.org/tools-metrics/self-sufficiency-standard-tool-for-california/>.

Introduction

The Central Valley/Mother Lode Center of Excellence developed this report to provide Modesto Junior College with labor market information for *Computer Graphics*. The geographical focus for this report is the North Central Valley/Northern Mother Lode (NCV/NML) subregion, but regional demand and supply data has been included for broader applicability and use. Analysis of the program and occupational data related to *Computer Graphics* is included in the report. The Standard Occupational Classification (SOC) System codes and occupational titles used in this report from the Bureau of Labor Statistics and O*NET OnLine are shown below.

Web and Digital Interface Designers (SOC 15-1255)

- **Job Description:** Design digital user interfaces or websites. Develop and test layouts, interfaces, functionality, and navigation menus to ensure compatibility and usability across browsers or devices. May use web framework applications as well as client-side code and processes. May evaluate web design following web and accessibility standards, and may analyze web use metrics and optimize websites for marketability and search engine ranking. May design and test interfaces that facilitate the human-computer interaction and maximize the usability of digital devices, websites, and software with a focus on aesthetics and design. May create graphics used in websites and manage website content and links.
- **Knowledge:** N/A
- **Skills:** N/A

Special Effects Artists and Animators (SOC 27-1014)

- **Job Description:** Create special effects or animations using film, video, computers, or other electronic tools and media for use in products, such as computer games, movies, music videos, and commercials.
- **Knowledge:** Computers and Electronics, English Language, Design, Communications and Media, Customer and Personal Service
- **Skills:** Active Listening, Critical Thinking, Reading Comprehension, Speaking, Active Learning

Graphic Designers (SOC 27-1024)

- **Job Description:** Design or create graphics to meet specific commercial or promotional needs, such as packaging, displays, or logos. May use a variety of mediums to achieve artistic or decorative effects.
- **Knowledge:** Design, Computers and Electronics, Fine Arts, Communications and Media, English Language
- **Skills:** Active Listening, Speaking, Active Learning, Critical Thinking, Writing

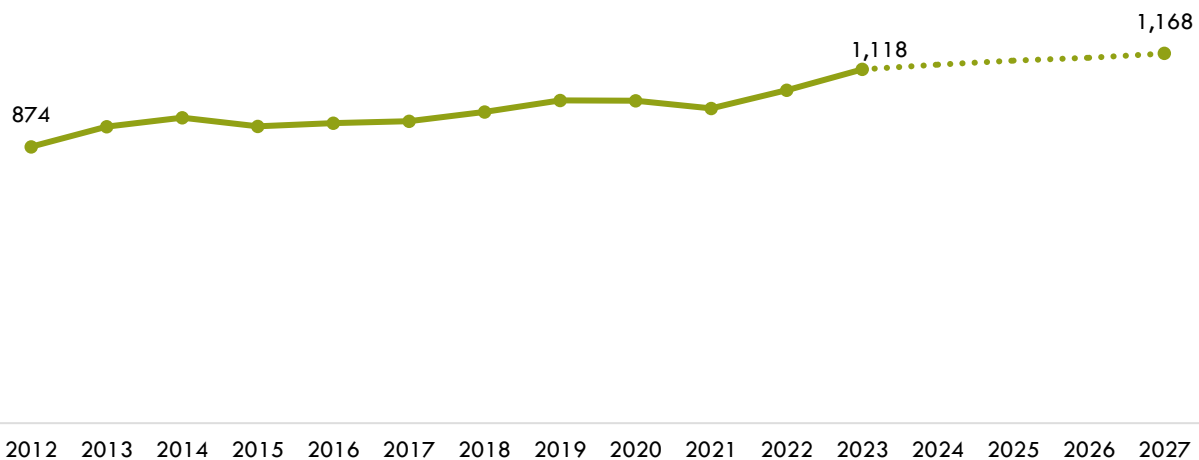
Prepress Technicians and Workers (SOC 51-5111)

- **Job Description:** Format and proof text and images submitted by designers and clients into finished pages that can be printed. Includes digital and photo typesetting. May produce printing plates.
- **Knowledge:** Computers and Electronics, English Language, Design, Mathematics, Production and Processing
- **Skills:** Active Listening, Critical Thinking, Monitoring, Speaking, Time Management

Employment

Exhibit 1a shows trends for *Computer Graphics* in the NCV/NML subregion. Between 2022 to 2027, the number of jobs for occupations related to *Computer Graphics* is projected to increase by 50, a growth rate of 4%.

Exhibit 1a. Historical employment and projected occupational demand for occupations related to *Computer Graphics* in the NCV/NML subregion, 2012-2027



Occupations related to *Computer Graphics* in the NCV/NML subregion employed 1,118 workers in 2022 (Exhibit 1b). Graphic designers are the largest occupation with a projection of 64 annual openings.

Exhibit 1b. Current employment and projected occupational demand for occupations related to *Computer Graphics* in the NCV/NML subregion, 2022-2027

Occupation	2022 Jobs	2027 Jobs	5-Year Change	5-Year % Change	Annual Openings
Graphic Designers	618	645	28	4%	64
Web and Digital Interface Designers	258	288	31	12%	29
Special Effects Artists and Animators	161	168	7	4%	19
Prepress Technicians and Workers	81	66	(15)	(19%)	10
TOTAL	1,118	1,168	50	4%	122

Wages

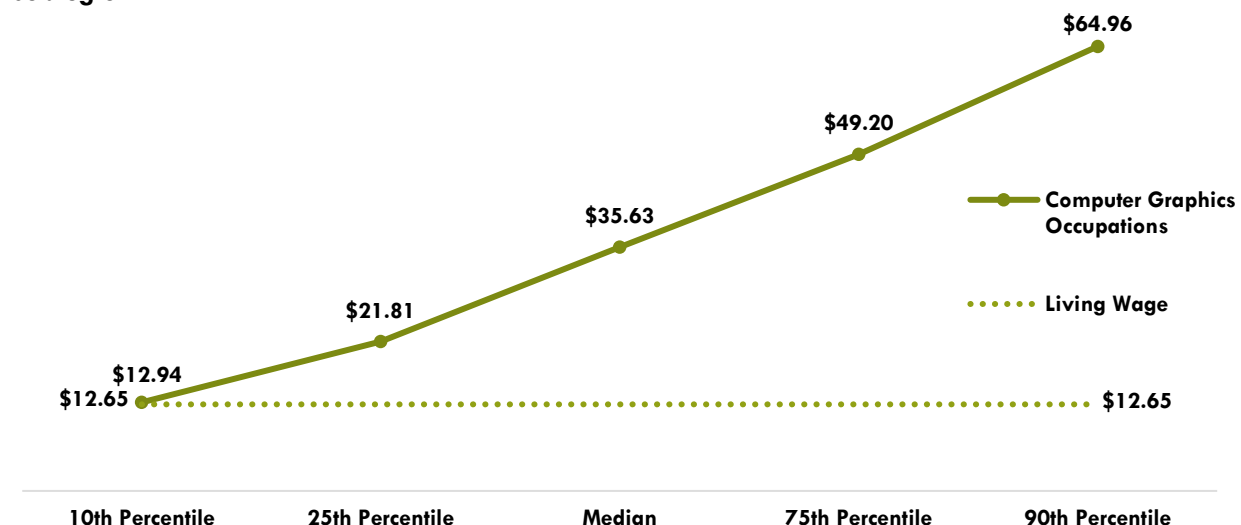
The average living wage for a single adult in the NCV/NML subregion is \$12.65/hour.² Exhibit 2a shows the highest entry-level hourly wages are for special effects artists and animators, a *Computer Graphics Occupation*, which has an entry-level wage of \$25.27/hour.³

Exhibit 2a. Hourly wages for occupations related to *Computer Graphics* in the NCV/NML subregion

Occupation	25 th Percentile Hourly Earnings	Median Hourly Earnings	75 th Percentile Hourly Earnings
Special Effects Artists and Animators	\$25.27	\$59.40	\$75.77
Web and Digital Interface Designers	\$24.94	\$37.80	\$59.33
Graphic Designers	\$20.08	\$26.84	\$37.88
Prepress Technicians and Workers	\$16.95	\$18.49	\$23.82

Exhibit 2b shows the average hourly wages for *Computer Graphics* occupations, which have an average entry-level wage that is more than the living wage for the NCV/NML subregion.

Exhibit 2b. Average hourly wages for occupations related to *Computer Graphics* in the NCV/NML subregion



² The term "living wage" in Center of Excellence reports is calculated by averaging the self-sufficiency wages from the Insight Center's California Family Needs Calculator for each county in the subregion: <https://insightccd.org/tools-metrics/self-sufficiency-standard-tool-for-california/>.

³ Note: 10th and 25th percentiles are considered entry-level wages while 75th and 90th are considered experienced wages, which may be obtained through long-term employment or extra training, etc.

Job Postings

There were 226 unique job postings for occupations related to *Computer Graphics* in the NCV/NML subregion from April 2023 to September 2023.⁴

Top Employers

The top employers with the most job postings are listed in Exhibit 3. The top employers in online job postings were Creative Circle, Total Wine & More, and Vineyard Vines.

Exhibit 3. Top employers of *Computer Graphics* in job postings

Employer
Creative Circle
Total Wine & More
Vineyard Vines
CompHealth
PayPal
Kagome Co., LTD
CMYK Print & Promotions
Bradley & Hammond
University of the Pacific
Google

Top Job Titles

Exhibit 4 shows the most common job titles for *Computer Graphics* in the NCV/NML subregion.

Exhibit 4. Top job titles in job postings for *Computer Graphics*

Job Title
Graphic Designers
Content Creators
Prepress Technicians

⁴ Other than occupational titles and job titles, the categories below can be counted one or multiple times per job posting, and across several areas in a single posting. For example, a skill can be counted in two different skill types, and an employer can indicate more than one education level.

Salaries

Exhibit 5 shows the “Market Salaries” for *Computer Graphics*. These are calculated by Lightcast using a machine learning model built from millions of job postings every year. This accounts for adjustments based on location, industry, skills, experience, education, among other variables.

Exhibit 5. Market salaries for Computer Graphics

Market Salary	Job Postings
\$57,000-\$63,999	12
\$64,000-\$70,999	7
\$50,000-\$56,999	6
\$71,000-\$77,999	5
\$78,000-\$84,999	5

Education

Of the 226 unique job postings, 34 listed a preferred or minimum educational requirement for the position being filled. Among those, 47% requested a bachelor’s degree, 26% requested a high school diploma or GED, and 21% requested an associate degree (Exhibit 6).

Exhibit 6. Education levels requested in job postings for Computer Graphics

Education Level	Job Postings	% of Job Postings
Bachelor's degree	16	47%
High school or GED	9	26%
Associate degree	7	21%
Master's degree	1	3%
Ph.D. or professional degree	1	3%

Baseline, Specialized, and Software Skills

Exhibit 7 depicts the top baseline, specialized, and software skills in job postings. The most commonly requested baseline skill is communication. The most commonly requested specialized skill is project graphic design. The most commonly requested software skill is Adobe Photoshop.

Exhibit 7. In-demand baseline, specialized, and software skills for Computer Graphics in job postings

Baseline Skills	Specialized Skills	Software Skills
Communication	Graphic Design	Adobe Photoshop
Problem Solving	Adobe Photoshop	Adobe Illustrator
Writing	Marketing	Adobe Creative Suite
Detail Oriented	Adobe Illustrator	Adobe After Effects
Organizational Skills	Adobe Creative Suite	Adobe InDesign

Certifications

Of the 226 job postings, there were five certifications listed. Among those, 29% indicated a need for a Board Certified/Board Eligible Certification. The next top certification is and English Learner Authorization (Exhibit 8).

Exhibit 8. Top Computer Graphics certifications requested in job postings

Certifications	% of Job Postings
American Production and Inventory Control Society (APICS) Certification	29%
English Learner Authorization	14%

Education, Work Experience, & Training

A postsecondary nondegree is typically required for prepress technicians and workers. A bachelor's degree is typically required for the remaining three occupations studied in this report (Exhibit 9).

Exhibit 9. Education, work experience, training, and Current Population Survey results for occupations related to Computer Graphics⁵

Occupation	Typical Entry-level Education	Work Experience Required	Typical On-The-Job Training	CPS
Graphic Designers	Bachelor's degree	None	None	26.5%
Web and Digital Interface Designers	Bachelor's degree	None	None	23.4%
Special Effects Artists and Animators	Bachelor's degree	None	None	27.7%
Prepress Technicians and Workers	Postsecondary nondegree award	None	None	38.2%

⁵ "Labor Force Statistics from the Current Population Survey," Bureau of Labor Statistics, <https://www.bls.gov/cps/>.

Supply

An analysis of program data from the Integrated Postsecondary Education Data System (IPEDS) for the last three program years shows that, on average, zero awards were conferred in the NCV/NML subregion (Exhibits 10 and 11).

Exhibit 10. TOP and CIP codes for Computer Graphics

TOP Titles	CIP Titles
	09.0702 - Digital Communication and Media/Multimedia.
0614.00 - Digital Media	10.0303 - Prepress/Desktop Publishing and Digital Imaging Design.
	50.0102 - Digital Arts.

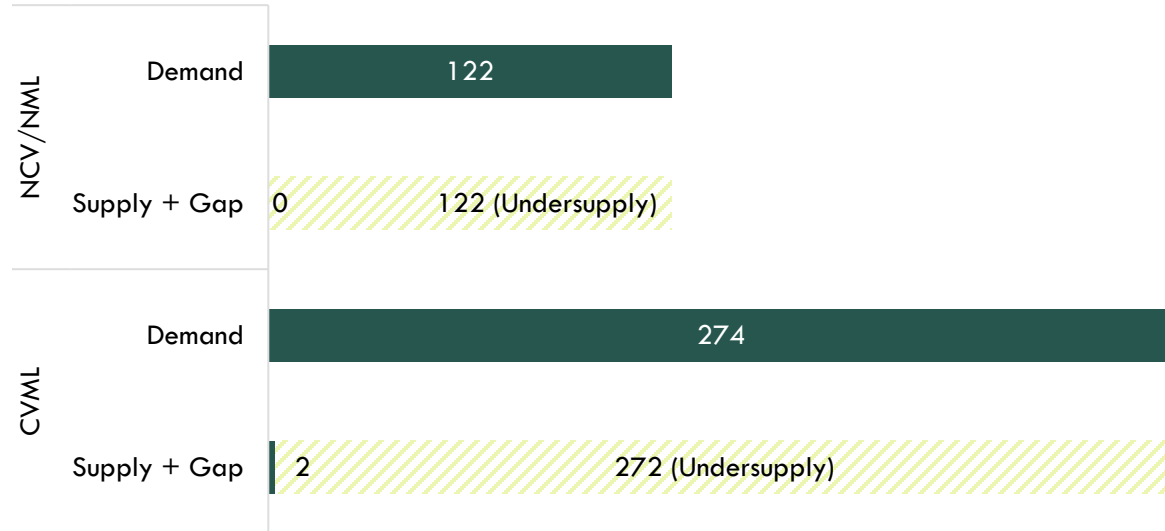
Exhibit 11. Postsecondary supply for Computer Graphics for Program Years 2019-20 through 2021-22

TOP/ CIP Code- Title	College	Certificate 30 < 60 Semester Units	Total
0614.00 - Digital Media	Cerro Coso	2	2
NCV/NML TOTAL		0	0
CVML TOTAL		2	2

*NCV/NML awards

There is an undersupply of 122 *Computer Graphics* workers in the NCV/NML subregion and an undersupply of 272 workers in the region (Exhibit 12).

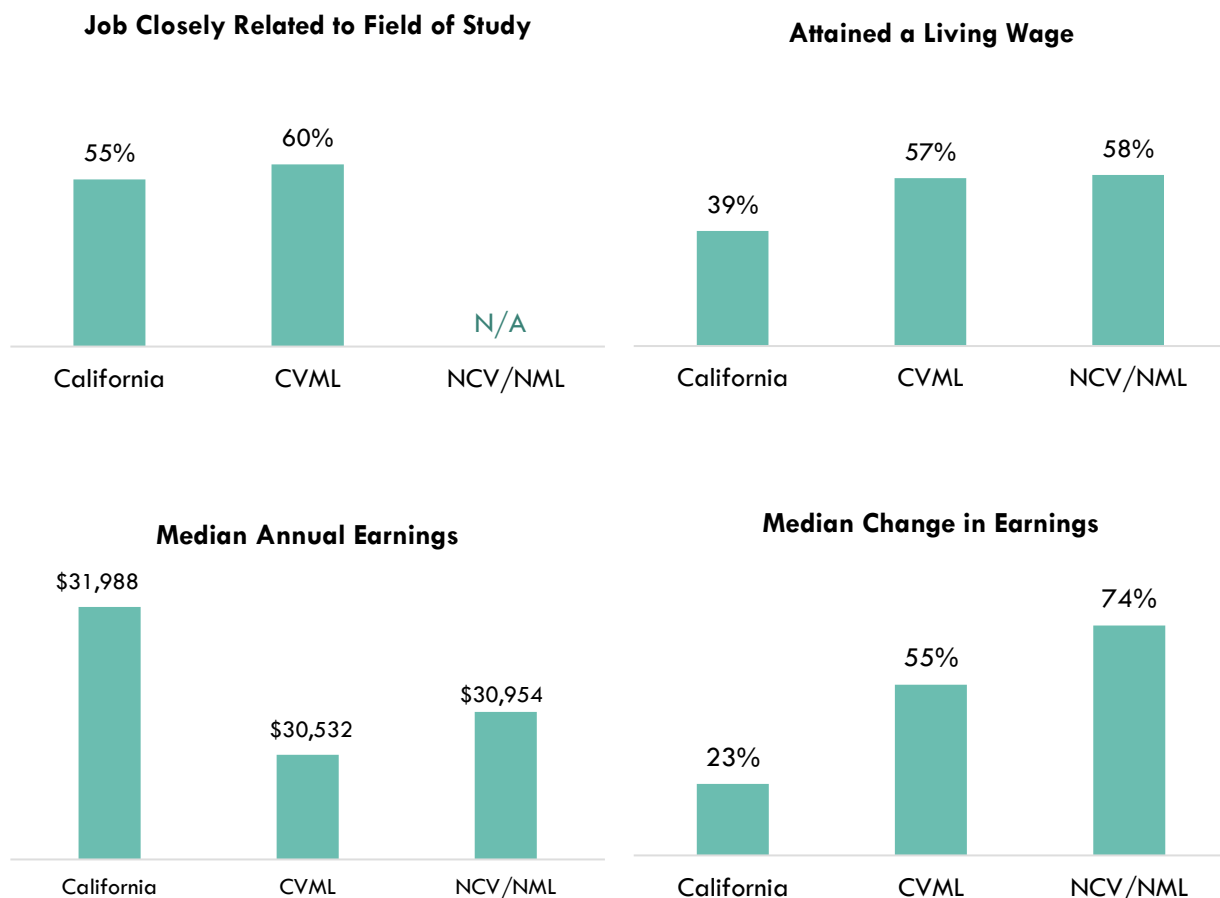
Exhibit 12. *Computer Graphics* workforce demand (annual job openings), postsecondary awards (supply), and additional students needed to fill gap in the NCV/NML subregion and region



Student Outcomes

Exhibits 13 summarize outcomes from California Community College Chancellor's LaunchBoard for TOP codes related to *Computer Graphics*. Notably, 60% of students obtained a job closely related to their field of study in the region, and 58% of students attained a living wage in the subregion.

Exhibit 13. LaunchBoard Metrics for TOP 0614.00 - Digital Media in California, CVML region, and NCV/NML subregion



Recommendation

This report suggests there is a shortage of 122 workers in the NCV/NML subregion and a shortage of 272 workers in the CVML region for *Computer Graphics*. Based on these findings, it is recommended that Modesto Junior College work with the regional directors, the college's advisory board, and local industry in the development of programs to address the shortage of *Computer Graphics* workers in the region.

Appendix: Methodology & Data Sources

Data Sources

Labor market and educational supply data compiled in this report derive from a variety of sources. Data were drawn from external sources, including the Economic Modeling Specialists, Inc., the California Community Colleges Chancellor's Office Management Information Systems Data Mart and the National Center for Educational Statistics (NCES) Integrated Postsecondary Education Data System (IPEDS). Below is the summary of the data sources found in this study.

Data Type	Source
Labor Market Information/Population Estimates and Projections/Educational Attainment	Economic Modeling Specialists, Intl. (Lightcast). Lightcast occupational employment data are based on final Lightcast industry data and final Lightcast staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates also affected by county-level Lightcast earnings by industry: economicmodeling.com.
Typical Education Level and On-the-job Training	Bureau of Labor Statistics (BLS) uses a system to assign categories for entry-level education and typical on-the-job training to each occupation for which BLS publishes projections data: https://www.bls.gov/emp/tables/educational-attainment.htm .
LaunchBoard	Chancellor's LaunchBoard. https://www.calpassplus.org/LaunchBoard/SWP.aspx
Labor Force, Employment and Unemployment Estimates	California Employment Development Department, Labor Market Information Division: labormarketinfo.edd.ca.gov .
Job Posting and Skills Data	Lightcast: https://lightcast.io/ .
Additional Education Requirements/Employer Preferences	The O*NET Job Zone database includes over 900 as well as information on skills, abilities, knowledge, work activities and interests associated with specific occupations: onetonline.org .

Key Terms and Concepts

Annual Job Openings: Annual openings are calculated by dividing the number of years in the projection period by total job openings.

Education Attainment Level: The highest education attainment level of workers age 25 years or older.

Employment Estimate: The total number of workers currently employed.

Employment Projections: Projections of employment are calculated by a proprietary Economic Modeling Specialists, Intl. (LIGHTCAST) formula that includes historical employment and economic indicators along with national, state and local trends.

LaunchBoard (Attained the Living Wage): Among SWP students who exited college and did not transfer to any postsecondary institution, the proportion who attained the district county living wage for a single adult measured immediately following academic year of exit

LaunchBoard (Median Annual Earnings): Among SWP students who exited the community college system and who did not transfer to any postsecondary institution, median earnings following the academic year of exit.

LaunchBoard (Median Change in Earnings): Among SWP students who exited and who did not transfer to any postsecondary institution, median change in earnings between the second quarter prior to the beginning of the academic year of entry and the second quarter after the end of the academic year of exit from the last college attended.

LaunchBoard (Job Closely Related to Field of Study): Among SWP students who responded to the CTE Outcomes Survey and did not transfer to any postsecondary institution, the proportion who reported that they are working in a job very closely or closely related to their field of study.

Living Wage: The cost of living in a specific community or region for one adult and no children. The cost increases with the addition of children.

Occupation: An occupation is a grouping of job titles that have a similar set of activities or tasks that employees perform.

Percent Change: Rate of growth or decline in the occupation for the projected period; this does not factor in replacement openings.

Replacements: Estimate of job openings resulting from workers retiring or otherwise permanently leaving an occupation. Workers entering an occupation often need training. These replacement needs, added to job openings due to growth, may be used to assess the minimum number of workers who will need to be trained for an occupation.

Total Job Openings (New + Replacements): Sum of projected growth (new jobs) and replacement needs. When an occupation is expected to lose jobs, or retain the current employment level, number of openings will equal replacements.

Typical Education Requirement: represents the typical education level most workers need to enter an occupation.

Typical On-The-Job Training: indicates the typical on-the-job training needed to attain competency in the skills needed in the occupation.