THE CONDITION OF CAREER PATHWAY READINESS IN THE UNITED STATES 2019

ACT POLICY & RESEARCH

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The Condition of Career Pathway Readiness in the United States

Executive Summary

- Achieving a score of Level 5 or higher on each of the three WorkKeys NCRC assessments is associated with being qualified for almost all jobs in the US.
- Overall average wages for jobs in the US increase with higher foundational skill levels.
- For examinees who took the three ACT® WorkKeys® National Career Readiness Certificate® (NCRC®) assessments (Workplace Documents, Applied Math, and Graphic Literacy) between June 2017 and July 2019, NCRC attainment levels generally increased with level of education.
- Individuals who tested in high school or who had a low education level were less likely to qualify for an NCRC compared to examinees with a middle or high level of education.
- Of the 16 Career and Technical Education (CTE) career clusters, half do not include occupations that span the full range of educational levels (low, middle, and high) required for entry. Seven CTE clusters (Business Management, Education & Training, Finance, Government, Hospitality & Tourism, Information Technology, and Marketing) have zero to four occupations requiring mid-level educational attainment for entry. The Hospitality & Tourism cluster has only two occupations that require a high level of education, and two clusters (Information Technology and STEM) have zero to two occupations that require a low level of education.
- For this report, career cluster benchmarks were estimated for 16 career clusters. A skills gap analysis was conducted by calculating the percentage of WorkKeys examinees who met the benchmarks for a career cluster, limiting the analyses to examinees whose educational attainment level was equal to the required educational level for entry.
- The gap analysis results indicate that level of educational attainment does not necessarily track with meeting or exceeding career pathway readiness skill benchmarks across career pathways for occupations that require a similar level of education for entry.
- Foundational skill gaps across all three career pathway readiness skill benchmarks were observed among examinees with a low level of educational attainment for occupations that required a similar level of education in five career clusters (Agriculture, Government, Human Services, Information Technology, and Marketing).
- For examinees with a middle level of educational attainment, skill gaps were found for occupations that required a similar level of education in three career clusters (Architecture & Construction; Information Technology; and Law, Public Safety, Corrections, & Security).
- Skill gaps among examinees with a high level of educational attainment for occupations that required a similar level of education were identified in eight career clusters (Agriculture; Architecture & Construction; Education & Training; Government; Human Services; Health Science; STEM; and Law, Public Safety, Corrections, & Security).

Overview

This report highlights the levels of career pathway readiness for various groups of ACT WorkKeys examinees in the US and provides career pathway readiness benchmarks for foundational skills by career cluster. This report is an update and expansion of *Career Readiness in the United States 2015*. Previous reports by ACT, such as *The Condition of Work Readiness in the United States* and *Career Readiness in the United States 2015*, presented skill readiness benchmarks at the occupational level, while others, such as *A Better Measure of Skills Gaps*, provided aggregate skill benchmarks by industry cluster.[1] In the *Condition of Work Readiness* and *Better Measure* reports, job profile data from the ACT® JobPro® database were used to determine skill readiness levels. Since 1993, ACT has conducted over 20,000 job analyses across a diverse array of industries and occupations.[2]

What Is Career Readiness?

The ACT Hierarchical Education and Workplace Readiness Framework, presented in the report *Ready for What? Development of a Hierarchical Framework Linking College Readiness and Career Readiness*, provides clarity about "readiness" and what it takes to be "ready" across the education-to-work landscape generally and for specific pathways.[3] The framework is flexible to address different use cases, each of which is supported by empirical evidence collected across various ACT education and workforce research studies and supplemented with O*NET data. The framework enables education and workforce stakeholders to better understand the differences and similarities between different types of readiness benchmarks and provides corresponding use cases to help inform national, state, and regional education and workforce policy.

The framework contains three tiers. The top tier is the most general and broadly applicable readiness use case in the workplace domain:

Career readiness is the knowledge, skills, abilities, and other characteristics (KSAOs) and level of KSAOs needed to succeed in a typical job at a typical organization.

In the middle tier of the framework, readiness information is provided at a finer degree of specificity for different career pathways:

Career pathway readiness is the knowledge, skills, abilities, and other characteristics (KSAOs) and level of KSAOs needed to succeed in a typical job within a career pathway.

The bottom tier of the framework includes readiness information at the most granular level for entry into a specific occupation:

Work readiness is the knowledge, skills, abilities, and other characteristics (KSAOs) and level of KSAOs needed to succeed in a specific job at a specific organization.

What are Career Pathways and Clusters?

Clustering industry or occupation data is a common strategy used by economic developers, workforce developers, and education/training providers to analyze and describe a national or regional economy in terms of employment and skills. Industry clusters are groups of similar and related businesses that share common markets, technologies, and worker skill needs, and which can be linked by buyer-seller relationships.[4]

Career clusters are groupings of occupations that are used by education/training providers to develop coursework, programs of study, and career navigation tools for students in both secondary and postsecondary education settings.[5]

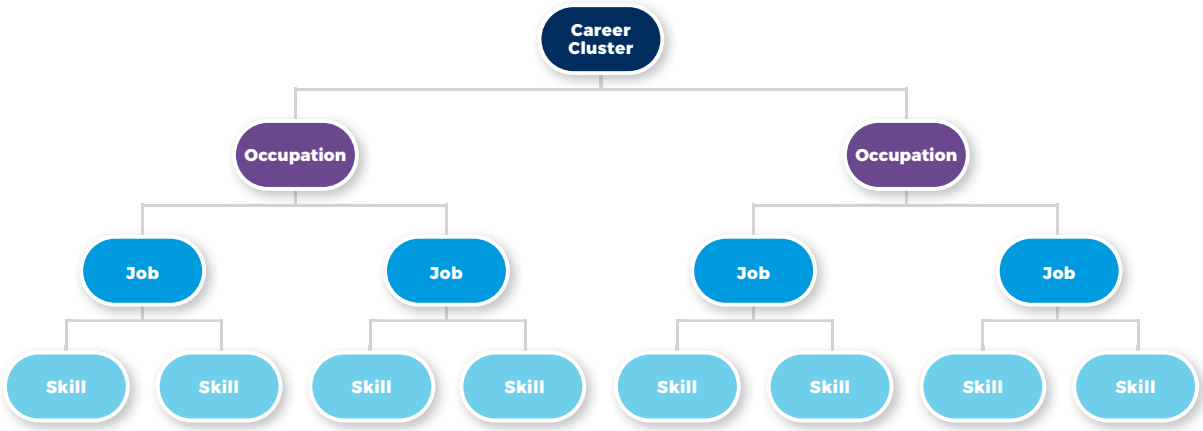
A career pathway is an integrated collection of workforce programs and services intended to develop students' core academic, technical and employability skills; provide them with continuous education and training; and place them in high-demand, high-opportunity jobs.[6]

Career pathways are used by workforce developers to understand the knowledge and skills of a national or local labor market and to bridge the gap between workforce availability and economic development capacity when constructing a regional economic development strategy. In this report career clusters, as defined by groupings of occupations (by O*NET code) from the CTE National Career Clusters® Framework, are used to understand readiness skills within the broader context of a career pathway.

Using Career Clusters to Understand Skill Needs

Skills and skill levels needed for individual jobs can be aggregated by occupational title or even more broadly by clusters of similar occupations (i.e., career clusters). Aggregated skill benchmarks for success in a specific career cluster can provide a more complete picture of the important factors needed by individuals to be prepared for success in the workforce and throughout their careers.

Aggregating Job Skills Data by Career Cluster



The skills and levels of proficiency needed can vary by career cluster and by level of educational attainment needed. The career readiness skills and performance benchmarks presented in this report focus on foundational cognitive skills and can be used by education/training providers to develop curricula and programs for individuals seeking to progress within a career cluster. Other constructs such as behavioral skills (e.g., work ethic), career navigation skills (e.g., interest-occupation fit), and other cross-cutting capabilities (e.g., critical thinking) are also needed for individual progression in a specific career cluster or occupation[7] but are not the focus of the current report.

Measuring Career Readiness in the United States

The following data represent WorkKeys examinees in the United States from June 2017 through July 2019. Examinee data are presented in aggregate form over this period. Data are presented for three WorkKeys assessments designed to measure cognitive skills: Workplace Documents, Applied Math, and Graphic Literacy. These assessments form the basis of the ACT WorkKeys National Career Readiness Certificate (NCRC). The skills measured by these assessments have been consistently identified as important for success in a broad range of jobs, making them "essential" foundational skills for career readiness.[8]

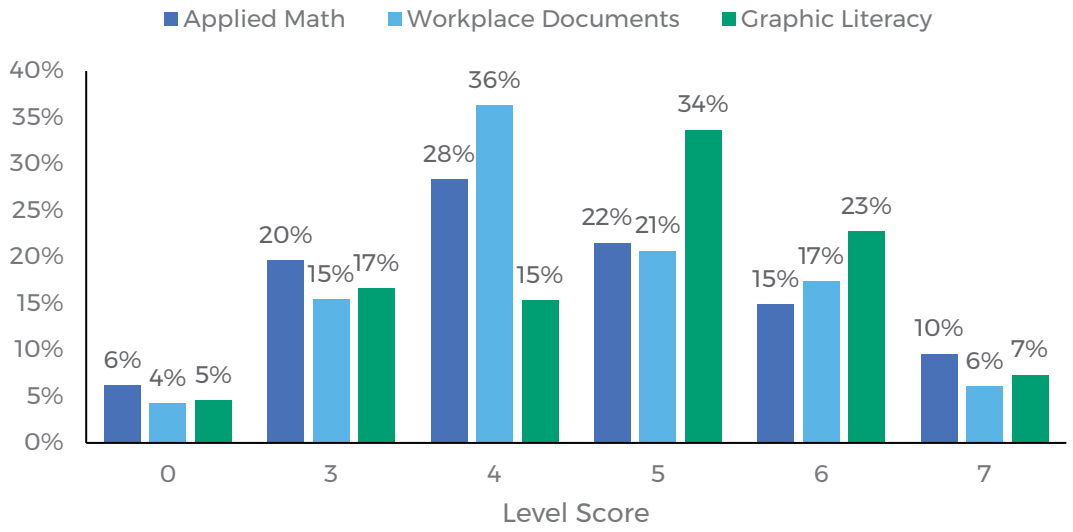
Benchmarks are provided for the three assessments, aggregating across all jobs in the US ("career readiness"), as well as for each of the 16 career clusters, which are segmented by high, middle, and low educational groupings. The grouping of occupations by education level shows the different skill levels needed for success in various levels of entry within each career pathway. Scores for each of the WorkKeys cognitive assessments are reported in "levels," ranging from a low score of 0 to a high score of 7.

In each skill area, Level 3 represents the perceived minimum level of proficiency that employers value for their jobs. Individuals scoring below a Level 3 are considered as not having the necessary level of skill for any job that requires that skill area. Scores for individuals who do not achieve the minimum (Level 3) are reported as 0. Ultimately, without the industry-specific knowledge necessary for an occupation or career pathway (usually gained through academic degrees, occupationally-specific licensures, and workforce certifications[9]), most individuals would not be considered fully qualified to enter a job or able to successfully perform job duties.

All Examinees

From June 2017 to July 2019 there were 895,374 unique examinees who took Applied Math, 904,141 who took Workplace Documents, and 879,773 who took Graphic Literacy. The distributions of level scores on the three WorkKeys assessments are shown in Figure 1.

Figure 1. Percentage of ACT WorkKeys Examinees Meeting WorkKeys Skill Levels



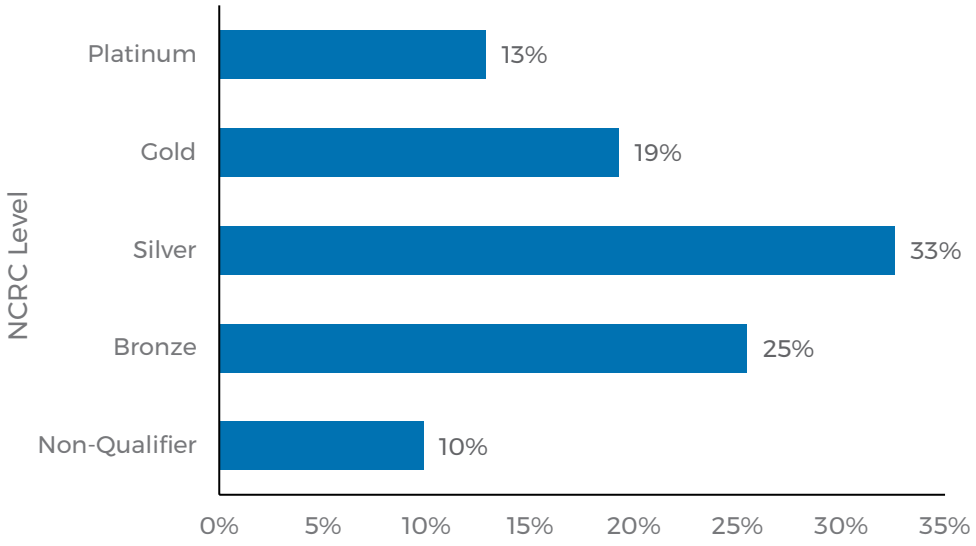
Note: In this report, totals may not sum to 100% due to rounding.

Level scores on different assessments are not directly comparable. For example, it cannot be said that Level 4 on Applied Math represents greater performance than Level 3 on Workplace Documents. That said, comparing the distributions of level scores on different assessments provides some indication of the standing of examinees relative to the levels of different skills required for success. For example, proportionally fewer examinees achieved the highest skill level for Graphic Literacy (7%) and Workplace Documents (6%) compared to Applied Math (10%).

However, those differences were much smaller in magnitude than the differences at other levels. For example, 64% of Graphic Literacy examinees achieved Level 5 or higher, whereas only 46% and 44% achieved Level 5 or higher on Applied Math and Workplace Documents, respectively. Note that the percentage of examinees with a given level score depends partly on the overall distribution of scores (i.e., scale scores on each WorkKeys assessment, which range from 65–90) and partly on the cut scores for each level of each assessment, which were established through a standard-setting procedure with content experts.[10]

An examinee's NCRC level is determined by the lowest score an individual achieved among Applied Math, Workplace Documents, and Graphic Literacy. Achieving a minimum score of Level 3 across the three assessments qualifies an individual for a Bronze NCRC; a minimum score of Level 4 qualifies for a Silver NCRC; a minimum score of Level 5 qualifies for a Gold NCRC; and a minimum score of Level 6 qualifies for a Platinum NCRC. An individual who took all three assessments and failed to achieve a minimum score of Level 3 on one or more of the three assessments would be considered an NCRC non-qualifier.

Figure 2. Percentage of ACT WorkKeys Examinees Earning NCRC Levels



There were 848,778 examinees who took all three WorkKeys NCRC assessments between June 2017 and July 2019. Of these examinees, 65% (n = 549,156) qualified for the NCRC at a Silver level or higher; 10% (n = 83,543) did not qualify for the NCRC (Figure 2). Thirteen percent (n = 109,123) of examinees qualified for a Platinum level NCRC.

WorkKeys Performance by Education Group

Segmenting examinees by their highest level of education provides additional insight about trends in career readiness skills. Students who took WorkKeys during high school were separated from the rest of the examinee population. The reasons for this were twofold: to allow for comparisons between high school and non-high school WorkKeys examinees, and to recognize that, although the high school testers technically had a "low" education level, many of them would ultimately achieve higher education levels.

Non-high school WorkKeys examinees were grouped by low, middle, and high education.[11] Low education examinees are those who have not completed any formal training beyond high school; middle education examinees are those who have completed at least one but fewer than four years of formal training beyond high school (e.g., associate degree or postsecondary non-degree award); and high education examinees are those who have completed four years or more of formal training beyond high school (e.g., bachelor's, master's, doctoral, or professional degree).

For examinees who took the three WorkKeys NCRC assessments between June 2017 and July 2019, the level of career readiness skills generally increased with level of education. This is apparent from the fact that examinees with a high education level were most likely to achieve Levels 6 and 7, and examinees with a low education level were most likely to achieve Levels 3 and 4 (Figures 3, 4, and 5).

High school examinees tended to achieve higher level scores than non-high school examinees with low education levels, particularly on Applied Math and Graphic Literacy. The level score distributions were similar for Workplace Documents. This finding is consistent with the notion that the high school examinees include high-ability individuals despite their current "low" education level. Non-high school examinees with middle or high education levels tended to achieve higher level scores than the high school examinees on all three tests.

It is important to note that each education group included examinees spanning the range of WorkKeys level scores. Thus, although education level is associated with achievement on WorkKeys, it is not the sole determinant of foundational workplace skills. Adults with only a high school education can still demonstrate high levels of competency in the skills measured by Applied Math, Workplace Documents, and Graphic Literacy. Conversely, adults with a bachelor's degree or higher may still exhibit deficiencies on the skills measured by the NCRC assessments.

Figure 3. Percentage of ACT WorkKeys Examinees Meeting WorkKeys Skill Levels by Education Group — Applied Math

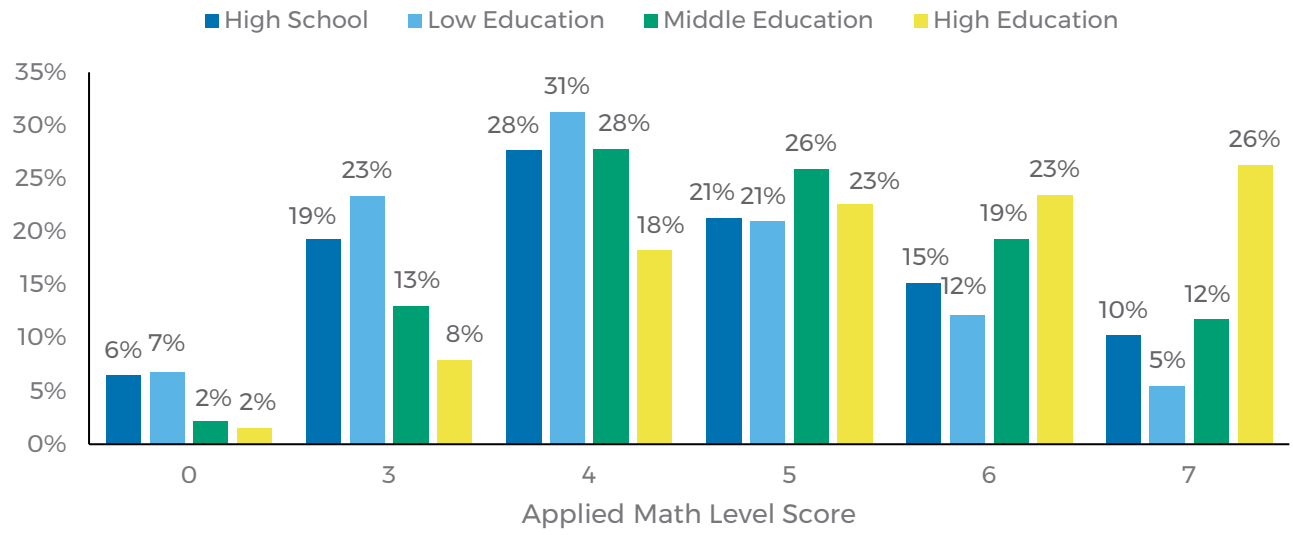


Figure 4. Percentage of ACT WorkKeys Examinees Meeting WorkKeys Skill Levels by Education Group — Workplace Documents

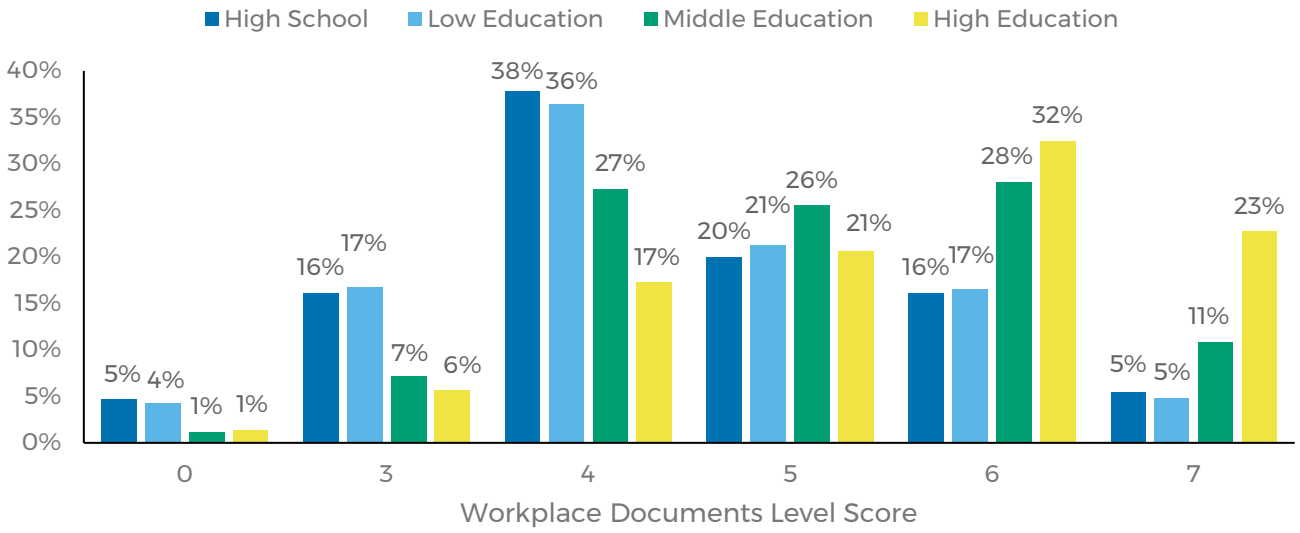
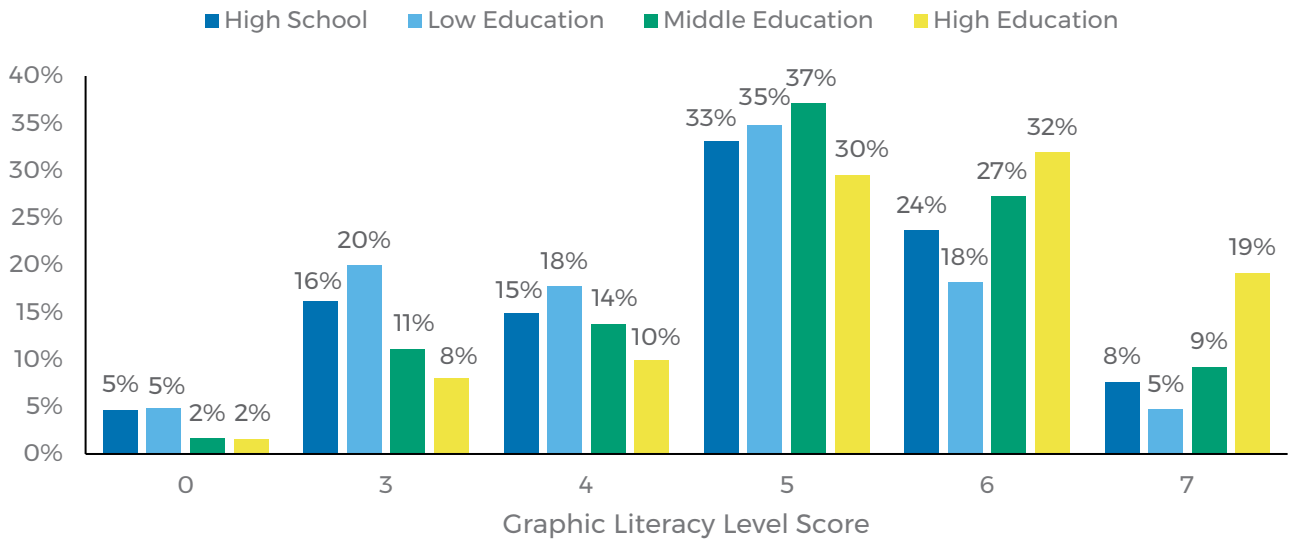
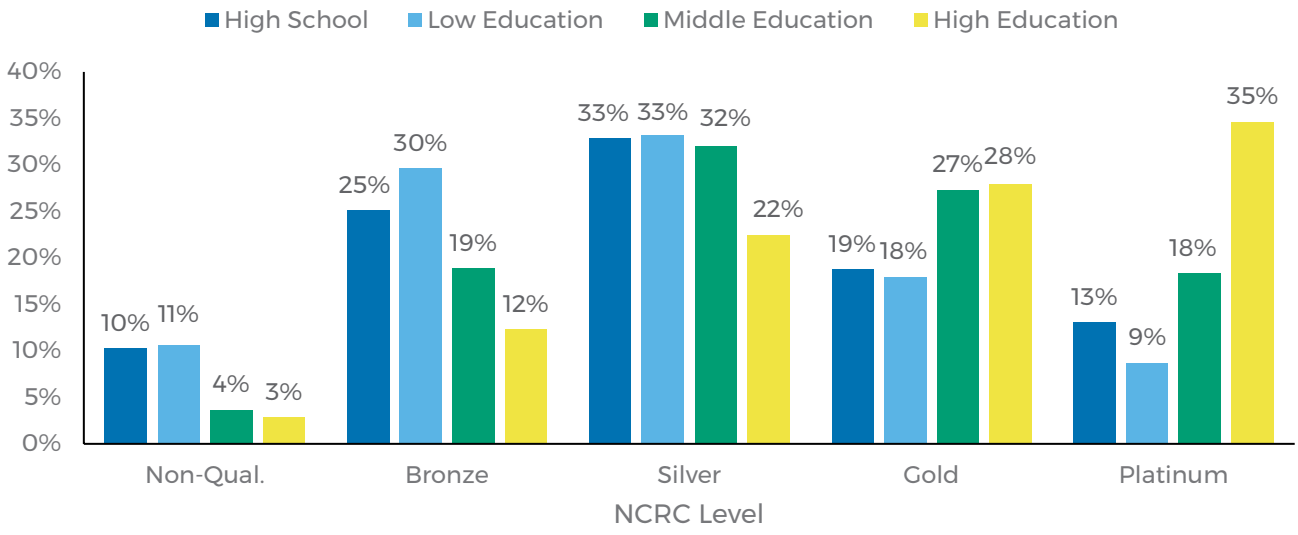


Figure 5. Percentage of ACT WorkKeys Examinees Meeting WorkKeys Skill Levels by Education Group — Graphic Literacy



For examinees who took the three WorkKeys NCRC assessments between June 2017 and July 2019, NCRC levels generally increased with level of education (Figure 6), which was expected considering the relationships observed for the three assessments, individually. High school and low education level examinees were less likely to qualify for the NCRC compared to examinees with a middle or high level of education. A similar share of high school examinees (10%, n = 60,372) and low education level examinees (11%, n = 17,620) did not qualify for a certificate due to scoring below Level 3 on at least one of the three WorkKeys NCRC assessments. Examinees were more likely to qualify for the NCRC at the Silver level or higher if they had a high (85%) or middle (78%) level of education compared to high school examinees (65%) and low education level examinees (60%).

Figure 6. Percentage of ACT WorkKeys Examinees Earning NCRC Levels by Education Group



WorkKeys Performance by Race/Ethnicity

For each of the three NCRC assessments, there were over 850,000 examinees during the June 2017 and July 2019 time period who also provided race/ethnicity data. White (~%55) and African American (~23%) examinees represented the two largest racial/ethnic groups assessed for each NCRC assessment. White (84%) and Asian (81%) examinees had the highest share of scores at Level 4 or higher on Applied Math (Table 1).

Table 1. Percentage of ACT WorkKeys Examinees Meeting WorkKeys Skill Levels by Race/Ethnicity – Applied Math

	Level Score					
Race/Ethnicity	**0**	**3**	**4**	**5**	**6**	**7**
African American	12%	34%	33%	14%	5%	1%
American Indian	9%	26%	32%	20%	10%	4%
Asian	5%	14%	22%	20%	19%	20%
Hispanic	7%	24%	32%	21%	11%	5%
Pacific Islander	14%	32%	28%	15%	8%	3%
White	3%	13%	26%	25%	20%	14%
Two or More Races	5%	18%	30%	23%	15%	9%
Prefer Not to Respond	8%	22%	30%	20%	12%	8%

Compared to other racial/ethnic groups as shown in Table 2, White examinees and individuals of Two or More Races were more likely to score at Level 4 or higher on Workplace Documents (86% and 83%, respectively).

Table 2. Percentage of ACT WorkKeys Examinees Meeting WorkKeys Skill Levels by Race/Ethnicity – Workplace Documents

	Level Score					
Race/Ethnicity	**0**	**3**	**4**	**5**	**6**	**7**
African American	6%	23%	44%	17%	9%	2%
American Indian	7%	21%	38%	18%	13%	3%
Asian	5%	17%	32%	18%	18%	9%
Hispanic	6%	20%	40%	19%	13%	3%
Pacific Islander	8%	27%	35%	17%	10%	3%
White	3%	11%	32%	23%	22%	8%
Two or More Races	3%	13%	37%	22%	18%	6%
Prefer Not to Respond	6%	18%	36%	19%	15%	6%

Compared to other racial/ethnic groups, White examinees were more likely to score at Level 4 or higher (86%) on Graphic Literacy (Table 3).

Table 3. Percentage of ACT WorkKeys Examinees Meeting WorkKeys Skill Levels by Race/Ethnicity – Graphic Literacy

	Level Score					
Race/Ethnicity	**0**	**3**	**4**	**5**	**6**	**7**
African American	7%	26%	22%	33%	10%	1%
American Indian	7%	23%	18%	33%	15%	3%
Asian	4%	14%	12%	29%	27%	13%
Hispanic	6%	21%	17%	35%	18%	4%
Pacific Islander	8%	28%	18%	30%	13%	3%
White	3%	11%	12%	34%	29%	10%
Two or More Races	3%	14%	15%	36%	24%	7%
Prefer Not to Respond	7%	20%	17%	32%	18%	6%

Consistent with results for the three assessments separately, White examinees were more likely than other racial/ethnic groups to earn a Silver NCRC or higher (75%). Asian examinees (70%) and examinees reporting Two or More Races (68%) were next most likely to earn a Silver NCRC or higher (Table 4).

Table 4. Percentage of ACT WorkKeys Examinees Earning NCRC Level by Race/Ethnicity

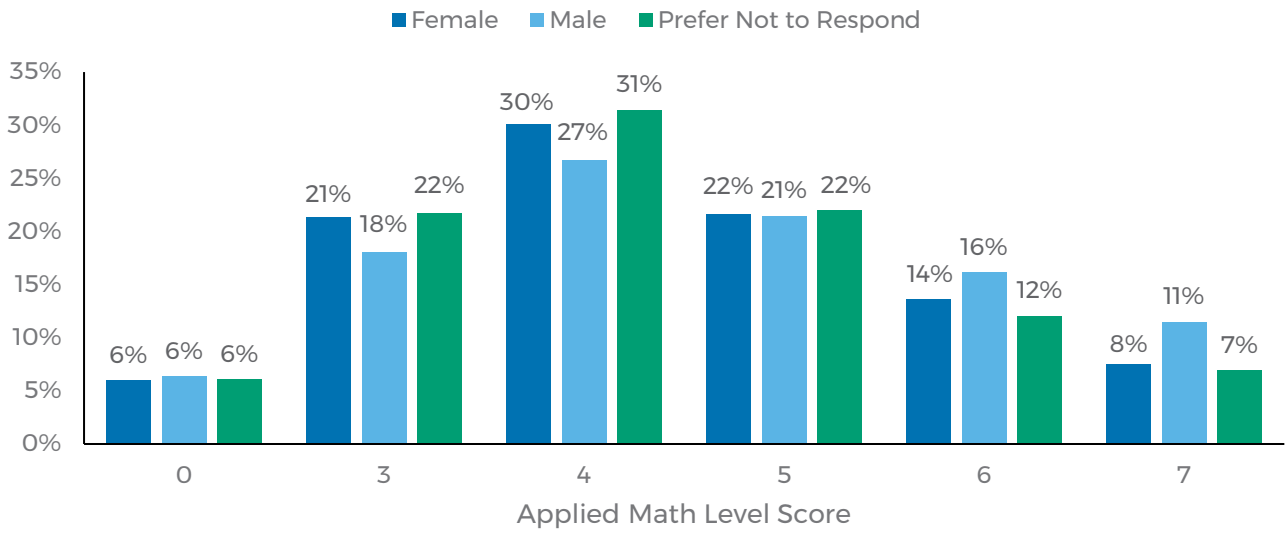
	NCRC Level				
Race/Ethnicity	**Non-Qualifiers**	**Bronze**	**Silver**	**Gold**	**Platinum**
African American	17%	38%	32%	10%	3%
American Indian	15%	33%	32%	14%	6%
Asian	8%	22%	29%	19%	22%
Hispanic	12%	31%	34%	16%	7%
Pacific Islander	20%	36%	27%	12%	5%
White	6%	19%	33%	24%	18%
Two or More Races	8%	24%	34%	20%	13%
Prefer Not to Respond	13%	29%	31%	17%	11%

WorkKeys Performance by Gender

For each of the three NCRC assessments, there were over 860,000 examinees during the June 2017 and July 2019 time period who also provided gender data, with 46% female and 53% male.

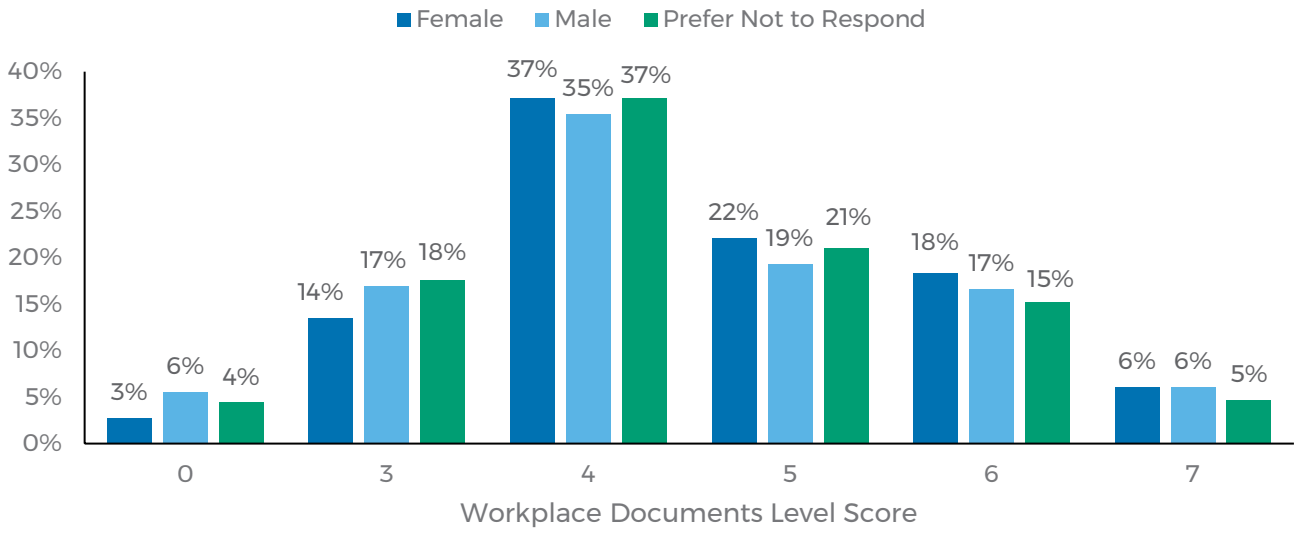
Compared to female examinees, male examinees had a slightly higher share of scores at Level 4 or higher on Applied Math (76% vs. 73%; Figure 7).

Figure 7. Percentage of ACT WorkKeys Examinees Meeting WorkKeys Skill Levels by Gender — Applied Math



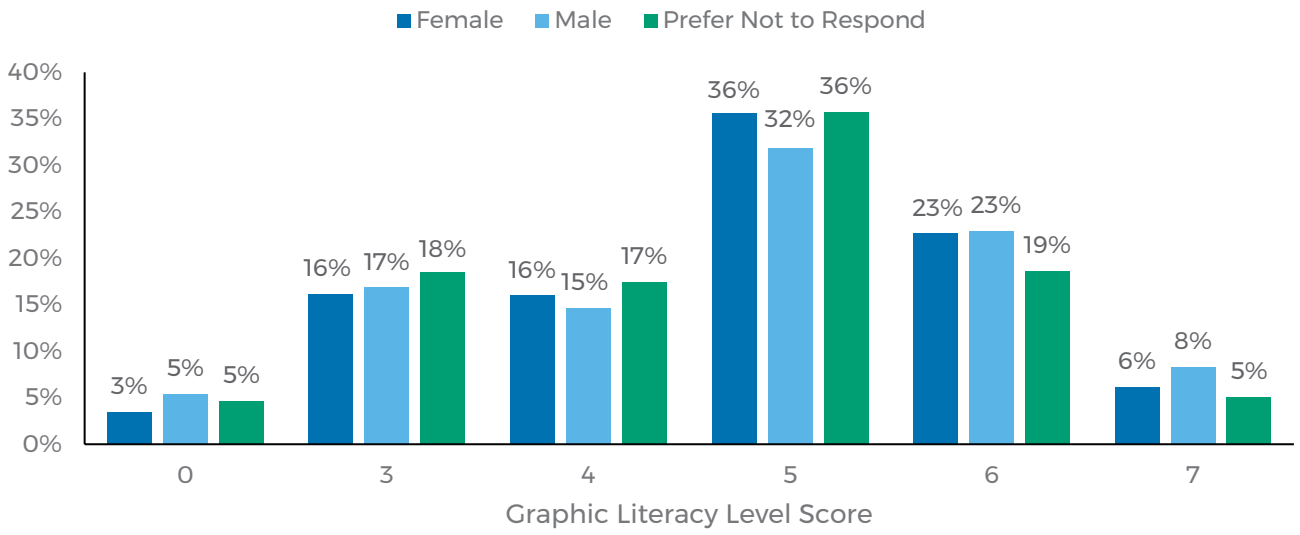
In contrast, female examinees were more likely to score at Level 4 or higher on Workplace Documents than males (84% vs. 78%; Figure 8).

Figure 8. Percentage of ACT WorkKeys Examinees Meeting WorkKeys Skill Levels by Gender — Workplace Documents



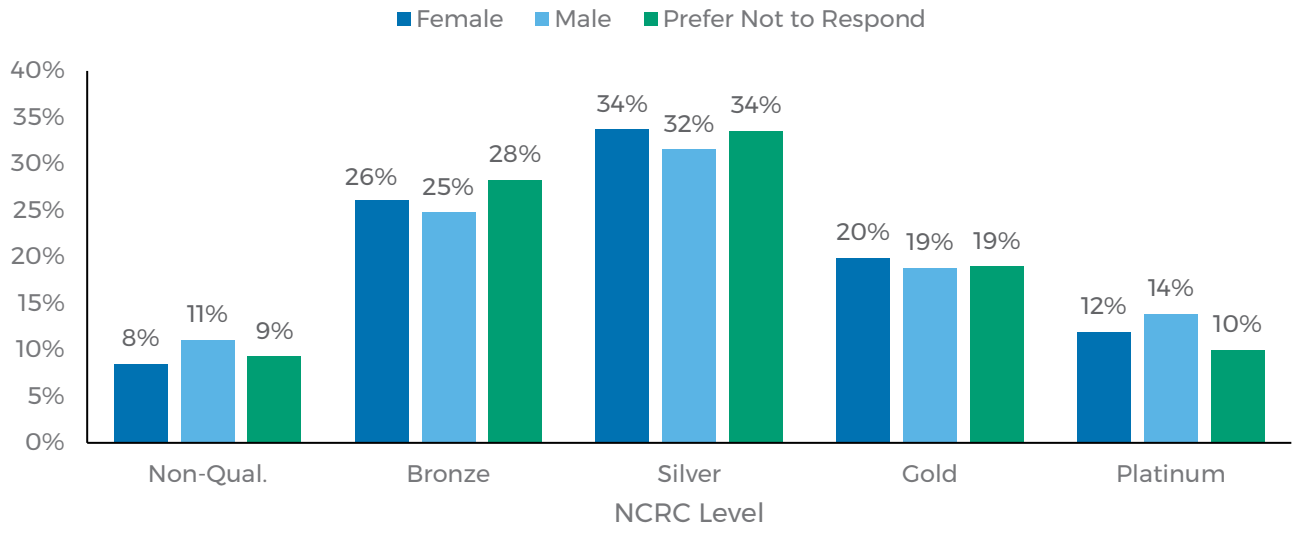
Moreover, female examinees were slightly more likely to score at Level 4 or higher on Graphic Literacy than males (80% vs 78%; Figure 9).

Figure 9. Percentage of ACT WorkKeys Examinees Meeting WorkKeys Skill Levels by Gender — Graphic Literacy



The small differences in the distributions of level scores on Applied Math, Workplace Documents, and Graphic Literacy translated into small differences in the distributions of NCRC levels for female and male examinees (Figure 10). Female and male examinees were similarly likely to qualify for the NCRC at the Silver level or higher (65% and 64%, respectively).

Figure 10. Percentage of ACT WorkKeys Examinees Earning NCRC Level by Gender



Career Readiness Benchmarks, Aggregating across All US Jobs

Career readiness benchmarks for the three WorkKeys assessments—Workplace Documents, Applied Math, and Graphic Literacy—were determined by the percentage of jobs in the US for which an examinee is qualified based on WorkKeys level scores. As summarized in Tables 5, 6, and 7, the results[12] indicate that **meeting a career readiness benchmark score of Level 5 or higher on each of the three WorkKeys assessments is associated with being qualified for almost all jobs in the US. Overall average wages for jobs in the US increase with higher foundational skill levels.**

These benchmarks were determined using the ACT JobPro database, which contains foundational skills data for 1,089 O*NET occupational titles (aggregated from more than 20,000 job analyses spanning a diverse array of industries), and employment and wage data from the US Bureau of Labor Statistics' *Occupational Employment and Wages, May 2018*.

Table 5. Percentage of Jobs in the US for Which an Examinee is Qualified Based on WorkKeys Level Score

Skill Level	Applied Math	Workplace Documents	Graphic Literacy
3	50%	26%	21%
4	33%	48%	62%
5	13%	17%	13%
6	2%	6%	3%
7	1%	3%	2%

Source: ACT Occupational Profiles

Table 6. Cumulative Percentage of Jobs in the US for Which an Examinee is Qualified Based on WorkKeys Level Score

Skill Level	Applied Math	Workplace Documents	Graphic Literacy
3	50%	26%	21%
4	84%	74%	83%
5	96%	91%	96%
6	99%	97%	98%
7	100%	100%	100%

Source: ACT Occupational Profiles

Table 7. US Mean Wages for Jobs by WorkKeys Level Score

Skill Level	Applied Math	Workplace Documents	Graphic Literacy
3	$33,586	$28,953	$28,418
4	$56,840	$46,294	$49,047
5	$91,371	$81,872	$86,147
6	$127,573	$75,063	$91,565
7	$111,235	$121,481	$139,132

Source: ACT Occupational Profiles

Career Pathway Readiness Benchmarks

Applying the same benchmarking methodology used in *A Better Measure of Skills Gaps, The Condition of Work Readiness in the United States,* and *Career Readiness in the United States 2015*, occupational profiles in the ACT JobPro database were used to determine career pathway readiness benchmarks for 16 career clusters in the United States.[13] These career pathway readiness benchmarks provide individuals with a snapshot of the skill requirements for different career pathways that require varying levels of education and training.

Career clusters were developed using data from O*NET and the National Career Clusters Framework.[14] Occupations within each career cluster were grouped into low, middle, and high education groupings based on the US Bureau of Labor Statistics' *Occupational Employment Projections through the Perspective of Education and Training* (refer to Table 8).[15] Employment and wage data are from the US Bureau of Labor Statistics' *Projections of Occupational Employment 2016–26* and *Occupational Employment and Wages, May 2018*.[16]

A skill benchmark for each of the three education groupings for each career cluster was then created by calculating the WorkKeys level score corresponding to the 85th percentile rank for each education grouping. This represents the skill levels required for entry into 85% (a clear majority) of those occupations. A skill benchmark for each education grouping represents the minimum skill demand for most occupations within a career cluster.

Table 8. Education Groups for Career Clusters

Education Groups for Career Clusters	
Education Group	**Typical Level of Education/Experience Required**
High Education	Doctoral or Professional Degree
	Master's Degree
	Bachelor's Degree
Middle Education	Associates Degree
	Postsecondary Non-Degree Award
Low Education	Some College, No Degree
	High School Diploma or Equivalent
	Less Than High School

A "skills gap" was defined as a gap between the skills needed for a career cluster at a given level of education and the skills possessed by WorkKeys examinees with a comparable level of education. Ultimately, career pathway readiness benchmarks are intended to be used to assist individuals in comparing their skill levels against what is typically needed for success along a career pathway.[17] Each of the following sections concludes with a gap analysis showing the percentage of WorkKeys examinees with a given level of education who demonstrated the minimum foundational workplace skill levels required for most jobs in a career cluster that require similar levels of education for entry into employment.

The Agriculture, Food, & Natural Resources Career Cluster

Occupations in the Agriculture, Food, & Natural Resources career cluster constituted 8% of total occupational employment in the US in 2018. Agriculture careers are projected to grow more than 5% from 2016–2026, with more than 1.89 million average openings a year due to growth and replacement.

Table 9. Top Openings Occupations in the Agriculture, Food, & Natural Resources Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Low	11-9013.00	Farmers, Ranchers, and Other Agricultural Managers	6	5	5	4,770	$79,940	84,800	High school diploma or equivalent
	45-2092.00	Farmworkers and Laborers, Crop, Nursery, and Greenhouse	3	3	3	287,420	$26,450	76,800	No formal educational credential
	53-7051.00	Industrial Truck and Tractor Operators	3	3	3	604,130	$36,480	65,900	No formal educational credential
	39-2021.00	Nonfarm Animal Caretakers	3	3	4	199,850	$25,890	45,200	High school diploma or equivalent
	45-2093.00	Farmworkers, Farm, Ranch, and Aquacultural Animals	3	3	3	37,780	$28,840	38,600	No formal educational credential
Middle	17-3029.00	Engineering Technicians, Except Drafters, All Other	4	4	4	83,360	$65,720	7,100	Associates degree
	19-4031.00	Chemical Technicians	4	5	4	65,500	$51,670	6,600	Associates degree
	19-4091.00	Environmental Science and Protection Technicians	5	5	4	32,600	$50,350	4,600	Associates degree
	17-3027.00	Mechanical Engineering Technicians	4	5	5	41,460	$58,240	4,200	Associates degree
	19-4093.00	Forest and Conservation Technicians	5	5	5	30,220	$40,110	4,000	Associates degree
High	19-2041.00	Environmental Scientists and Specialists, Including Health	5	7	7	80,480	$77,580	9,500	Bachelor's degree
	29-9011.00	Occupational Health and Safety Specialists	3	4	4	88,390	$74,940	4,900	Bachelor's degree
	17-2081.01	Water/ Wastewater Engineers	7	6	6	53,070	$92,640	4,000	Bachelor's degree
	19-1021.00	Biochemists and Biophysicists	6	7	7	28,500	$105,940	3,200	Doctoral or professional degree
	19-1013.00	Soil and Plant Scientists	6	7	7	15,010	$70,630	2,200	Bachelor's degree

Table 10. Fastest Growing Occupations in the Agriculture, Food, & Natural Resources Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Employment % Change	Typical Level of Education Needed for Entry
Low	47-5013.00	Service Unit Operators, Oil, Gas, and Mining	3	3	4	49,710	$52,780	23.4	No formal educational credential
	39-2021.00	Nonfarm Animal Caretakers	3	3	4	199,850	$25,890	21.9	High school diploma or equivalent
	53-7073.00	Wellhead Pumpers	5	5	5	13,280	$53,870	21.7	High school diploma or equivalent
	47-4041.00	Hazardous Materials Removal Workers	3	4	4	44,000	$47,050	17.1	High school diploma or equivalent
	53-7072.00	Pump Operators, Except Wellhead Pumpers	3	4	4	10,820	$47,510	13.8	High school diploma or equivalent
Middle	19-4041.00	Geological and Petroleum Technicians	6	5	5	15,060	$62,890	16.4	Associates degree
	17-3025.00	Environmental Engineering Technicians	4	4	4	17,310	$54,800	12.9	Associates degree
	19-4091.00	Environmental Science and Protection Technicians	5	5	4	32,600	$50,350	11.9	Associates degree
	19-4011.00	Agricultural and Food Science Technicians	4	4	4	21,290	$44,170	6.3	Associates degree
	17-3029.00	Engineering Technicians, Except Drafters, All Other	4	4	4	83,360	$65,720	5.2	Associates degree
High	25-1042.00	Biological Science Teachers, Postsecondary	6	7	6	51,770	$97,340	15.1	Doctoral or professional degree
	19-1021.00	Biochemists and Biophysicists	6	7	7	28,500	$105,940	11.3	Doctoral or professional degree
	19-2041.00	Environmental Scientists and Specialists, Including Health	5	7	7	80,480	$77,580	11.1	Bachelor's degree
	11-9121.01	Clinical Research Coordinators	5	5	4	60,260	$139,680	9.9	Bachelor's degree
	25-1053.00	Environmental Science Teachers, Postsecondary	5	7	6	6,040	$91,330	9.6	Doctoral or professional degree

Table 11. Highest Paying Occupations in the Agriculture, Food, & Natural Resources Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Average Annual Job Openings	Typical Level of Education Needed for Entry
Low	11-9013.00	Farmers, Ranchers, and Other Agricultural Managers	6	5	5	4,770	$79,940	84,800	High school diploma or equivalent
	51-8092.00	Gas Plant Operators	4	4	4	14,620	$71,470	1,700	High school diploma or equivalent
	51-8093.00	Petroleum Pump System Operators, Refinery Operators, and Gaugers	4	4	4	38,930	$70,630	4,300	High school diploma or equivalent
	53-7071.00	Gas Compressor and Gas Pumping Station Operators	3	4	4	3,460	$62,900	500	High school diploma or equivalent
	51-8099.00	Plant and System Operators, All Other	4	4	4	12,270	$58,300	1,200	High school diploma or equivalent
Middle	53-5021.00	Captains, Mates, and Pilots of Water Vessels	5	4	4	36,390	$82,380	4,400	Postsecondary nondegree award
	17-3029.00	Engineering Technicians, Except Drafters, All Other	4	4	4	83,360	$65,720	7,100	Associates degree
	49-3011.00	Aircraft Mechanics and Service Technicians	4	5	5	131,690	$65,230	10,800	Postsecondary nondegree award
	19-4041.00	Geological and Petroleum Technicians	6	5	5	15,060	$62,890	1,900	Associates degree
	17-3027.00	Mechanical Engineering Technicians	4	5	5	41,460	$58,240	4,200	Associates degree
High	11-9121.01	Clinical Research Coordinators	5	5	4	60,260	$139,680	5,200	Bachelor's degree
	19-3011.00	Economists	7	7	7	18,650	$116,020	1,600	Master's degree
	19-1021.00	Biochemists and Biophysicists	6	7	7	28,500	$105,940	3,200	Doctoral or professional degree
	25-1042.00	Biological Science Teachers, Postsecondary	6	7	6	51,770	$97,340	6,000	Doctoral or professional degree
	17-2081.01	Water/ Wastewater Engineers	7	6	6	53,070	$92,640	4,000	Bachelor's degree

Career Pathway Readiness for Agriculture, Food, & Natural Resources Careers

The aggregated WorkKeys skills benchmarks indicate that, across education groups, Level 4 is the lowest level of Applied Math skills needed for the Agriculture career cluster (see Table 12). Additionally, all three education groups in the Agriculture career cluster require at least Level 5 for Workplace Documents and Graphic Literacy.

Table 12. Career Pathway Readiness Benchmarks – Agriculture, Food, and Natural Resources

Education Group	Number of Occupations	Applied Math	Workplace Documents	Graphic Literacy
	SKILL LEVEL REQUIRED FOR 85% OF OCCUPATIONS			
Low Education Occupations	59	4	5	5
Middle Education Occupations	17	5	5	5
High Education Occupations	26	6	7	7

Source: ACT Occupational Profiles

Agriculture, Food, & Natural Resources Career Pathway Readiness of US WorkKeys Examinees

Table 13. Examinee Gap Analysis for Agriculture, Food and Natural Resources – Percentage of Examinees that Met or Exceeded Median Skill Level Requirements

Education Group (Examinees and Occupations)	Applied Math	Workplace Documents	Graphic Literacy	All Three
Low Education	73%	42%	63%	37%
Middle Education	57%	64%	74%	46%
High Education	50%	23%	19%	10%

Roughly a third (37%) of examinees with a low level of educational attainment met or exceeded all three skill benchmarks for the low education Agriculture career cluster (as shown in Table 13). Very few (10%) of examinees with a high level of educational attainment met or exceeded all three benchmarks for high education occupations in the same cluster.

The Architecture & Construction Career Cluster

Occupations in the Architecture & Construction career cluster constituted 6% of total occupational employment in the US in 2018. Architecture & Construction careers are projected to grow more than 10% from 2016–2026, with more than one million average openings a year due to growth and replacement.

Table 14. Top Openings Occupations in the Architecture & Construction Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Low	47-2061.00	Construction Laborers	3	4	4	1,001,470	$40,350	145,700	No formal educational credential
	47-2031.00	Carpenters	4	4	4	718,730	$51,120	104,900	High school diploma or equivalent
	47-2111.00	Electricians	4	5	5	655,840	$59,190	82,100	High school diploma or equivalent
	47-1011.00	First-Line Supervisors of Construction Trades Workers	4	5	4	598,210	$70,540	68,500	High school diploma or equivalent
	47-2152.00	Plumbers, Pipefitters, and Steamfitters	4	4	4	438,070	$58,150	61,100	High school diploma or equivalent
Middle	49-9021.00	Heating, Air Conditioning, and Refrigeration Mechanics	4	4	4	324,310	$50,160	38,700	Postsecondary nondegree award
	17-3011.00	Architectural and Civil Drafters	5	5	5	97,610	$56,700	9,500	Associates degree
	17-3022.00	Civil Engineering Technicians	4	4	4	71,150	$54,670	7,200	Associates degree
	17-3029.00	Engineering Technicians, Except Drafters, All Other	4	4	4	83,360	$65,720	7,100	Associates degree
	17-3013.00	Mechanical Drafters	5	4	5	56,170	$59,010	5,900	Associates degree
High	11-9021.00	Construction Managers	5	6	5	278,460	$103,110	33,400	Bachelor's degree
	17-2051.01	Transportation Engineers	6	6	6	306,030	$93,720	25,900	Bachelor's degree
	13-1051.00	Cost Estimators	5	4	4	211,600	$69,710	24,400	Bachelor's degree
	11-9041.00	Architectural and Engineering Managers	7	7	5	188,290	$148,970	13,600	Bachelor's degree
	15-2031.00	Operations Research Analysts	7	7	7	104,200	$88,350	10,700	Bachelor's degree

Table 15. Fastest Growing Occupations in the Architecture & Construction Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Employment % Change	Typical Level of Education Needed for Entry
Low	47-2231.00	Solar Photovoltaic Installers	5	5	4	8,950	$46,010	105.3	High school diploma or equivalent
	47-5011.00	Derrick Operators, Oil and Gas	3	3	3	11,310	$47,630	25.7	No formal educational credential
	47-5012.00	Rotary Drill Operators, Oil and Gas	3	3	4	18,010	$56,740	24.2	No formal educational credential
	47-5021.00	Earth Drillers, Except Oil and Gas	3	4	4	18,270	$47,570	19.7	High school diploma or equivalent
	47-2152.00	Plumbers, Pipefitters, and Steamfitters	4	4	4	438,070	$58,150	15.8	High school diploma or equivalent
Middle	49-9021.00	Heating, Air Conditioning, and Refrigeration Mechanics	4	4	4	324,310	$50,160	14.7	Postsecondary nondegree award
	17-3022.00	Civil Engineering Technicians	4	4	4	71,150	$54,670	8.8	Associates degree
	17-3011.00	Architectural and Civil Drafters	5	5	5	97,610	$56,700	8.1	Associates degree
	17-3019.00	Drafters, All Other	5	4	5	14,580	$54,240	7.9	Associates degree
	17-3012.00	Electrical and Electronics Drafters	5	4	5	24,900	$64,400	6.7	Associates degree
High	15-2031.00	Operations Research Analysts	7	7	7	104,200	$88,350	27.4	Bachelor's degree
	17-1021.00	Cartographers and Photogrammetrists	4	5	6	11,050	$68,340	19.4	Bachelor's degree
	25-1032.00	Engineering Teachers, Postsecondary	7	7	7	37,530	$113,680	14.5	Doctoral or professional degree
	11-9021.00	Construction Managers	5	6	5	278,460	$103,110	11.4	Bachelor's degree
	17-1022.00	Surveyors	5	5	5	45,310	$66,440	11.2	Bachelor's degree

Table 16. Highest Paying Occupations in the Architecture & Construction Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Low	47-1011.00	First-Line Supervisors of Construction Trades Workers	4	5	4	598,210	$70,540	68,500	High school diploma or equivalent
	49-9051.00	Electrical Power-Line Installers and Repairers	4	4	4	114,800	$70,240	11,700	High school diploma or equivalent
	49-9097.00	Signal and Track Switch Repairers	3	3	3	7,730	$67,800	1,000	High school diploma or equivalent
	53-4031.00	Railroad Conductors and Yardmasters	3	4	4	42,360	$66,080	3,700	High school diploma or equivalent
	47-2072.00	Pile-Driver Operators	3	4	3	3,450	$64,360	500	High school diploma or equivalent
Middle	49-2095.00	Electrical and Electronics Repairers, Powerhouse, Substation, and Relay	4	4	4	22,980	$80,040	2,100	Postsecondary nondegree award
	17-3029.00	Engineering Technicians, Except Drafters, All Other	4	4	4	83,360	$65,720	7,100	Associates degree
	17-3012.00	Electrical and Electronics Drafters	5	4	5	24,900	$64,400	2,500	Associates degree
	17-3013.00	Mechanical Drafters	5	4	5	56,170	$59,010	5,900	Associates degree
	17-3011.00	Architectural and Civil Drafters	5	5	5	97,610	$56,700	9,500	Associates degree
High	11-9041.00	Architectural and Engineering Managers	7	7	5	188,290	$148,970	13,600	Bachelor's degree
	25-1032.00	Engineering Teachers, Postsecondary	7	7	7	37,530	$113,680	4,500	Doctoral or professional degree
	11-9021.00	Construction Managers	5	6	5	278,460	$103,110	33,400	Bachelor's degree
	17-2199.00	Engineers, All Other	6	6	6	142,030	$99,410	9,500	Bachelor's degree
	25-1031.00	Architecture Teachers, Postsecondary	7	7	7	6,880	$99,320	800	Doctoral or professional degree

Career Pathway Readiness for Architecture & Construction Careers

The aggregated WorkKeys skills benchmarks indicate that Level 4 is the level of Graphic Literacy, Workplace Documents, and Applied Math skills needed for most low education Architecture & Construction careers (Table 17). However, occupations in the high education group in the Architecture career cluster require Level 7 for Applied Math and Workplace Documents.

Table 17. Career Pathway Readiness Benchmarks – Architecture & Construction

Education Group	Number of Occupations	Applied Math	Workplace Documents	Graphic Literacy
	SKILL LEVEL REQUIRED FOR 85% OF OCCUPATIONS			
Low Education Occupations	80	4	4	4
Middle Education Occupations	14	5	5	5
High Education Occupations	19	7	7	6

Source: ACT Occupational Profiles

Architecture & Construction Career Pathway Readiness of US WorkKeys Examinees

Table 18. Examinee Gap Analysis for Architecture & Construction – Percentage of Examinees that Met or Exceeded Median Skill Level Requirements

Education Group (Examinees and Occupations)	Applied Math	Workplace Documents	Graphic Literacy	All Three
Low Education	73%	79%	78%	64%
Middle Education	57%	64%	74%	46%
High Education	26%	23%	51%	13%

Less than half (46%) of examinees with a middle level of educational attainment and very few (13%) of those with a high level of educational attainment met or exceeded all three skill benchmarks for the middle and high education groups in the Architecture & Construction career cluster (as shown in Table 18).

The Arts, Audio Video Technology, & Communications Career Cluster

Occupations in the Arts, Audio Video Technology, & Communications career cluster constituted 2% of total occupational employment in the US in 2018. Arts, Audio Video Technology, & Communications careers are projected to grow more than 4% from 2016–2026, with more than 400,000 average openings a year due to growth and replacement.

Table 19. Top Openings Occupations in the Arts, Audio Video Technology, & Communications Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Low	27-2042.00	Musicians and Singers	3	4	4	41,680	$56,077	18,000	No formal educational credential
	43-9021.00	Data Entry Keyers	3	3	4	174,930	$33,740	16,800	High school diploma or equivalent
	27-4021.00	Photographers	3	4	4	49,560	$42,770	9,700	High school diploma or equivalent
	27-3099.00	Media and Communication Workers, All Other	3	4	4	20,420	$52,430	3,300	High school diploma or equivalent
	27-2099.00	Entertainers and Performers, Sports and Related Workers, All Other	3	4	4	13,740	$35,547	3,200	No formal educational credential
Middle	49-2022.00	Telecommunications Equipment Installers and Repairers	4	4	4	229,890	$57,080	21,900	Postsecondary nondegree award
	27-4011.00	Audio and Video Equipment Technicians	3	5	4	75,940	$48,940	9,000	Postsecondary nondegree award
	49-2097.00	Electronic Home Entertainment Equipment Installers and Repairers	3	4	4	26,070	$39,800	3,300	Postsecondary nondegree award
	51-5111.00	Prepress Technicians and Workers	3	3	4	29,990	$42,240	3,000	Postsecondary nondegree award
	27-4012.00	Broadcast Technicians	3	4	4	31,580	$46,770	2,900	Associates degree
High	27-3031.00	Public Relations Specialists	4	5	4	239,030	$68,440	28,300	Bachelor's degree
	27-1024.00	Graphic Designers	4	4	4	217,810	$54,680	26,200	Bachelor's degree
	27-2012.00	Producers and Directors	4	5	4	118,630	$89,840	14,000	Bachelor's degree
	27-3043.00	Writers and Authors	3	5	4	45,210	$73,090	12,700	Bachelor's degree
	27-3041.00	Editors	3	5	4	95,750	$69,480	12,300	Bachelor's degree

Table 20. Fastest Growing Occupations in the Arts, Audio Video Technology, & Communications Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Employment % Change	Typical Level of Education Needed for Entry
Low	43-2099.00	Communications Equipment Operators, All Other	3	4	4	2,100	$43,410	10.4	High school diploma or equivalent
	39-3092.00	Costume Attendants	3	3	3	6,460	$46,010	9.7	High school diploma or equivalent
	27-3099.00	Media and Communication Workers, All Other	3	4	4	20,420	$52,430	8.7	High school diploma or equivalent
	27-2099.00	Entertainers and Performers, Sports and Related Workers, All Other	3	4	4	13,740	$35,547	8.0	No formal educational credential
	27-4099.00	Media and Communication Equipment Workers, All Other	3	4	4	18,790	$77,080	7.9	High school diploma or equivalent
Middle	27-4011.00	Audio and Video Equipment Technicians	3	5	4	75,940	$48,940	12.9	Postsecondary nondegree award
	27-4014.00	Sound Engineering Technicians	3	5	4	13,510	$63,500	6.3	Postsecondary nondegree award
	49-2021.00	Radio, Cellular, and Tower Equipment Installers and Repairers	4	4	4	13,930	$56,340	5.5	Associates degree
	49-2097.00	Electronic Home Entertainment Equipment Installers and Repairers	3	4	4	26,070	$39,800	1.2	Postsecondary nondegree award
	27-4012.00	Broadcast Technicians	3	4	4	31,580	$46,770	(3.2)	Associates degree
High	27-4032.00	Film and Video Editors	3	4	4	28,160	$86,830	16.3	Bachelor's degree
	25-4011.00	Archivists	4	5	5	6,370	$56,400	14.3	Master's degree
	25-4012.00	Curators	4	5	5	12,280	$58,490	14.0	Master's degree
	25-4013.00	Museum Technicians and Conservators	4	5	5	13,100	$46,870	12.4	Bachelor's degree
	25-1121.00	Art, Drama, and Music Teachers, Postsecondary	5	7	6	94,310	$82,560	12.0	Master's degree

Table 21. Highest Paying Occupations in the Arts, Audio Video Technology, & Communications Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Low	27-4099.00	Media and Communication Equipment Workers, All Other	3	4	4	18,790	$77,080	2,100	High school diploma or equivalent
	27-1019.00	Artists and Related Workers, All Other	4	4	4	6,620	$67,700	1,100	No formal educational credential
	27-2042.00	Musicians and Singers	3	4	4	41,680	$56,077	18,000	No formal educational credential
	27-2032.00	Choreographers	3	4	4	5,090	$53,560	1,000	High school diploma or equivalent
	27-3099.00	Media and Communication Workers, All Other	3	4	4	20,420	$52,430	3,300	High school diploma or equivalent
Middle	27-4014.00	Sound Engineering Technicians	3	5	4	13,510	$63,500	1,700	Postsecondary nondegree award
	49-2022.00	Telecommunications Equipment Installers and Repairers	4	4	4	229,890	$57,080	21,900	Postsecondary nondegree award
	49-2021.00	Radio, Cellular, and Tower Equipment Installers and Repairers	4	4	4	13,930	$56,340	1,600	Associates degree
	27-4011.00	Audio and Video Equipment Technicians	3	5	4	75,940	$48,940	9,000	Postsecondary nondegree award
	27-4012.00	Broadcast Technicians	3	4	4	31,580	$46,770	2,900	Associates degree
High	27-1011.00	Art Directors	4	5	5	40,210	$104,590	8,000	Bachelor's degree
	27-3021.00	Broadcast News Analysts	3	6	4	5,890	$91,990	500	Bachelor's degree
	13-1011.00	Agents and Business Managers of Artists, Performers, and Athletes	5	5	4	14,830	$90,930	2,300	Bachelor's degree
	27-2012.00	Producers and Directors	4	5	4	118,630	$89,840	14,000	Bachelor's degree
	27-1022.00	Fashion Designers	3	4	4	19,750	$87,610	2,300	Bachelor's degree

Career Pathway Readiness for Arts, Audio Video Technology, & Communications Careers

The aggregated WorkKeys skills benchmarks indicate that, across education groups, Level 3 is the lowest level of Applied Math skills needed for Arts, Audio Video Technology, & Communications careers (Table 22). Additionally, all three education groups in the Arts & Communications career cluster require at least Level 4 for Workplace Documents and Graphic Literacy.

Table 22. Career Pathway Readiness Benchmarks – Arts, Audio Video Technology, & Communications

Education Group	Number of Occupations	Applied Math	Workplace Documents	Graphic Literacy
	SKILL LEVEL REQUIRED FOR 85% OF OCCUPATIONS			
Low Education Occupations	23	3	4	4
Middle Education Occupations	9	4	5	4
High Education Occupations	40	5	6	5

Source: ACT Occupational Profiles

Arts, Audio Video Technology, & Communications Career Pathway Readiness of US WorkKeys Examinees

Table 23. Examinee Gap Analysis for Arts, Audio Video Technology, & Communications – Percentage of Examinees that Met or Exceeded Median Skill Level Requirements

Education Group (Examinees and Occupations)	Applied Math	Workplace Documents	Graphic Literacy	All Three
Low Education	93%	79%	78%	71%
Middle Education	85%	64%	87%	60%
High Education	72%	55%	81%	50%

Half (50%) of examinees with a high level of educational attainment met or exceeded all three skill benchmarks for the high education group in the Arts & Communications career cluster (as shown in Table 23).

The Business Management & Administration Career Cluster

Occupations in the Business Management & Administration career cluster constituted 20% of total occupational employment in the US in 2018. Business Management & Administration careers are projected to grow more than 4% from 2016–2026, with more than three million average openings a year due to growth and replacement.

Table 24. Top Openings Occupations in the Business Management Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Low	43-4051.00	Customer Service Representatives	4	4	4	2,871,400	$36,470	373,400	High school diploma or equivalent
	43-9061.00	Office Clerks, General	3	4	4	2,972,930	$35,200	356,200	High school diploma or equivalent
	43-6014.00	Secretaries and Administrative Assistants	3	4	4	2,165,310	$38,030	244,300	High school diploma or equivalent
	43-3031.00	Bookkeeping, Accounting, and Auditing Clerks	4	4	4	1,530,430	$42,110	186,600	Some college, no degree
	43-1011.00	First-Line Supervisors of Office and Administrative Support Workers	4	4	4	1,477,560	$59,340	153,000	High school diploma or equivalent
Middle	43-4161.00	Human Resources Assistants, Except Payroll and Timekeeping	4	4	4	124,600	$41,620	15,100	Associates degree
High	11-1021.00	General and Operations Managers	5	5	5	2,289,770	$123,880	210,800	Bachelor's degree
	13-2011.00	Accountants and Auditors	5	4	5	1,259,930	$78,820	141,800	Bachelor's degree
	13-1199.00	Business Operations Specialists, All Other	4	5	4	1,060,580	$76,960	104,200	Bachelor's degree
	13-1111.00	Management Analysts	4	4	4	684,470	$94,390	81,300	Bachelor's degree
	11-9199.00	Managers, All Other	4	5	4	462,840	$115,590	78,700	Bachelor's degree

The Business Management cluster is largely made up of jobs that require either a low or high level of education for entry. There is only one occupation in this cluster that requires a middle level of education (in this case, an Associates Degree for Human Resources Assistants).

Table 25. Fastest Growing Occupations in the Business Management Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Employment % Change	Typical Level of Education Needed for Entry
Low	43-3021.00	Billing and Posting Clerks	4	4	4	469,250	$39,520	14.2	High school diploma or equivalent
	43-9041.00	Insurance Claims and Policy Processing Clerks	3	4	4	274,560	$42,150	11.0	High school diploma or equivalent
	13-2082.00	Tax Preparers	4	4	4	68,090	$46,860	10.8	High school diploma or equivalent
	43-5011.00	Cargo and Freight Agents	3	4	4	92,280	$46,070	10.4	High school diploma or equivalent
	43-9199.00	Office and Administrative Support Workers, All Other	4	3	4	196,570	$37,480	9.2	High school diploma or equivalent
Middle	43-4161.00	Human Resources Assistants, Except Payroll and Timekeeping	4	4	4	124,600	$41,620	(1.8)	Associates degree
High	15-2041.00	Statisticians	7	7	7	39,920	$92,600	33.4	Master's degree
	15-2031.00	Operations Research Analysts	7	7	7	104,200	$88,350	27.4	Bachelor's degree
	11-3031.00	Financial Managers	5	5	5	608,120	$146,830	18.7	Bachelor's degree
	25-1011.00	Business Teachers, Postsecondary	4	7	6	84,230	$103,330	18.1	Doctoral or professional degree
	11-9151.00	Social and Community Service Managers	4	5	4	149,870	$71,670	15.7	Bachelor's degree

Table 26. Highest Paying Occupations in the Business Management Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Low	11-3071.00	Transportation, Storage, and Distribution Managers	4	4	4	124,810	$102,850	9,700	High school diploma or equivalent
	49-1011.00	First-Line Supervisors of Mechanics, Installers, and Repairers	4	5	5	471,820	$69,320	43,400	High school diploma or equivalent
	51-1011.00	First-Line Supervisors of Production and Operating Workers	4	4	4	622,790	$64,340	59,500	High school diploma or equivalent
	41-3011.00	Advertising Sales Agents	3	4	4	133,110	$63,360	17,800	High school diploma or equivalent
	43-6011.00	Executive Secretaries and Executive Administrative Assistants	4	4	4	570,530	$61,550	54,600	High school diploma or equivalent
Middle	43-4161.00	Human Resources Assistants, Except Payroll and Timekeeping	4	4	4	124,600	$41,620	15,100	Associates degree
High	11-1011.00	Chief Executives	5	6	5	195,530	$200,140	20,100	Bachelor's degree
	11-3021.00	Computer and Information Systems Managers	5	5	5	391,430	$152,860	32,500	Bachelor's degree
	11-3031.00	Financial Managers	5	5	5	608,120	$146,830	56,800	Bachelor's degree
	11-2022.00	Sales Managers	4	5	5	379,050	$140,320	36,200	Bachelor's degree
	11-9121.00	Natural Sciences Managers	6	5	4	60,260	$139,680	5,200	Bachelor's degree

Career Pathway Readiness for Business Management & Administration Careers

The aggregated WorkKeys skills benchmarks indicate that for the high education group, Level 5 is the lowest level of Graphic Literacy and Applied Math skills needed for Business Management & Administration careers while a Level 4 is the lowest level of Applied Math, Workplace Documents, and Graphic Literacy skills needed for occupations in low and middle education groups (as shown in Table 27).

Table 27. Career Pathway Readiness Benchmarks – Business Management & Administration

Education Group	Number of Occupations	Applied Math	Workplace Documents	Graphic Literacy
	SKILL LEVEL REQUIRED FOR 85% OF OCCUPATIONS			
Low Education Occupations	48	4	4	4
Middle Education Occupations	1	4	4	4
High Education Occupations	71	5	6	5

Source: ACT Occupational Profiles

Business Management & Administration Career Pathway Readiness of US WorkKeys Examinees

Table 28. Examinee Gap Analysis for Business Management & Administration – Percentage of Examinees that Met or Exceeded Median Skill Level Requirements

Education Group (Examinees and Occupations)	Applied Math	Workplace Documents	Graphic Literacy	All Three
Low Education	73%	79%	78%	64%
Middle Education	85%	92%	87%	78%
High Education	72%	55%	81%	50%

Half (50%) of examinees with a high level of educational attainment met or exceeded all three skill benchmarks for the high education group in the Business Management career cluster (Table 28).

The Education & Training Career Cluster

Occupations in the Education & Training career cluster constituted 7% of total occupational employment in the US in 2018. Education & Training careers are projected to grow more than 9% from 2016–2026, with more than one million average openings a year due to growth and replacement.

Table 29. Top Openings Occupations in the Education & Training Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Low	25-9041.00	Teacher Assistants	4	4	3	1,331,560	$28,750	147,900	Some college, no degree
	39-9032.00	Recreation Workers	3	4	4	353,570	$28,310	70,600	High school diploma or equivalent
	39-9031.00	Fitness Trainers and Aerobics Instructors	4	4	4	308,470	$44,580	54,800	High school diploma or equivalent
	25-3021.00	Self-Enrichment Education Teachers	4	4	5	243,080	$44,960	46,300	High school diploma or equivalent
	43-4121.00	Library Assistants, Clerical	3	4	3	88,970	$28,960	16,300	High school diploma or equivalent
Middle	25-2011.00	Preschool Teachers, Except Special Education	4	4	5	424,520	$34,410	53,600	Associates degree
	25-4031.00	Library Technicians	4	4	4	88,690	$36,080	14,400	Postsecondary nondegree award
High	25-3099.00	Teachers and Instructors, All Other	4	6	5	994,000	$39,710	121,300	Bachelor's degree
	25-2021.00	Elementary School Teachers, Except Special Education	4	6	5	1,410,970	$62,200	112,800	Bachelor's degree
	25-2031.00	Secondary School Teachers, Except Special and CTE	4	6	5	1,051,570	$64,340	79,500	Bachelor's degree
	25-2022.00	Middle School Teachers, Except Special and CTE	4	6	5	609,970	$62,030	50,500	Bachelor's degree
	27-2022.00	Coaches and Scouts	4	4	4	236,970	$43,870	42,000	Bachelor's degree

The Education & Training cluster is largely made up of jobs that require a high level of education for entry. There are only two occupations in this cluster that require a middle level of education (in this case, a Postsecondary Non-Degree Award for Library Technicians and an Associates Degree for Preschool Teachers) and another six requiring a low level of education.

Table 30. Fastest Growing Occupations in the Education & Training Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Employment % Change	Typical Level of Education Needed for Entry
Low	25-3021.00	Self-Enrichment Education Teachers	4	4	5	243,080	$44,960	14.9	High school diploma or equivalent
	39-9031.00	Fitness Trainers and Aerobics Instructors	4	4	4	308,470	$44,580	9.8	High school diploma or equivalent
	43-4121.00	Library Assistants, Clerical	3	4	3	88,970	$28,960	9.4	High school diploma or equivalent
	39-9032.00	Recreation Workers	3	4	4	353,570	$28,310	8.5	High school diploma or equivalent
	25-9041.00	Teacher Assistants	4	4	3	1,331,560	$28,750	8.4	Some college, no degree
Middle	25-2011.00	Preschool Teachers, Except Special Education	4	4	5	424,520	$34,410	10.5	Associates degree
	25-4031.00	Library Technicians	4	4	4	88,690	$36,080	9.1	Postsecondary nondegree award
High	25-1071.00	Health Specialties Teachers, Postsecondary	6	7	6	199,480	$122,320	25.9	Doctoral or professional degree
	25-1011.00	Business Teachers, Postsecondary	4	7	6	84,230	$103,330	18.1	Doctoral or professional degree
	27-3091.00	Interpreters and Translators	3	4	4	57,140	$55,230	16.7	Bachelor's degree
	25-1066.00	Psychology Teachers, Postsecondary	7	7	6	37,630	$88,490	15.1	Doctoral or professional degree
	25-1032.00	Engineering Teachers, Postsecondary	7	7	7	37,530	$113,680	14.5	Doctoral or professional degree

Table 31. Highest Paying Occupations in the Education & Training Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Low	27-2021.00	Athletes and Sports Competitors	0	4	4	10,800	$87,030	1,700	No formal educational credential
	25-3021.00	Self-Enrichment Education Teachers	4	4	5	243,080	$44,960	46,300	High school diploma or equivalent
	39-9031.00	Fitness Trainers and Aerobics Instructors	4	4	4	308,470	$44,580	54,800	High school diploma or equivalent
	43-4121.00	Library Assistants, Clerical	3	4	3	88,970	$28,960	16,300	High school diploma or equivalent
	25-9041.00	Teacher Assistants	4	4	3	1,331,560	$28,750	147,900	Some college, no degree
Middle	25-4031.00	Library Technicians	4	4	4	88,690	$36,080	14,400	Postsecondary nondegree award
	25-2011.00	Preschool Teachers, Except Special Education	4	4	5	424,520	$34,410	53,600	Associates degree
High	25-1071.00	Health Specialties Teachers, Postsecondary	6	7	6	199,480	$122,320	25,800	Doctoral or professional degree
	25-1032.00	Engineering Teachers, Postsecondary	7	7	7	37,530	$113,680	4,500	Doctoral or professional degree
	11-9033.00	Education Administrators, Postsecondary	5	5	5	143,430	$111,210	15,700	Master's degree
	25-1011.00	Business Teachers, Postsecondary	4	7	6	84,230	$103,330	10,400	Doctoral or professional degree
	25-1031.00	Architecture Teachers, Postsecondary	7	7	7	6,880	$99,320	800	Doctoral or professional degree

Career Pathway Readiness for Education & Training Careers

The aggregated WorkKeys skills benchmarks indicate that for the low and middle education groups, Level 4 is the lowest level of Applied Math and Workplace Documents skills needed for Education & Training careers; however, higher levels are needed for the high education group—such as a Level 7 for Workplace Documents—which comprises the majority of occupations for this cluster (Table 32).

Table 32. Career Pathway Readiness Benchmarks – Education & Training

Education Group	Number of Occupations	Applied Math	Workplace Documents	Graphic Literacy
	SKILL LEVEL REQUIRED FOR 85% OF OCCUPATIONS			
Low Education Occupations	6	4	4	4
Middle Education Occupations	2	4	4	5
High Education Occupations	52	5	7	6

Source: ACT Occupational Profiles

Education & Training Career Pathway Readiness of US WorkKeys Examinees

Table 33. Examinee Gap Analysis for Education & Training – Percentage of Examinees that Met or Exceeded Median Skill Level Requirements

Education Group (Examinees and Occupations)	Applied Math	Workplace Documents	Graphic Literacy	All Three
Low Education	73%	79%	78%	64%
Middle Education	85%	92%	74%	69%
High Education	72%	23%	51%	20%

Less than a quarter (20%) of examinees with a high level of educational attainment met or exceeded all three skill benchmarks for the high education group in the Education & Training career cluster (as shown in Table 33).

The Finance Career Cluster

Occupations in the Finance career cluster constituted 4% of total occupational employment in the US in 2018. Finance careers are projected to grow more than 6% from 2016–2026, with more than 600,000 average openings a year due to growth and replacement.

Table 34. Most Openings Occupations in the Finance Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Low	41-4012.00	Sales Representatives, Wholesale and Manufacturing	5	5	4	1,350,180	$69,480	159,100	High school diploma or equivalent
	41-3021.00	Insurance Sales Agents	4	5	5	393,830	$67,890	54,500	High school diploma or equivalent
	43-3071.00	Tellers	3	4	4	468,470	$30,140	51,500	High school diploma or equivalent
	41-9041.00	Telemarketers	3	4	4	164,160	$28,550	33,300	No formal educational credential
	43-3011.00	Bill and Account Collectors	3	4	4	251,330	$38,220	30,200	High school diploma or equivalent
Middle	13-1032.00	Insurance Appraisers, Auto Damage	4	5	4	15,200	$65,510	1,500	Postsecondary nondegree award
High	11-3031.00	Financial Managers	5	5	5	608,120	$146,830	56,800	Bachelor's degree
	41-3031.00	Securities, Commodities, and Financial Services Sales Agents	4	4	4	415,890	$98,770	38,000	Bachelor's degree
	13-2072.00	Loan Officers	4	5	4	304,950	$76,270	30,500	Bachelor's degree
	13-2051.00	Financial Analysts	5	5	4	306,200	$100,990	29,000	Bachelor's degree
	13-2052.00	Personal Financial Advisors	4	4	4	200,260	$121,770	25,400	Bachelor's degree

The Finance cluster is largely made up of jobs that require either a low or high level of education for entry. There is only one occupation in this cluster that requires a middle level of education (in this case, an Associates Degree for Insurance Appraisers).

Table 35. Fastest Growing Occupations in the Finance Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Employment % Change	Typical Level of Education Needed for Entry
Low	43-4131.00	Loan Interviewers and Clerks	3	4	4	222,620	$41,310	12.4	High school diploma or equivalent
	43-3099.00	Financial Clerks, All Other	4	4	4	31,010	$43,670	9.9	High school diploma or equivalent
	41-3021.00	Insurance Sales Agents	4	5	5	393,830	$67,890	9.7	High school diploma or equivalent
	41-4012.00	Sales Representatives, Wholesale and Manufacturing	5	5	4	1,350,180	$69,480	5.5	High school diploma or equivalent
	41-9041.00	Telemarketers	3	4	4	164,160	$28,550	-	No formal educational credential
Middle	13-1032.00	Insurance Appraisers, Auto Damage	4	5	4	15,200	$65,510	4.9	Postsecondary nondegree award
High	15-2011.00	Actuaries	7	7	7	20,760	$116,250	22.5	Bachelor's degree
	11-3031.00	Financial Managers	5	5	5	608,120	$146,830	18.7	Bachelor's degree
	25-1011.00	Business Teachers, Postsecondary	4	7	6	84,230	$103,330	18.1	Doctoral or professional degree
	13-2052.00	Personal Financial Advisors	4	4	4	200,260	$121,770	14.4	Bachelor's degree
	13-2071.00	Credit Counselors	4	4	4	35,740	$49,820	13.9	Bachelor's degree

Table 36. Highest Paying Occupations in the Finance Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Low	41-4012.00	Sales Representatives, Wholesale and Manufacturing	5	5	4	1,350,180	$69,480	159,100	High school diploma or equivalent
	41-3021.00	Insurance Sales Agents	4	5	5	393,830	$67,890	54,500	High school diploma or equivalent
	13-1031.00	Claims Adjusters, Examiners, and Investigators	3	4	4	287,730	$67,540	24,500	High school diploma or equivalent
	43-3099.00	Financial Clerks, All Other	4	4	4	31,010	$43,670	4,300	High school diploma or equivalent
	43-4131.00	Loan Interviewers and Clerks	3	4	4	222,620	$41,310	25,700	High school diploma or equivalent
Middle	13-1032.00	Insurance Appraisers, Auto Damage	4	5	4	15,200	$65,510	1,500	Postsecondary nondegree award
High	11-3031.00	Financial Managers	5	5	5	608,120	$146,830	56,800	Bachelor's degree
	13-2052.00	Personal Financial Advisors	4	4	4	200,260	$121,770	25,400	Bachelor's degree
	15-2011.00	Actuaries	7	7	7	20,760	$116,250	2,100	Bachelor's degree
	25-1011.00	Business Teachers, Postsecondary	4	7	6	84,230	$103,330	10,400	Doctoral or professional degree
	13-2051.00	Financial Analysts	5	5	4	306,200	$100,990	29,000	Bachelor's degree

Career Pathway Readiness for Finance Careers

The aggregated WorkKeys skills benchmarks indicate that, across the low and middle education groups, Level 4 is the lowest level of Graphic Literacy and Applied Math skills needed for Finance careers (Table 37). However, Level 5 is the Applied Math, Graphic Literacy, and Workplace Documents benchmark for high education Finance careers, though some occupations require higher levels (e.g., actuaries).

Table 37. Career Pathway Readiness Benchmarks - Finance

Education Group	Number of Occupations	Applied Math	Workplace Documents	Graphic Literacy
	SKILL LEVEL REQUIRED FOR 85% OF OCCUPATIONS			
Low Education Occupations	13	4	4	4
Middle Education Occupations	1	4	5	4
High Education Occupations	21	5	5	5

Source: ACT Occupational Profiles

Finance Career Pathway Readiness of US WorkKeys Examinees

Table 38. Examinee Gap Analysis for Finance – Percentage of Examinees that Met or Exceeded Median Skill Level Requirements

Education Group (Examinees and Occupations)	Applied Math	Workplace Documents	Graphic Literacy	All Three
Low Education	73%	79%	78%	64%
Middle Education	85%	64%	87%	60%
High Education	72%	76%	81%	62%

The majority of examinees across low, middle, and high levels of educational attainment met or exceeded all three skill benchmarks for low, middle, and high education groups in the Finance career cluster (Table 38).

The Government & Public Administration Career Cluster

Occupations in the Government & Public Administration career cluster constituted 4% of total occupational employment in the US in 2018. Government & Public Administration careers are projected to grow more than 8% from 2016–2026, with more than 500,000 average openings a year due to growth and replacement.

Table 39. Most Openings Occupations in the Government & Public Administration Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Low	13-2082.00	Tax Preparers	4	4	4	68,090	$46,860	11,500	High school diploma or equivalent
	17-3031.00	Surveying and Mapping Technicians	5	4	5	52,300	$47,690	7,200	High school diploma or equivalent
	33-9093.00	Transportation Security Screeners	3	4	4	45,250	$41,860	4,200	High school diploma or equivalent
	53-6051.07	Transportation Vehicle, Equipment and Systems Inspectors	3	3	3	29,990	$75,330	2,900	High school diploma or equivalent
	11-9131.00	Postmasters and Mail Superintendents	4	4	4	13,770	$77,040	600	High school diploma or equivalent
High	11-1021.00	General and Operations Managers	5	5	5	2,289,770	$123,880	210,800	Bachelor's degree
	13-2011.00	Accountants and Auditors	5	4	5	1,259,930	$78,820	141,800	Bachelor's degree
	11-9199.00	Managers, All Other	4	5	4	462,840	$115,590	78,700	Bachelor's degree
	11-3011.00	Administrative Services Managers	5	5	4	283,570	$106,050	26,200	Bachelor's degree
	13-1041.00	Compliance Officers	3	4	4	300,900	$72,520	25,900	Bachelor's degree

The Government & Public Administration cluster is entirely made up of jobs that require either a low or high level of education for entry. There are no occupations in this cluster that requires a middle level of education.

Table 40. Fastest Growing Occupations in the Government & Public Administration Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Employment % Change	Typical Level of Education Needed for Entry
Low	13-2082.00	Tax Preparers	4	4	4	68,090	$46,860	10.8	High school diploma or equivalent
	17-3031.00	Surveying and Mapping Technicians	5	4	5	52,300	$47,690	10.6	High school diploma or equivalent
	11-3071.00	Transportation, Storage, and Distribution Managers	4	4	4	124,810	$102,850	6.7	High school diploma or equivalent
	53-6051.07	Transportation Vehicle, Equipment and Systems Inspectors	3	3	3	29,990	$75,330	5.9	High school diploma or equivalent
	33-9093.00	Transportation Security Screeners	3	4	4	45,250	$41,860	2.6	High school diploma or equivalent
High	11-9151.00	Social and Community Service Managers	4	5	4	149,870	$71,670	15.7	Bachelor's degree
	19-3051.00	Urban and Regional Planners	6	6	6	37,840	$76,240	12.8	Master's degree
	11-3011.00	Administrative Services Managers	5	5	4	283,570	$106,050	10.1	Bachelor's degree
	13-2011.00	Accountants and Auditors	5	4	5	1,259,930	$78,820	10.0	Bachelor's degree
	13-2061.00	Financial Examiners	5	4	4	58,590	$90,310	9.8	Bachelor's degree

Table 41. Highest Paying Occupations in the Government & Public Administration Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Low	11-3071.00	Transportation, Storage, and Distribution Managers	4	4	4	124,810	$102,850	9,700	High school diploma or equivalent
	11-9131.00	Postmasters and Mail Superintendents	4	4	4	13,770	$77,040	600	High school diploma or equivalent
	53-6051.07	Transportation Vehicle, Equipment and Systems Inspectors	3	3	3	29,990	$75,330	2,900	High school diploma or equivalent
	17-3031.00	Surveying and Mapping Technicians	5	4	5	52,300	$47,690	7,200	High school diploma or equivalent
	13-2082.00	Tax Preparers	4	4	4	68,090	$46,860	11,500	High school diploma or equivalent
High	11-9041.00	Architectural and Engineering Managers	7	7	5	188,290	$148,970	13,600	Bachelor's degree
	11-1021.00	General and Operations Managers	5	5	5	2,289,770	$123,880	210,800	Bachelor's degree
	11-9199.00	Managers, All Other	4	5	4	462,840	$115,590	78,700	Bachelor's degree
	19-3094.00	Political Scientists	6	7	7	5,660	$115,300	700	Master's degree
	11-3011.00	Administrative Services Managers	5	5	4	283,570	$106,050	26,200	Bachelor's degree

Career Readiness Benchmarks for Government & Public Administration Careers

The aggregated WorkKeys skills benchmarks indicate that, across low and high education groups, Level 5 is the lowest level of Applied Math skills needed for Government & Public Administration careers (Table 42). However, the high education group in the Government career cluster requires at least a Level 7 for Workplace Documents and a Level 6 for Graphic Literacy.

Table 42. Career Pathway Readiness Benchmarks – Government & Public Administration

Education Group	Number of Occupations	Applied Math	Workplace Documents	Graphic Literacy
	SKILL LEVEL REQUIRED FOR 85% OF OCCUPATIONS			
Low Education Occupations	11	5	4	5
Middle Education Occupations	0	N/A	N/A	N/A
High Education Occupations	26	5	7	6

Source: ACT Occupational Profiles
Note: N/A = number of occupations within a career cluster education group insufficient to calculate a benchmark.

Government & Public Administration Career Pathway Readiness of US WorkKeys Examinees

Table 43. Examinee Gap Analysis for Government & Public Administration – Percentage of Examinees that Met or Exceeded Median Skill Level Requirements

Education Group (Examinees and Occupations)	Applied Math	Workplace Documents	Graphic Literacy	All Three
Low Education	45%	79%	63%	40%
Middle Education	—	—	—	—
High Education	72%	23%	51%	20%

Less than half (40%) of examinees with a low level and only a fifth (20%) with a high level of educational attainment met or exceeded all three skill benchmarks for the low and high education groups in the Government career cluster (as shown in Table 43).

The Health Science Career Cluster

Occupations in the Health Science career cluster constituted 14% of total occupational employment in the US in 2018. Health Science careers are projected to grow more than 14% from 2016–2026, with more than two million average openings a year due to growth and replacement.

Table 44. Most Openings Occupations in the Health Science Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Low	31-1011.00	Home Health Aides	3	4	4	797,670	$25,330	167,700	High school diploma or equivalent
	43-1011.00	First-Line Supervisors of Office and Administrative Support Workers	4	4	4	1,477,560	$59,340	153,000	High school diploma or equivalent
	43-4171.00	Receptionists and Information Clerks	3	4	4	1,043,630	$30,350	151,200	High school diploma or equivalent
	35-1012.00	First-Line Supervisors of Food Preparation and Serving Workers	4	5	4	964,400	$36,190	146,200	High school diploma or equivalent
	43-6013.00	Medical Secretaries	3	5	4	585,410	$37,090	80,800	High school diploma or equivalent
Middle	31-1014.00	Nursing Assistants	3	4	4	1,450,960	$29,580	193,600	Postsecondary nondegree award
	31-9092.00	Medical Assistants	4	4	4	673,660	$34,540	95,000	Postsecondary nondegree award
	29-2061.00	Licensed Practical and Licensed Vocational Nurses	4	4	4	701,690	$47,050	62,700	Postsecondary nondegree award
	31-9091.00	Dental Assistants	3	4	4	341,060	$39,770	45,900	Postsecondary nondegree award
	31-9011.00	Massage Therapists	3	4	4	105,160	$45,880	21,900	Postsecondary nondegree award
High	29-1141.00	Registered Nurses	5	5	4	2,951,960	$75,510	203,600	Bachelor's degree
	11-9111.00	Medical and Health Services Managers	4	4	4	372,670	$113,730	36,400	Bachelor's degree
	11-3011.00	Administrative Services Managers	5	5	4	283,570	$106,050	26,200	Bachelor's degree
	25-1071.00	Health Specialties Teachers, Postsecondary	6	7	6	199,480	$122,320	25,800	Doctoral or professional degree
	21-1014.00	Mental Health Counselors	4	4	4	158,000	$46,740	20,800	Master's degree

Table 45. Fastest Growing Occupations in the Health Science Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Employment % Change	Typical Level of Education Needed for Entry
Low	31-1011.00	Home Health Aides	3	4	4	797,670	$25,330	46.7	High school diploma or equivalent
	31-2022.00	Physical Therapist Aides	3	4	4	47,260	$28,500	29.1	High school diploma or equivalent
	31-2012.00	Occupational Therapy Aides	4	4	3	7,700	$32,580	24.7	High school diploma or equivalent
	43-6013.00	Medical Secretaries	3	5	4	585,410	$37,090	22.5	High school diploma or equivalent
	53-3011.00	Ambulance Drivers and Attendants, Except EMTs	3	4	3	15,380	$29,010	21.9	High school diploma or equivalent
Middle	31-2021.00	Physical Therapist Assistants	4	4	4	94,250	$57,750	30.8	Associates degree
	31-9092.00	Medical Assistants	4	4	4	673,660	$34,540	29.1	Postsecondary nondegree award
	31-2011.00	Occupational Therapy Assistants	4	4	4	42,660	$60,410	28.9	Associates degree
	31-9097.00	Phlebotomists	3	4	4	125,280	$35,560	24.4	Postsecondary nondegree award
	31-9011.00	Massage Therapists	3	4	4	105,160	$45,880	23.5	Postsecondary nondegree award
High	29-1071.00	Physician Assistants	6	6	7	114,710	$108,430	37.4	Master's degree
	29-1171.00	Nurse Practitioners	6	5	4	179,650	$110,030	36.0	Master's degree
	29-9092.00	Genetic Counselors	5	5	4	2,640	$80,860	28.3	Master's degree
	25-1071.00	Health Specialties Teachers, Postsecondary	6	7	6	199,480	$122,320	25.9	Doctoral or professional degree
	29-1123.00	Physical Therapists	4	6	5	228,600	$88,880	25.0	Doctoral or professional degree

Table 46. Highest Paying Occupations in the Health Science Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Low	13-1031.00	Claims Adjusters, Examiners, and Investigators	3	4	4	287,730	$67,540	24,500	High school diploma or equivalent
	43-6011.00	Executive Secretaries and Executive Administrative Assistants	4	4	4	570,530	$61,550	54,600	High school diploma or equivalent
	43-1011.00	First-Line Supervisors of Office and Administrative Support Workers	4	4	4	1,477,560	$59,340	153,000	High school diploma or equivalent
	29-2092.00	Hearing Aid Specialists	4	4	4	7,680	$55,650	600	High school diploma or equivalent
	29-9012.00	Occupational Health and Safety Technicians	5	4	4	18,020	$55,270	1,100	High school diploma or equivalent
Middle	29-1124.00	Radiation Therapists	4	6	5	18,260	$86,730	1,200	Associates degree
	19-4051.00	Nuclear Technicians	4	4	4	7,230	$79,970	800	Associates degree
	29-2033.00	Nuclear Medicine Technologists	3	4	4	18,810	$78,870	1,300	Associates degree
	29-2021.00	Dental Hygienists	3	4	4	215,150	$75,500	17,500	Associates degree
	29-2032.00	Diagnostic Medical Sonographers	3	4	4	71,130	$73,860	5,400	Associates degree
High	29-1061.00	Anesthesiologists	6	7	7	31,060	$267,020	1,500	Doctoral or professional degree
	29-1067.00	Surgeons	6	7	7	34,390	$255,110	2,000	Doctoral or professional degree
	29-1022.00	Oral and Maxillofacial Surgeons	6	7	7	4,830	$242,370	300	Doctoral or professional degree
	29-1064.00	Obstetricians and Gynecologists	6	7	7	18,590	$238,320	1,000	Doctoral or professional degree
	29-1023.00	Orthodontists	6	7	7	5,350	$225,760	300	Doctoral or professional degree

Career Pathway Readiness for Health Science Careers

The aggregated WorkKeys skills benchmarks indicate that, for the low and middle education groups, Level 4 is the lowest level of Graphic Literacy, Workplace Documents, and Applied Math skills needed for the Health Science career cluster (Table 47). However, the high education group in the Health Science career cluster requires at least a Level 6 for Applied Math and a Level 7 for both Graphic Literacy and Workplace Documents.

Table 47. Career Pathway Readiness Benchmarks – Health Science

Education Group	Number of Occupations	Applied Math	Workplace Documents	Graphic Literacy
	SKILL LEVEL REQUIRED FOR 85% OF OCCUPATIONS			
Low Education Occupations	31	4	4	4
Middle Education Occupations	37	4	4	4
High Education Occupations	91	6	7	7

Source: ACT Occupational Profiles

Health Science Career Pathway Readiness of US WorkKeys Examinees

Table 48. Examinee Gap Analysis for Health Science – Percentage of Examinees that Met or Exceeded Median Skill Level Requirements

Education Group (Examinees and Occupations)	Applied Math	Workplace Documents	Graphic Literacy	All Three
Low Education	73%	79%	78%	64%
Middle Education	85%	92%	87%	78%
High Education	50%	23%	19%	10%

Very few examinees with a high level of educational attainment (10%) met or exceeded all three skill benchmarks for careers that required a similar level of education in the Health Science career cluster (as shown in Table 48). This is most likely due to a low volume of examinees with PhD or higher levels of education in the WorkKeys examinee data, as many of the occupations in the high education group for this cluster require advanced degrees.

The Hospitality & Tourism Career Cluster

Occupations in the Hospitality & Tourism career cluster constituted 13% of total occupational employment in the US in 2018. Hospitality & Tourism careers are projected to grow more than 9% from 2016–2026, with more than three million average openings a year due to growth and replacement.

Table 49. Most Openings Occupations in the Hospitality & Tourism Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Low	35-3021.00	Combined Food Preparation and Serving Workers	3	3	3	3,676,180	$22,140	736,000	No formal educational credential
	35-3031.00	Waiters and Waitresses	3	3	3	2,582,410	$25,830	522,700	No formal educational credential
	37-2011.00	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	3	3	3	2,156,270	$28,950	343,500	No formal educational credential
	37-2012.00	Maids and Housekeeping Cleaners	3	3	3	924,290	$25,570	200,800	No formal educational credential
	35-2014.00	Cooks, Restaurant	3	3	4	1,340,810	$27,580	195,300	No formal educational credential
Middle	35-2013.00	Cooks, Private Household	3	3	4	460	$41,240	3,700	Postsecondary nondegree award
High	11-9199.00	Managers, All Other	4	5	4	462,840	$115,590	78,700	Bachelor's degree
	25-9021.00	Farm and Home Management Advisors	5	5	5	8,020	$52,700	1,000	Master's degree

The Hospitality & Tourism cluster is largely made up of jobs that require a low level of education for entry. There is only one occupation in this cluster that requires a middle level of education (in this case, a Postsecondary Non-Degree Award for Private Household Cooks) and two occupations that require a high level of education (a Bachelor's Degree for Managers and a Master's Degree for Farm and Home Management Advisors).

Table 50. Fastest Growing Occupations in the Hospitality & Tourism Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Employment % Change	Typical Level of Education Needed for Entry
Low	35-3021.00	Combined Food Preparation and Serving Workers	3	3	3	3,676,180	$22,140	16.8	No formal educational credential
	39-9041.00	Residential Advisors	3	3	3	108,380	$29,970	12.9	High school diploma or equivalent
	37-2019.00	Building Cleaning Workers, All Other	3	3	3	13,650	$32,710	12.6	No formal educational credential
	35-2014.00	Cooks, Restaurant	3	3	4	1,340,810	$27,580	11.8	No formal educational credential
	39-3099.00	Entertainment Attendants and Related Workers, All Other	3	3	4	5,480	$29,690	11.4	High school diploma or equivalent
Middle	35-2013.00	Cooks, Private Household	3	3	4	460	$41,240	5.7	Postsecondary nondegree award
High	11-9199.00	Managers, All Other	4	5	4	462,840	$115,590	7.6	Bachelor's degree
	25-9021.00	Farm and Home Management Advisors	5	5	5	8,020	$52,700	7.3	Master's degree

Table 51. Highest Paying Occupations in the Hospitality & Tourism Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Low	11-9071.00	Gaming Managers	4	4	4	4,300	$85,260	500	High school diploma or equivalent
	11-9081.00	Lodging Managers	5	5	5	37,050	$62,270	5,100	High school diploma or equivalent
	11-9051.00	Food Service Managers	3	4	4	219,160	$58,960	36,700	High school diploma or equivalent
	35-1011.00	Chefs and Head Cooks	3	4	4	128,600	$52,160	20,300	High school diploma or equivalent
	39-1011.00	Gaming Supervisors	4	4	4	39,000	$48,850	6,200	High school diploma or equivalent
Middle	35-2013.00	Cooks, Private Household	3	3	4	460	$41,240	3,700	Postsecondary nondegree award
High	11-9199.00	Managers, All Other	4	5	4	462,840	$115,590	78,700	Bachelor's degree
	25-9021.00	Farm and Home Management Advisors	5	5	5	8,020	$52,700	1,000	Master's degree

Career Pathway Readiness for Hospitality & Tourism Careers

The aggregated WorkKeys skills benchmarks indicate that for the low education group Level 4 is the lowest level of Graphic Literacy, Applied Math, and Workplace Documents skills needed for Hospitality & Tourism careers (Table 52). However, the high education group in the Hospitality career cluster requires at least a Level 5 for Workplace Documents, Graphic Literacy, and Applied Math.

Table 52. Career Pathway Readiness Benchmarks – Hospitality & Tourism

Education Group	Number of Occupations	Applied Math	Workplace Documents	Graphic Literacy
	SKILL LEVEL REQUIRED FOR 85% OF OCCUPATIONS			
Low Education Occupations	46	4	4	4
Middle Education Occupations	1	3	3	4
High Education Occupations	2	5	5	5

Source: ACT Occupational Profiles

Hospitality & Tourism Career Pathway Readiness of US WorkKeys Examinees

Table 53. Examinee Gap Analysis for Hospitality & Tourism – Percentage of Examinees that Met or Exceeded Median Skill Level Requirements

Education Group (Examinees and Occupations)	Applied Math	Workplace Documents	Graphic Literacy	All Three
Low Education	73%	79%	78%	64%
Middle Education	98%	99%	87%	86%
High Education	72%	76%	81%	62%

The majority of examinees with a low, middle, and high level of educational attainment met or exceeded all three skill benchmarks across all education groups in the Hospitality & Tourism career cluster (as shown in Table 53).

The Human Services Career Cluster

Occupations in the Human Services career cluster constituted 7% of total occupational employment in the US in 2018. Human Services careers are projected to grow more than 13% from 2016–2026, with more than one million average openings a year due to growth and replacement.

Table 54. Most Openings Occupations in the Human Services Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Low	39-9021.00	Personal Care Aides	3	4	3	2,211,950	$25,090	410,300	High school diploma or equivalent
	39-9011.00	Childcare Workers	3	4	3	564,630	$24,610	188,800	High school diploma or equivalent
	41-1011.00	First-Line Supervisors of Retail Sales Workers	4	4	4	1,181,530	$45,080	171,400	High school diploma or equivalent
	39-9032.00	Recreation Workers	3	4	4	353,570	$28,310	70,600	High school diploma or equivalent
	39-1021.00	First-Line Supervisors of Personal Service Workers	4	4	4	228,620	$41,710	30,900	High school diploma or equivalent
Middle	39-5012.00	Hairdressers, Hairstylists, and Cosmetologists	3	3	4	377,210	$30,190	82,400	Postsecondary nondegree award
	25-2011.00	Preschool Teachers, Except Special Education	4	4	5	424,520	$34,410	53,600	Associates degree
	39-5092.00	Manicurists and Pedicurists	3	3	3	110,170	$25,860	16,400	Postsecondary nondegree award
	39-5094.00	Skincare Specialists	3	3	4	50,740	$36,350	8,000	Postsecondary nondegree award
	39-5011.00	Barbers	3	3	4	20,130	$33,220	5,800	Postsecondary nondegree award
High	21-1021.00	Child, Family, and School Social Workers	4	4	4	320,170	$49,760	37,900	Bachelor's degree
	11-2022.00	Sales Managers	4	5	5	379,050	$140,320	36,200	Bachelor's degree
	21-2011.00	Clergy	4	5	5	50,960	$53,290	29,200	Bachelor's degree
	21-1022.00	Healthcare Social Workers	4	4	4	168,190	$58,470	22,500	Master's degree
	11-2021.00	Marketing Managers	7	5	5	240,440	$147,240	21,300	Bachelor's degree

Table 55. Fastest Growing Occupations in the Human Services Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Employment % Change	Typical Level of Education Needed for Entry
Low	39-9021.00	Personal Care Aides	3	4	3	2,211,950	$25,090	37.4	High school diploma or equivalent
	21-1094.00	Community Health Workers	4	4	4	56,130	$43,480	18.1	High school diploma or equivalent
	39-1021.00	First-Line Supervisors of Personal Service Workers	4	4	4	228,620	$41,710	13.0	High school diploma or equivalent
	39-5093.00	Shampooers	3	3	3	13,720	$22,160	12.2	No formal educational credential
	39-3093.00	Locker Room, Coatroom, and Dressing Room Attendants	3	3	3	17,610	$26,720	8.7	High school diploma or equivalent
Middle	39-5094.00	Skincare Specialists	3	3	4	50,740	$36,350	12.6	Postsecondary nondegree award
	39-5092.00	Manicurists and Pedicurists	3	3	3	110,170	$25,860	12.0	Postsecondary nondegree award
	39-5091.00	Makeup Artists, Theatrical and Performance	3	4	3	3,140	$72,030	11.2	Postsecondary nondegree award
	39-5012.00	Hairdressers, Hairstylists, and Cosmetologists	3	3	4	377,210	$30,190	10.6	Postsecondary nondegree award
	25-2011.00	Preschool Teachers, Except Special Education	4	4	5	424,520	$34,410	10.5	Associates degree
High	21-1013.00	Marriage and Family Therapists	4	4	4	48,520	$54,150	20.2	Master's degree
	21-1011.00	Substance Abuse and Behavioral Disorder Counselors	3	5	4	102,000	$46,740	19.9	Bachelor's degree
	21-1014.00	Mental Health Counselors	4	4	4	158,000	$46,740	19.8	Master's degree
	21-1022.00	Healthcare Social Workers	4	4	4	168,190	$58,470	18.5	Master's degree
	21-1023.00	Mental Health and Substance Abuse Social Workers	4	4	4	116,750	$49,630	17.9	Master's degree

Table 56. Highest Paying Occupations in the Human Services Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Low	43-4061.00	Eligibility Interviewers, Government Programs	4	5	4	137,830	$46,480	13,600	High school diploma or equivalent
	41-1011.00	First-Line Supervisors of Retail Sales Workers	4	4	4	1,181,530	$45,080	171,400	High school diploma or equivalent
	21-1094.00	Community Health Workers	4	4	4	56,130	$43,480	8,500	High school diploma or equivalent
	39-1021.00	First-Line Supervisors of Personal Service Workers	4	4	4	228,620	$41,710	30,900	High school diploma or equivalent
	51-6052.00	Tailors, Dressmakers, and Custom Sewers	3	3	4	21,150	$34,330	5,500	No formal educational credential
Middle	11-9061.00	Funeral Service Managers	5	6	5	8,400	$93,820	2,000	Associates degree
	39-5091.00	Makeup Artists, Theatrical and Performance	3	4	3	3,140	$72,030	600	Postsecondary nondegree award
	39-4031.00	Morticians, Undertakers, and Funeral Directors	5	6	5	25,740	$57,620	3,700	Associates degree
	39-4011.00	Embalmers	5	6	4	4,070	$46,640	600	Associates degree
	39-5094.00	Skincare Specialists	3	3	4	50,740	$36,350	8,000	Postsecondary nondegree award
High	11-2022.00	Sales Managers	4	5	5	379,050	$140,320	36,200	Bachelor's degree
	11-9121.00	Natural Sciences Managers	6	5	4	60,260	$139,680	5,200	Bachelor's degree
	11-9199.00	Managers, All Other	4	5	4	462,840	$115,590	78,700	Bachelor's degree
	19-3094.00	Political Scientists	6	7	7	5,660	$115,300	700	Master's degree
	15-2021.00	Mathematicians	7	7	7	2,580	$104,870	300	Master's degree

Career Pathway Readiness for Human Services Careers

The aggregated WorkKeys skills benchmarks indicate that, for the low education group, Level 4 is the lowest level of Graphic Literacy, Applied Math, and Workplace Documents skills needed for Human Services careers (Table 57). However, for the high education group, higher skill levels are required: Level 6 for Graphic Literacy and Applied Math and Level 7 for Workplace Documents.

Table 57. Career Pathway Readiness Benchmarks – Human Services

Education Group	Number of Occupations	Applied Math	Workplace Documents	Graphic Literacy
	SKILL LEVEL REQUIRED FOR 85% OF OCCUPATIONS			
Low Education Occupations	19	4	4	4
Middle Education Occupations	9	5	6	5
High Education Occupations	47	6	7	6

Source: ACT Occupational Profiles

Human Services Career Pathway Readiness of US WorkKeys Examinees

Table 58. Examinee Gap Analysis for Human Services – Percentage of Examinees that Met or Exceeded Median Skill Level Requirements

Education Group (Examinees and Occupations)	Applied Math	Workplace Documents	Graphic Literacy	All Three
Low Education	73%	79%	78%	64%
Middle Education	57%	39%	74%	32%
High Education	50%	23%	51%	18%

Roughly two-thirds (64%) and less than a fifth (18%) of examinees with low and high levels of educational attainment, respectively, met or exceeded all three skill benchmarks for the low and high education groups in the Human Services career cluster (as shown in Table 58).

The Information Technology Career Cluster

Occupations in the Information Technology career cluster constituted 4% of total occupational employment in the US in 2018. Information Technology careers are projected to grow more than 12% from 2016–2026, with more than 400,000 average openings a year due to growth and replacement.

Table 59. Most Openings Occupations in the Information Technology Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Low	15-1151.00	Computer User Support Specialists	4	4	4	630,700	$55,050	55,400	Some college, no degree
	43-9011.00	Computer Operators	3	5	4	34,700	$46,750	3,400	High school diploma or equivalent
Middle	15-1152.00	Computer Network Support Specialists	5	5	4	181,360	$68,050	16,500	Associates degree
	15-1134.00	Web Developers	5	5	6	127,300	$75,580	14,200	Associates degree
	51-4012.00	Computer Numerically Controlled Machine Tool Programmers	4	4	4	23,770	$56,300	3,100	Postsecondary nondegree award
High	15-1132.00	Software Developers, Applications	4	4	4	903,160	$108,080	85,500	Bachelor's degree
	15-1121.00	Computer Systems Analysts	5	4	4	587,970	$93,610	44,800	Bachelor's degree
	15-1133.00	Softw are Developers, Systems Software	4	5	4	405,330	$114,000	32,700	Bachelor's degree
	11-3021.00	Computer and Information Systems Managers	5	5	5	391,430	$152,860	32,500	Bachelor's degree
	15-1142.00	Network and Computer Systems Administrators	5	5	4	366,250	$87,070	27,000	Bachelor's degree

The Information Technology cluster is largely made up of jobs that require a high level of education for entry. There are only two occupations in this cluster that require a low level of education (Some College, No Degree for Computer User Support Specialists and High School Diploma for Computer Operators) and three that requires a middle level of education (in this case, an Associates Degree for Computer Network Support Specialists and Web Developers and a Postsecondary Non-Degree Award for CNC Machine Tool Programmers) (Table 59).

Table 60. Fastest Growing Occupations in the Information Technology Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Employment % Change	Typical Level of Education Needed for Entry
Low	15-1151.00	Computer User Support Specialists	4	4	4	630,700	$55,050	11.2	Some college, no degree
	43-9011.00	Computer Operators	3	5	4	34,700	$46,750	(22.9)	High school diploma or equivalent
Middle	51-4012.00	Computer Numerically Controlled Machine Tool Programmers	4	4	4	23,770	$56,300	16.3	Postsecondary nondegree award
	15-1134.00	Web Developers	5	5	6	127,300	$75,580	13.1	Associates degree
	15-1152.00	Computer Network Support Specialists	5	5	4	181,360	$68,050	8.1	Associates degree
High	15-1132.00	Software Developers, Applications	4	4	4	903,160	$108,080	30.5	Bachelor's degree
	15-1122.00	Information Security Analysts	5	6	6	108,060	$102,470	28.4	Bachelor's degree
	25-1032.00	Engineering Teachers, Postsecondary	7	7	7	37,530	$113,680	14.5	Doctoral or professional degree
	11-3021.00	Computer and Information Systems Managers	5	5	5	391,430	$152,860	11.9	Bachelor's degree
	15-1141.00	Database Administrators	5	4	5	110,090	$92,030	11.5	Bachelor's degree

Table 61. Highest Paying Occupations in the Information Technology Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Low	15-1151.00	Computer User Support Specialists	4	4	4	630,700	$55,050	55,400	Some college, no degree
	43-9011.00	Computer Operators	3	5	4	34,700	$46,750	3,400	High school diploma or equivalent
Middle	15-1134.00	Web Developers	5	5	6	127,300	$75,580	14,200	Associates degree
	15-1152.00	Computer Network Support Specialists	5	5	4	181,360	$68,050	16,500	Associates degree
	51-4012.00	Computer Numerically Controlled Machine Tool Programmers	4	4	4	23,770	$56,300	3,100	Postsecondary nondegree award
High	11-3021.00	Computer and Information Systems Managers	5	5	5	391,430	$152,860	32,500	Bachelor's degree
	11-9041.00	Architectural and Engineering Managers	7	7	5	188,290	$148,970	13,600	Bachelor's degree
	17-2061.00	Computer Hardware Engineers	7	6	6	60,750	$117,840	5,100	Bachelor's degree
	15-1133.00	Software Developers, Systems Software	4	5	4	405,330	$114,000	32,700	Bachelor's degree
	25-1032.00	Engineering Teachers, Postsecondary	7	7	7	37,530	$113,680	4,500	Doctoral or professional degree

Career Pathway Readiness for Information Technology Careers

The aggregated WorkKeys skills benchmarks indicate that, across middle and high education groups, Level 5 is the lowest level of Applied Math skills needed for Information Technology careers while Level 4 is the lowest level needed for occupations in the low education group (Table 62).

Table 62. Career Pathway Readiness Benchmarks – Information Technology

Education Group	Number of Occupations	Applied Math	Workplace Documents	Graphic Literacy
	SKILL LEVEL REQUIRED FOR 85% OF OCCUPATIONS			
Low Education Occupations	2	4	5	4
Middle Education Occupations	3	5	5	6
High Education Occupations	30	5	6	5

Source: ACT Occupational Profiles

Information Technology Career Pathway Readiness of US WorkKeys Examinees

Table 63. Examinee Gap Analysis for Information Technology – Percentage of Examinees that Met or Exceeded Median Skill Level Requirements

Education Group (Examinees and Occupations)	Applied Math	Workplace Documents	Graphic Literacy	All Three
Low Education	73%	42%	78%	40%
Middle Education	57%	64%	36%	30%
High Education	72%	55%	81%	50%

Less than half (40%) of examinees with a low level and less than a third (30%) with a middle level of educational attainment met or exceeded all three skill benchmarks for the low and middle education groups in the Information Technology career cluster (as shown in Table 63).

The Law, Public Safety, Corrections, & Security Career Cluster

Occupations in the Law, Public Safety, Corrections, & Security career cluster constituted 4% of total occupational employment in the US in 2018. Law careers are projected to grow more than 6% from 2016–2026, with more than 500,000 average openings a year due to growth and replacement.

Table 64. Most Openings Occupations in the Law, Public Safety, Corrections, & Security Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Low	33-9032.00	Security Guards	3	4	4	1,114,380	$32,050	157,500	High school diploma or equivalent
	33-3051.00	Police and Sheriff's Patrol Officers	3	4	4	661,330	$65,400	49,500	High school diploma or equivalent
	33-9092.00	Lifeguards, Ski Patrol, and Other Recreational Protective Workers	3	4	4	144,370	$24,420	39,700	No formal educational credential
	33-9099.00	Protective Service Workers, All Other	3	4	4	141,790	$34,650	35,200	High school diploma or equivalent
	33-3012.00	Correctional Officers and Jailers	3	4	3	415,000	$49,300	31,300	High school diploma or equivalent
Middle	23-2011.00	Paralegals and Legal Assistants	3	6	3	309,940	$54,500	34,700	Associates degree
	33-2011.00	Firefighters	4	4	4	321,570	$53,240	24,300	Postsecondary nondegree award
	23-2099.00	Legal Support Workers, All Other	4	4	4	43,150	$71,420	4,400	Associates degree
	33-1021.00	First-Line Supervisors of Fire Fighting and Prevention Workers	5	5	4	65,920	$80,310	4,400	Postsecondary nondegree award
	23-2091.00	Court Reporters	4	5	4	14,490	$62,390	1,700	Postsecondary nondegree award
High	23-1011.00	Lawyers	5	7	5	642,750	$144,230	41,900	Doctoral or professional degree
	21-1021.00	Child, Family, and School Social Workers	4	4	4	320,170	$49,760	37,900	Bachelor's degree
	25-1066.00	Psychology Teachers, Postsecondary	7	7	6	37,630	$88,490	4,500	Doctoral or professional degree
	19-4092.00	Forensic Science Technicians	5	5	5	15,970	$62,490	2,200	Bachelor's degree
	25-1112.00	Law Teachers, Postsecondary	5	7	6	16,990	$130,710	1,900	Doctoral or professional degree

Table 65. Fastest Growing Occupations in the Law, Public Safety, Corrections, & Security Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Employment % Change	Typical Level of Education Needed for Entry
Low	33-2022.00	Forest Fire Inspectors and Prevention Specialists	5	4	4	2,130	$49,610	26.6	High school diploma or equivalent
	33-9021.00	Private Detectives and Investigators	4	4	4	30,990	$56,810	10.5	High school diploma or equivalent
	33-9091.00	Crossing Guards	3	4	4	79,880	$31,970	8.5	No formal educational credential
	33-9011.00	Animal Control Workers	3	4	4	12,080	$38,490	8.4	High school diploma or equivalent
	33-9099.00	Protective Service Workers, All Other	3	4	4	141,790	$34,650	8.4	High school diploma or equivalent
Middle	23-2011.00	Paralegals and Legal Assistants	3	6	3	309,940	$54,500	14.6	Associates degree
	33-2021.00	Fire Inspectors and Investigators	5	4	4	12,530	$64,140	7.3	Postsecondary nondegree award
	33-1021.00	First-Line Supervisors of Fire Fighting and Prevention Workers	5	5	4	65,920	$80,310	7.2	Postsecondary nondegree award
	33-2011.00	Firefighters	4	4	4	321,570	$53,240	7.2	Postsecondary nondegree award
	23-2099.00	Legal Support Workers, All Other	4	4	4	43,150	$71,420	3.6	Associates degree
High	19-4092.00	Forensic Science Technicians	5	5	5	15,970	$62,490	16.8	Bachelor's degree
	25-1066.00	Psychology Teachers, Postsecondary	7	7	6	37,630	$88,490	15.1	Doctoral or professional degree
	21-1021.00	Child, Family, and School Social Workers	4	4	4	320,170	$49,760	13.3	Bachelor's degree
	25-1111.00	Criminal Justice and Enforcement Teachers, Postsecondary	5	7	6	14,890	$72,390	12.5	Doctoral or professional degree
	25-1112.00	Law Teachers, Postsecondary	5	7	6	16,990	$130,710	12.2	Doctoral or professional degree

Table 66. Highest Paying Occupations in the Law, Public Safety, Corrections, & Security Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Low	33-1012.00	First-Line Supervisors of Police and Detectives	4	5	4	116,660	$93,100	7,100	High school diploma or equivalent
	33-3021.00	Detectives and Criminal Investigators	3	4	4	103,450	$85,020	7,500	High school diploma or equivalent
	33-3052.00	Transit and Railroad Police	3	4	4	4,470	$74,450	400	High school diploma or equivalent
	33-1011.00	First-Line Supervisors of Correctional Officers	3	5	3	43,760	$68,350	2,500	High school diploma or equivalent
	33-3051.00	Police and Sheriff's Patrol Officers	3	4	4	661,330	$65,400	49,500	High school diploma or equivalent
Middle	33-1021.00	First-Line Supervisors of Fire Fighting and Prevention Workers	5	5	4	65,920	$80,310	4,400	Postsecondary nondegree award
	23-2099.00	Legal Support Workers, All Other	4	4	4	43,150	$71,420	4,400	Associates degree
	33-2021.00	Fire Inspectors and Investigators	5	4	4	12,530	$64,140	1,400	Postsecondary nondegree award
	23-2091.00	Court Reporters	4	5	4	14,490	$62,390	1,700	Postsecondary nondegree award
	23-2011.00	Paralegals and Legal Assistants	3	6	3	309,940	$54,500	34,700	Associates degree
High	23-1011.00	Lawyers	5	7	5	642,750	$144,230	41,900	Doctoral or professional degree
	25-1112.00	Law Teachers, Postsecondary	5	7	6	16,990	$130,710	1,900	Doctoral or professional degree
	23-1023.00	Judges, Magistrate Judges, and Magistrates	5	7	5	28,520	$121,130	1,400	Doctoral or professional degree
	23-1021.00	Administrative Law Judges, Adjudicators, and Hearing Officers	5	7	5	14,280	$101,210	700	Doctoral or professional degree
	25-1066.00	Psychology Teachers, Postsecondary	7	7	6	37,630	$88,490	4,500	Doctoral or professional degree

Career Pathway Readiness for Law, Public Safety, Corrections, & Security Careers

The aggregated WorkKeys skills benchmarks indicate that, across the low and middle education groups, Level 4 is the lowest level of Graphic Literacy skills needed for Law, Public Safety, Corrections, & Security careers. However, for high education occupations, Level 6 is the lowest level of Graphic Literacy skills needed for Law careers.

Table 67. Career Pathway Readiness Benchmarks - Law, Public Safety, Corrections, & Security

Education Group	Number of Occupations	Applied Math	Workplace Documents	Graphic Literacy
	SKILL LEVEL REQUIRED FOR 85% OF OCCUPATIONS			
Low Education Occupations	28	4	4	4
Middle Education Occupations	12	5	5	4
High Education Occupations	12	5	7	6

Source: ACT Occupational Profiles

Law, Public Safety, Corrections, & Security Career Pathway Readiness of US WorkKeys Examinees

Table 68. Examinee Gap Analysis for Law, Public Safety, Corrections, & Security – Percentage of Examinees that Met or Exceeded Median Skill Level Requirements

Education Group (Examinees and Occupations)	Applied Math	Workplace Documents	Graphic Literacy	All Three
Low Education	73%	79%	78%	64%
Middle Education	57%	64%	87%	47%
High Education	72%	23%	51%	20%

Only a fifth (20%) of examinees with a high level of educational attainment and less than half (47%) of those with a middle level of educational attainment met or exceeded all three skill benchmarks for the high and middle education groups in the Law, Public Safety, Corrections, & Security career cluster (as shown in Table 68).

The Manufacturing Career Cluster

Occupations in the Manufacturing career cluster constituted 8% of total occupational employment in the US in 2018. The number of manufacturing careers is projected to decline (-1%) from 2016–2026, with more than one million average openings a year due to growth and replacement.

Table 69. Most Openings Occupations in the Manufacturing Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Low	49-9071.00	Maintenance and Repair Workers, General	4	4	4	1,384,240	$41,020	154,700	High school diploma or equivalent
	53-7064.00	Packers and Packagers, Hand	3	3	4	663,970	$26,490	108,400	No formal educational credential
	51-2092.00	Team Assemblers	3	3	3	1,131,000	$30,720	107,700	High school diploma or equivalent
	51-9198.00	Helpers–Production Workers	3	3	3	350,410	$29,380	72,000	High school diploma or equivalent
	51-9061.00	Inspectors, Testers, Sorters, Samplers, and Weighers	3	4	4	557,510	$42,010	52,700	High school diploma or equivalent
Middle	49-3023.02	Automotive Specialty Technicians	4	4	4	648,050	$43,730	75,900	Postsecondary nondegree award
	17-3023.00	Electrical and Electronic Engineering Technicians	4	5	5	126,950	$65,050	12,000	Associates degree
	19-4099.00	Life, Physical, and Social Science Technicians, All Other	4	4	4	65,220	$52,940	9,900	Associates degree
	17-3022.00	Civil Engineering Technicians	4	4	4	71,150	$54,670	7,200	Associates degree
	17-3029.00	Engineering Technicians, Except Drafters, All Other	4	4	4	83,360	$65,720	7,100	Associates degree
High	19-4021.00	Biological Technicians	4	4	4	77,450	$48,060	8,900	Bachelor's degree
	27-1025.00	Interior Designers	6	5	6	57,070	$59,120	6,600	Bachelor's degree
	29-9011.00	Occupational Health and Safety Specialists	3	4	4	88,390	$74,940	4,900	Bachelor's degree
	27-1022.00	Fashion Designers	3	4	4	19,750	$87,610	2,300	Bachelor's degree
	25-9021.00	Farm and Home Management Advisors	5	5	5	8,020	$52,700	1,000	Master's degree

Table 70. Fastest Growing Occupations in the Manufacturing Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Employment % Change	Typical Level of Education Needed for Entry
Low	47-5071.00	Roustabouts, Oil and Gas	3	3	3	54,810	$40,220	24.5	No formal educational credential
	47-4041.00	Hazardous Materials Removal Workers	3	4	4	44,000	$47,050	17.1	High school diploma or equivalent
	47-4021.00	Elevator Installers and Repairers	4	4	4	26,830	$79,370	12.1	High school diploma or equivalent
	51-9198.00	Helpers–Production Workers	3	3	3	350,410	$29,380	11.6	High school diploma or equivalent
	47-4031.00	Fence Erectors	4	4	4	23,530	$37,650	11.2	No formal educational credential
Middle	49-9081.00	Wind Turbine Service Technicians	4	4	4	5,580	$58,000	96.1	Postsecondary nondegree award
	17-3025.00	Environmental Engineering Technicians	4	4	4	17,310	$54,800	12.9	Associates degree
	19-4091.00	Environmental Science and Protection Technicians	5	5	4	32,600	$50,350	11.9	Associates degree
	19-4099.00	Life, Physical, and Social Science Technicians, All Other	4	4	4	65,220	$52,940	9.6	Associates degree
	17-3022.00	Civil Engineering Technicians	4	4	4	71,150	$54,670	8.8	Associates degree
High	19-4021.00	Biological Technicians	4	4	4	77,450	$48,060	10.2	Bachelor's degree
	29-9011.00	Occupational Health and Safety Specialists	3	4	4	88,390	$74,940	7.6	Bachelor's degree
	25-9021.00	Farm and Home Management Advisors	5	5	5	8,020	$52,700	7.3	Master's degree
	27-1025.00	Interior Designers	6	5	6	57,070	$59,120	4.9	Bachelor's degree
	27-1022.00	Fashion Designers	3	4	4	19,750	$87,610	3.1	Bachelor's degree

Table 71. Highest Paying Occupations in the Manufacturing Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Low	51-8011.00	Nuclear Power Reactor Operators	4	4	5	6,280	$95,310	500	High school diploma or equivalent
	51-8012.00	Power Distributors and Dispatchers	4	4	4	11,620	$85,340	1,000	High school diploma or equivalent
	47-4021.00	Elevator Installers and Repairers	4	4	4	26,830	$79,370	3,000	High school diploma or equivalent
	51-8013.00	Power Plant Operators	4	5	5	33,920	$78,030	3,200	High school diploma or equivalent
	51-8091.00	Chemical Plant and System Operators	4	4	4	28,190	$61,570	2,800	High school diploma or equivalent
Middle	19-4051.00	Nuclear Technicians	4	4	4	7,230	$79,970	800	Associates degree
	17-3029.00	Engineering Technicians, Except Drafters, All Other	4	4	4	83,360	$65,720	7,100	Associates degree
	17-3023.00	Electrical and Electronic Engineering Technicians	4	5	5	126,950	$65,050	12,000	Associates degree
	17-3024.01	Robotics Technicians	4	4	4	13,520	$60,240	1,200	Associates degree
	49-2094.00	Electrical and Electronics Repairers, Commercial and Industrial Equipment	4	5	4	59,520	$59,210	6,100	Postsecondary nondegree award
High	27-1022.00	Fashion Designers	3	4	4	19,750	$87,610	2,300	Bachelor's degree
	29-9011.00	Occupational Health and Safety Specialists	3	4	4	88,390	$74,940	4,900	Bachelor's degree
	27-1025.00	Interior Designers	6	5	6	57,070	$59,120	6,600	Bachelor's degree
	25-9021.00	Farm and Home Management Advisors	5	5	5	8,020	$52,700	1,000	Master's degree
	19-4021.00	Biological Technicians	4	4	4	77,450	$48,060	8,900	Bachelor's degree

Career Pathway Readiness for Manufacturing Careers

The aggregated WorkKeys skills benchmarks indicate that, for low and middle education groups, Level 4 is the lowest level of Applied Math and Graphic Literacy skills needed for jobs in the Manufacturing career cluster (Table 72). However, Level 5 is the lowest level of Applied Math, Workplace Documents, and Graphic Literacy skills needed for occupations in the high education group.

Table 72. Career Pathway Readiness Benchmarks - Manufacturing

Education Group	Number of Occupations	Applied Math	Workplace Documents	Graphic Literacy
	SKILL LEVEL REQUIRED FOR 85% OF OCCUPATIONS			
Low Education Occupations	120	4	4	4
Middle Education Occupations	34	4	5	4
High Education Occupations	5	5	5	5

Source: ACT Occupational Profiles

Manufacturing Career Pathway Readiness of US WorkKeys Examinees

Table 73. Examinee Gap Analysis for Manufacturing – Percentage of Examinees that Met or Exceeded Median Skill Level Requirements

Education Group (Examinees and Occupations)	Applied Math	Workplace Documents	Graphic Literacy	All Three
Low Education	73%	79%	78%	64%
Middle Education	85%	64%	87%	60%
High Education	72%	76%	81%	62%

The majority of examinees across all levels of educational attainment met or exceeded all three skill benchmarks for jobs that required similar levels of education in the Manufacturing career cluster (as shown in Table 73).

The Marketing Career Cluster

Occupations in the Marketing career cluster constituted 13% of total occupational employment in the US in 2018. Marketing careers are projected to grow more than 4% from 2016–2026, with more than two million average openings a year due to growth and replacement.

Table 74. Most Openings Occupations in the Marketing Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Low	41-2031.00	Retail Salespersons	3	4	4	4,448,120	$28,310	671,700	No formal educational credential
	41-2011.00	Cashiers	3	3	3	3,635,550	$23,240	653,900	No formal educational credential
	43-5081.00	Stock Clerks and Order Fillers	3	3	3	2,056,030	$28,520	269,300	High school diploma or equivalent
	41-1011.00	First-Line Supervisors of Retail Sales Workers	4	4	4	1,181,530	$45,080	171,400	High school diploma or equivalent
	41-4012.00	Sales Representatives, Wholesale and Manufacturing	5	5	4	1,350,180	$69,480	159,100	High school diploma or equivalent
High	13-1161.00	Market Research Analysts and Marketing Specialists	4	4	4	638,200	$70,960	76,700	Bachelor's degree
	41-4011.00	Sales Representatives, Wholesale and Manufacturing	4	4	4	312,980	$91,830	37,200	Bachelor's degree
	11-2022.00	Sales Managers	4	5	5	379,050	$140,320	36,200	Bachelor's degree
	13-1023.00	Purchasing Agents, Except Wholesale and Farm Products	4	4	4	309,000	$62,120	23,800	Bachelor's degree
	11-2021.00	Marketing Managers	7	5	5	240,440	$147,240	21,300	Bachelor's degree

The Marketing cluster is entirely made up of jobs that require either a low or high level of education for entry. There are no occupations in this cluster that require a middle level of education.

Table 75. Fastest Growing Occupations in the Marketing Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Employment % Change	Typical Level of Education Needed for Entry
Low	11-9141.00	Property, Real Estate, and Community Association Managers	4	4	4	202,550	$71,730	10.7	High school diploma or equivalent
	41-9099.00	Sales and Related Workers, All Other	3	3	4	95,690	$40,480	9.8	High school diploma or equivalent
	41-3099.00	Sales Representatives, Services, All Other	5	5	4	1,033,820	$64,860	9.6	High school diploma or equivalent
	41-9011.00	Demonstrators and Product Promoters	4	3	4	81,250	$33,260	7.0	No formal educational credential
	41-1012.00	First-Line Supervisors of Non-Retail Sales Workers	5	5	4	247,570	$84,600	6.4	High school diploma or equivalent
High	13-1161.00	Market Research Analysts and Marketing Specialists	4	4	4	638,200	$70,960	22.8	Bachelor's degree
	25-1011.00	Business Teachers, Postsecondary	4	7	6	84,230	$103,330	18.1	Doctoral or professional degree
	13-2021.00	Appraisers and Assessors of Real Estate	5	5	5	57,900	$61,870	14.4	Bachelor's degree
	13-1121.00	Meeting, Convention, and Event Planners	4	4	4	110,120	$53,730	10.2	Bachelor's degree
	11-2021.00	Marketing Managers	7	5	5	240,440	$147,240	10.0	Bachelor's degree

Table 76. Highest Paying Occupations in the Marketing Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Low	41-1012.00	First-Line Supervisors of Non-Retail Sales Workers	5	5	4	247,570	$84,600	39,800	High school diploma or equivalent
	41-9021.00	Real Estate Brokers	4	5	4	40,320	$78,940	9,300	High school diploma or equivalent
	11-9141.00	Property, Real Estate, and Community Association Managers	4	4	4	202,550	$71,730	28,400	High school diploma or equivalent
	41-4012.00	Sales Representatives, Wholesale and Manufacturing	5	5	4	1,350,180	$69,480	159,100	High school diploma or equivalent
	41-3099.00	Sales Representatives, Services, All Other	5	5	4	1,033,820	$64,860	130,900	High school diploma or equivalent
High	11-2021.00	Marketing Managers	7	5	5	240,440	$147,240	21,300	Bachelor's degree
	11-2022.00	Sales Managers	4	5	5	379,050	$140,320	36,200	Bachelor's degree
	11-2011.00	Advertising and Promotions Managers	4	5	4	25,260	$133,090	3,400	Bachelor's degree
	41-9031.00	Sales Engineers	6	4	4	65,720	$108,610	8,300	Bachelor's degree
	25-1011.00	Business Teachers, Postsecondary	4	7	6	84,230	$103,330	10,400	Doctoral or professional degree

Career Readiness Benchmarks for Marketing Careers

The aggregated WorkKeys skills benchmarks indicate that, across the low and high education groups, Level 5 is the lowest level of Workplace Documents skills needed for Marketing careers (Table 77). Level 6 is the lowest level of Applied Math skills needed for occupations in the high education group, while Level 5 is the lowest level needed for those in the low education group.

Table 77. Career Pathway Readiness Benchmarks - Marketing

Education Group	Number of Occupations	Applied Math	Workplace Documents	Graphic Literacy
	SKILL LEVEL REQUIRED FOR 85% OF OCCUPATIONS			
Low Education Occupations	29	5	5	4
Middle Education Occupations	0	N/A	N/A	N/A
High Education Occupations	17	6	5	5

Source: ACT Occupational Profiles
Note: N/A = number of occupations within a career cluster education group insufficient to calculate a benchmark.

Marketing Career Pathway Readiness of US WorkKeys Examinees

Table 78. Examinee Gap Analysis for Marketing – Percentage of Examinees that Met or Exceeded Median Skill Level Requirements

Education Group (Examinees and Occupations)	Applied Math	Workplace Documents	Graphic Literacy	All Three
Low Education	45%	42%	78%	32%
Middle Education	—	—	—	—
High Education	50%	76%	81%	46%

Roughly a third (32%) and less than half (46%) of examinees with a low and high level of educational attainment, respectively, met or exceeded all three skill benchmarks for the low and high education groups in the Marketing career cluster (as shown in Table 78).

The STEM (Science, Technology, Engineering, & Math) Career Cluster

Occupations in the STEM career cluster constituted 3% of total occupational employment in the US in 2018. STEM careers are projected to grow more than 11% from 2016–2026, with more than 300,000 average openings a year due to growth and replacement.

Table 79. Most Openings Occupations in the STEM Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Middle	19-4099.01	Quality Control Analysts	4	4	4	65,220	$52,940	9,900	Associates degree
	17-3026.00	Industrial Engineering Technicians	4	4	4	66,540	$58,860	5,500	Associates degree
	29-2051.00	Dietetic Technicians	3	4	3	33,540	$30,130	3,000	Associates degree
	17-3019.00	Drafters, All Other	5	4	5	14,580	$54,240	1,500	Associates degree
	17-3024.00	Electro-Mechanical Technicians	4	4	4	13,520	$60,240	1,200	Associates degree
High	17-2051.00	Civil Engineers	6	6	6	306,030	$93,720	25,900	Bachelor's degree
	25-1071.00	Health Specialties Teachers, Postsecondary	6	7	6	199,480	$122,320	25,800	Doctoral or professional degree
	13-1051.00	Cost Estimators	5	4	4	211,600	$69,710	24,400	Bachelor's degree
	17-2141.00	Mechanical Engineers	6	6	6	303,440	$92,800	21,200	Bachelor's degree
	17-2112.00	Industrial Engineers	5	6	6	279,550	$91,630	19,700	Bachelor's degree

The STEM cluster is entirely made up of jobs that require either a middle or high level of education for entry. There are no occupations in this cluster that require a low level of education.

Table 80. Fastest Growing Occupations in the STEM Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Employment % Change	Typical Level of Education Needed for Entry
Middle	19-4099.01	Quality Control Analysts	4	4	4	65,220	$52,940	9.6	Associates degree
	29-2051.00	Dietetic Technicians	3	4	3	33,540	$30,130	9.3	Associates degree
	17-3019.00	Drafters, All Other	5	4	5	14,580	$54,240	7.9	Associates degree
	17-3024.00	Electro-Mechanical Technicians	4	4	4	13,520	$60,240	3.5	Associates degree
	17-3026.00	Industrial Engineering Technicians	4	4	4	66,540	$58,860	0.6	Associates degree
High	15-2041.00	Statisticians	7	7	7	39,920	$92,600	33.4	Master's degree
	15-2021.00	Mathematicians	7	7	7	2,580	$104,870	29.4	Master's degree
	25-1071.00	Health Specialties Teachers, Postsecondary	6	7	6	199,480	$122,320	25.9	Doctoral or professional degree
	17-1021.00	Cartographers and Photogrammetrists	4	5	6	11,050	$68,340	19.4	Bachelor's degree
	15-1111.00	Computer and Information Research Scientists	7	5	4	30,070	$123,850	19.2	Master's degree

Table 81. Highest Paying Occupations in the STEM Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Middle	19-4051.00	Nuclear Technicians	4	4	4	7,230	$79,970	800	Associates degree
	17-3024.00	Electro-Mechanical Technicians	4	4	4	13,520	$60,240	1,200	Associates degree
	17-3026.00	Industrial Engineering Technicians	4	4	4	66,540	$58,860	5,500	Associates degree
	17-3019.00	Drafters, All Other	5	4	5	14,580	$54,240	1,500	Associates degree
	19-4099.01	Quality Control Analysts	4	4	4	65,220	$52,940	9,900	Associates degree
High	29-1062.00	Family and General Practitioners	6	7	7	114,130	$211,780	6,000	Doctoral or professional degree
	17-2171.00	Petroleum Engineers	6	6	6	32,510	$156,370	2,800	Bachelor's degree
	11-9041.00	Architectural and Engineering Managers	7	7	5	188,290	$148,970	13,600	Bachelor's degree
	11-9121.00	Natural Sciences Managers	6	5	4	60,260	$139,680	5,200	Bachelor's degree
	19-2012.00	Physicists	7	7	7	17,620	$125,280	1,700	Doctoral or professional degree

Career Pathway Readiness for STEM Careers

The aggregated WorkKeys skills benchmarks indicate that, across the middle education group, Level 4 is the lowest level of Applied Math, Graphic Literacy, and Workplace Documents skills needed for jobs in the STEM career cluster, while Level 7 is needed for high education occupations (Table 82).

Table 82. Career Pathway Readiness Benchmarks - STEM

Education Group	Number of Occupations	Applied Math	Workplace Documents	Graphic Literacy
	SKILL LEVEL REQUIRED FOR 85% OF OCCUPATIONS			
Low Education Occupations	0	N/A	N/A	N/A
Middle Education Occupations	10	4	4	4
High Education Occupations	108	7	7	7

Source: ACT Occupational Profiles
Note: N/A = number of occupations within a career cluster education group insufficient to calculate a benchmark.

STEM Career Pathway Readiness of US WorkKeys Examinees

Table 83. Examinee Gap Analysis for STEM – Percentage of Examinees that Met or Exceeded Median Skill Level Requirements

Education Group (Examinees and Occupations)	Applied Math	Workplace Documents	Graphic Literacy	All Three
Low Education	–	–	–	–
Middle Education	85%	92%	87%	78%
High Education	26%	23%	19%	8%

Very few examinees with a high level of educational attainment (8%) met or exceeded all three skill benchmarks for jobs that required a high level of education in the STEM career cluster. However, the majority of examinees with a middle level of educational attainment (78%) met or exceeded all three benchmarks for jobs that required a similar level of education (as shown in Table 83).

The Transportation, Distribution, & Logistics Career Cluster

Occupations in the Transportation, Distribution, & Logistics career cluster constituted 9% of total occupational employment in the US in 2018. Transportation careers are projected to grow more than 6% from 2016–2026, with more than one million average openings a year due to growth and replacement.

Table 84. Most Openings Occupations in the Transportation, Distribution, & Logistics Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Low	53-7062.00	Laborers and Freight, Stock, and Material Movers, Hand	3	3	4	2,893,180	$30,890	388,600	No formal educational credential
	53-3033.00	Light Truck or Delivery Services Drivers	3	3	3	915,310	$36,920	110,200	High school diploma or equivalent
	43-5071.00	Shipping, Receiving, and Traffic Clerks	3	4	4	655,590	$34,980	67,200	High school diploma or equivalent
	53-3022.00	Bus Drivers, School or Special Client	3	4	3	504,150	$33,390	64,800	High school diploma or equivalent
	53-7061.00	Cleaners of Vehicles and Equipment	3	4	3	378,850	$26,900	57,800	No formal educational credential
Middle	53-3032.00	Heavy and Tractor-Trailer Truck Drivers	3	4	4	1,800,330	$45,570	214,300	Postsecondary nondegree award
	49-3023.00	Automotive Service Technicians and Mechanics	4	4	4	648,050	$43,730	75,900	Postsecondary nondegree award
	49-3011.00	Aircraft Mechanics and Service Technicians	4	5	5	131,690	$65,230	10,800	Postsecondary nondegree award
	53-5021.00	Captains, Mates, and Pilots of Water Vessels	5	4	4	36,390	$82,380	4,400	Postsecondary nondegree award
	53-2021.00	Air Traffic Controllers	5	6	6	22,390	$120,830	2,400	Associates degree
High	11-3011.00	Administrative Services Managers	5	5	4	283,570	$106,050	26,200	Bachelor's degree
	11-1011.00	Chief Executives	5	6	5	195,530	$200,140	20,100	Bachelor's degree
	13-1081.00	Logisticians	5	5	5	169,820	$78,730	15,600	Bachelor's degree
	53-2011.00	Airline Pilots, Copilots, and Flight Engineers	5	6	6	82,890	$169,560	8,100	Bachelor's degree
	29-9011.00	Occupational Health and Safety Specialists	3	4	4	88,390	$74,940	4,900	Bachelor's degree

Table 85. Fastest Growing Occupations in the Transportation, Distribution, & Logistics Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Employment % Change	Typical Level of Education Needed for Entry
Low	49-3091.00	Bicycle Repairers	3	3	4	12,200	$30,290	29.4	High school diploma or equivalent
	47-2073.00	Operating Engineers and Other Construction Equipment Operators	3	4	4	383,480	$53,030	12.4	High school diploma or equivalent
	49-3053.00	Outdoor Power Equipment and Other Small Engine Mechanics	3	3	4	31,760	$36,940	11.4	High school diploma or equivalent
	53-7061.00	Cleaners of Vehicles and Equipment	3	4	3	378,850	$26,900	10.8	No formal educational credential
	53-6031.00	Automotive and Watercraft Service Attendants	3	3	3	113,760	$25,940	10.6	No formal educational credential
Middle	49-9092.00	Commercial Divers	4	4	4	3,380	$59,470	10.6	Postsecondary nondegree award
	53-5021.00	Captains, Mates, and Pilots of Water Vessels	5	4	4	36,390	$82,380	8.8	Postsecondary nondegree award
	17-3021.00	Aerospace Engineering and Operations Technicians	4	4	4	10,110	$68,970	6.6	Associates degree
	53-5031.00	Ship Engineers	5	4	5	8,740	$75,710	6.5	Postsecondary nondegree award
	49-3023.00	Automotive Service Technicians and Mechanics	4	4	4	648,050	$43,730	6.3	Postsecondary nondegree award
High	11-3011.00	Administrative Services Managers	5	5	4	283,570	$106,050	10.1	Bachelor's degree
	11-9199.00	Managers, All Other	4	5	4	462,840	$115,590	7.6	Bachelor's degree
	29-9011.00	Occupational Health and Safety Specialists	3	4	4	88,390	$74,940	7.6	Bachelor's degree
	13-1081.00	Logisticians	5	5	5	169,820	$78,730	6.9	Bachelor's degree
	53-2011.00	Airline Pilots, Copilots, and Flight Engineers	5	6	6	82,890	$169,560	3.4	Bachelor's degree

Table 86. Highest Paying Occupations in the Transportation, Distribution, & Logistics Career Cluster

Education Group	O*NET Code	Occupation Title	Applied Math	Workplace Documents	Graphic Literacy	US Employment 2018	US Mean Annual Wages 2018	US Annual Openings (2016-2026)	Typical Level of Education Needed for Entry
Low	11-3071.00	Transportation, Storage, and Distribution Managers	4	4	4	124,810	$102,850	9,700	High school diploma or equivalent
	53-2012.00	Commercial Pilots	5	6	6	37,870	$96,530	4,000	High school diploma or equivalent
	53-6051.00	Transportation Inspectors	3	3	3	29,990	$75,330	2,900	High school diploma or equivalent
	47-2011.00	Boilermakers	4	3	3	13,870	$63,240	1,900	High school diploma or equivalent
	53-4021.00	Railroad Brake, Signal, and Switch Operators	3	3	4	14,270	$58,890	1,700	High school diploma or equivalent
Middle	53-2021.00	Air Traffic Controllers	5	6	6	22,390	$120,830	2,400	Associates degree
	53-5021.00	Captains, Mates, and Pilots of Water Vessels	5	4	4	36,390	$82,380	4,400	Postsecondary nondegree award
	53-5031.00	Ship Engineers	5	4	5	8,740	$75,710	1,300	Postsecondary nondegree award
	17-3021.00	Aerospace Engineering and Operations Technicians	4	4	4	10,110	$68,970	1,100	Associates degree
	49-2091.00	Avionics Technicians	4	4	5	18,860	$65,330	1,500	Associates degree
High	53-2011.00	Airline Pilots, Copilots, and Flight Engineers	5	6	6	82,890	$169,560	8,100	Bachelor's degree
	11-9199.00	Managers, All Other	4	5	4	462,840	$115,590	78,700	Bachelor's degree
	11-3011.00	Administrative Services Managers	5	5	4	283,570	$106,050	26,200	Bachelor's degree
	13-1081.00	Logisticians	5	5	5	169,820	$78,730	15,600	Bachelor's degree
	29-9011.00	Occupational Health and Safety Specialists	3	4	4	88,390	$74,940	4,900	Bachelor's degree

Career Pathway Readiness for Transportation, Distribution, & Logistics Careers

The aggregated WorkKeys skills benchmarks indicate that, across the low education group, Level 4 is the lowest level of Applied Math, Graphic Literacy, and Workplace Documents skills needed for jobs in the Transportation, Distribution, & Logistics career cluster (Table 87). For middle and high education occupations, Level 5 is the lowest level of Applied Math and Graphic Literacy skills needed for Transportation careers.

Table 87. Career Pathway Readiness Benchmarks – Transportation, Distribution, & Logistics

Education Group	Number of Occupations	Applied Math	Workplace Documents	Graphic Literacy
	SKILL LEVEL REQUIRED FOR 85% OF OCCUPATIONS			
Low Education Occupations	53	4	4	4
Middle Education Occupations	16	5	4	5
High Education Occupations	8	5	6	5

Source: ACT Occupational Profiles

Transportation, Distribution, & Logistics Career Pathway Readiness of US WorkKeys Examinees

Table 88. Examinee Gap Analysis for Transportation, Distribution, & Logistics – Percentage of Examinees that Met or Exceeded Median Skill Level Requirements

Education Group (Examinees and Occupations)	Applied Math	Workplace Documents	Graphic Literacy	All Three
Low Education	73%	79%	78%	64%
Middle Education	57%	92%	74%	52%
High Education	72%	55%	81%	50%

More than half of examinees with a low or middle level of educational attainment met or exceeded all three skill benchmarks for jobs that required similar levels of education in the Transportation career cluster (as shown in Table 88).

Policies and Practices to Increase Career Readiness

Use Career Readiness and Career Pathway Readiness Benchmarks to Set Goals for Students and Programs

Broadly applicable career readiness benchmarks can be developed at the state or local level and used by policymakers to guide education and workforce development efforts for regions, districts, or schools. These aggregate career readiness benchmarks can be used in workforce development efforts to ensure that job seekers have the foundational skills local employers seek. Career pathway readiness benchmarks can be used in career counseling to guide individuals who are exploring different college majors, CTE programs, or job training programs linked to different career pathways. Students can work with high school or career counselors to set goals for KSAO development in alignment with the student's college major or career pathway interests.

Career pathway readiness benchmarks can also be used by education and training providers to help better align programs with student learning objectives and ensure alignment with the KSAOs demanded by local industry. Work readiness benchmarks (at the occupational level) can be used to align job-specific and work-based learning programs (including apprenticeships and other rigorous and structured work-based learning experiences) to local employer needs as well as to ensure student readiness upon entry into and completion of the program.

Value College Readiness and Career Readiness Equally

At any stage in the educational pipeline, but especially in high school, classifying students as either "college prep" or "career focused" does students a grave disservice, leaving them at a disadvantage in developing the skills on the "other side" of an artificial divide. Both types of readiness are essential to every student, and both types are empirically measurable. All students deserve to know their strengths and areas for development with respect to both college and career, so that they have the data necessary to help them explore their options within whichever education and career pathways they ultimately choose. A lack of equity of "choice" for a student's education and career path is a problem which must be addressed. Schools, districts, and states should provide all students with the opportunity to benefit from both college preparatory coursework and the applied teaching that occurs in CTE programs.

Perhaps the most challenging issue that policymakers face when trying to address readiness is the issue of equity of opportunity. While domestic and international research support the assumption that higher educational attainment and cognitive skill levels are related to increased lifetime earnings, everyone does not have an equal chance of increasing their education and skills. Breaking the pattern of income and opportunity inequality in the US is inextricably linked to providing individuals of all ages with the knowledge and skills needed to successfully navigate career and education transitions throughout their lifetimes.

Encourage Career Awareness and Advisement Activities to Begin Earlier in a Student's Educational Pathway

Developing a plan is the critical first step in an individual's lifelong journey toward making their educational and career aspirations a reality. While research has demonstrated that students stand to benefit the most from career exploration activities that take place early in their education, particularly in middle school, two primary barriers currently prevent career awareness from occurring sooner. First, lighter caseloads for school counselors would allow for greater attention to assisting students along their education and career pathways. School- and institution-based counselors should be provided with professional development opportunities focused on promoting career readiness to ensure that they are able to act as a conduit of relevant and timely information for students as they seek out programs and coursework that fit their needs and match their interests regardless of their postsecondary plans.

Second, students need greater exposure to quality CTE courses earlier on in order to make informed steps along their educational pathway. Support for introductory or exploratory CTE courses that seek to familiarize students with industries, careers, and available credentials are often fragmented and overshadowed by other priorities such as core academic courses or are simply not offered at all. State CTE policy should therefore aim to ensure that all middle school students have the opportunity to enroll in introductory or exploratory CTE courses that seek to familiarize students with potential CTE pathways to keep students engaged with their learning and help them begin to formulate a plan for their future.

Offer Authentic Work-Based Learning Experiences and Training in State Education Policies and Programs

State education agencies must ensure that programs and curricula have genuine value for students inside and outside of the classroom. High-quality CTE contextualizes and brings to life such concepts as the practical uses of mathematics, the real-world applications of reading comprehension, and the utility of biology for a future in the health sciences industry. One of the effects of this approach is that it helps students engage with the material being taught.

Another crucial form of engagement in CTE programs is the integration, at appropriate stages of student career pathway readiness, of authentic work-based experiences. Incorporating job shadowing, internships, and apprenticeships into state education policies—often through partnerships between educators and employers—gives students an opportunity to experiment with various career paths, allowing them to more clearly identify their interests and strengths. Such programs can offer valuable work-based learning experiences that can act as a connection point to apprenticeship programs, which offer further intensive on-the-job training and relevant technical instruction.

Recognize the Importance of Foundational and Nonacademic Behaviors Along with an Individual's Academic and Technical Skills in State Education Policies and Programs

Major drivers of economic change and upheaval in the labor market—globalization, technological advancements, and an aging workforce—have increasingly required students to learn new, transferable foundational skills in addition to traditional academic and technical competencies. These skills are foundational in that they are both fundamental, because they are the foundation toward more advanced skill development, and portable, because they are commonly recognized by employers nationwide and across a wide variety of occupations.

Additionally, as addressed in the ACT readiness and Holistic frameworks,[18] nonacademic characteristics such as behavioral skills and career navigation skills are necessary for success in both college and career. Acknowledging and incorporating these characteristics into determinations of readiness is essential to improving equity because these characteristics interact with attainment of academic skills and exhibit smaller group differences among individuals who may not have the same academic or economic opportunities as others.

Endnotes

[1] ACT. (2011). *A better measure of skills gaps*. Iowa City, IA: ACT. Retrieved from https://www.act.org/content/dam/act/unsecured/documents/abettermeasure.pdf; ACT. (2013). *The condition of work readiness in the United States*. Iowa City, IA: ACT. Retrieved from https://www.act.org/content/dam/act/unsecured/documents/ConditionWorkReadiness.pdf; LeFebvre, M. (2015). *Career readiness in the United States 2015*. Iowa City, IA: ACT. Retrieved from http://www.act.org/content/dam/act/unsecured/documents/CareerReadinessinUS-2015.pdf.

[2] ACT Job Profiling is used to establish career readiness standards. When a job profile or job analysis is conducted, it is essentially a local content validation study. Local content validation studies are recommended by the federal *Uniform Guidelines on Personnel Selection* for employers using cognitive assessments for selection purposes. Job profiling fits the definition of a local content validation study under the Uniform Guidelines. Content validation links the content of a test to observable work behaviors such as job performance (i.e., it establishes the relevance of the test to the job). Subject matter experts rate the importance of specific job tasks and assign WorkKeys skill levels to each task that is needed to be successful on the job. An overall skill level is then computed for the specific WorkKeys tests that are relevant to the job (e.g., Workplace Documents, Applied Math, or Graphic Literacy). Content validation is the preferred method for using cognitive assessments for personnel selection under the *Uniform Guidelines* to prevent adverse impact in selection procedures. ACT has an established database (JobPro) of cognitive skills and skill levels required for over 20,000 jobs gathered through 20 years of local content validation studies. The JobPro database is the source of evidence for Career and Job Readiness standards for WorkKeys cognitive assessments.

[3] LeFebvre, M. & Mattern, K. (2018). Ready for what? Development of a hierarchical framework linking college readiness and career readiness. Iowa City, IA. Retrieved from https://www.act.org/content/dam/act/unsecured/documents/Ready-for-What-May-2018.pdf.

[4] Porter, M. E. (1990). *The competitive advantage of nations*. New York, NY: Free Press.

[5] Career Clusters have been used by the US Department of Education Office of Career, Technical, and Adult Education (formerly known as the Office of Vocational Adult Education) since 2001 as part of Perkins accountability requirements. More information about the history of Career Clusters can be found at www.careertech.org/career-clusters.

[6] Workforce Innovation and Opportunity Act (2014). H.R. 803; Pub.L. 113-128.

[7] Camara, W., O'Connor, R., Mattern, K., & Hanson, M. A. (2015). *Beyond academics: A holistic framework for enhancing education and workplace success*. Iowa City, IA: ACT, Inc. 2015. Retrieved from http://www.act.org/content/dam/act/unsecured/documents/ACT_RR2015-4.pdf.

[8] Analysis of the ACT JobPro database has found that the skills measured by Workplace Documents, Graphic Literacy, and Applied Math are most often determined via the job profiling process to be important for job performance.

[9] Professional standards for certification and licensure, programs of study in education, and training programs vary significantly by career pathway, occupation, educational institution, and state, and are outside the scope of this report.

[10] For more information about the development of WorkKeys assessments, visit:
https://www.act.org/content/dam/act/unsecured/documents/WorkKeys-Applied-Math-Technical-Manual.pdf
https://www.act.org/content/dam/act/unsecured/documents/WorkKeys-Workplace-Document-Technical-Manual.pdf
https://www.act.org/content/dam/act/unsecured/documents/WorkKeys-Graphic-Literacy-Technical-Manual.pdf

[11] Educational level achieved was determined via self-reported data that is included in the user registration section of the WorkKeys assessment process. Due to missing registration data, it was not possible to identify an education level for approximately 3% of the sample.

[12] Uses the same methodology from LeFebvre, M. & Mattern, K. (2018) to calculate career readiness benchmarks across all jobs in the US. Median skill levels were created by SOC code using profile data in JobPro. The percentage of total jobs/employment by skill level was calculated by weighting each SOC code/occupation by its US employment and summing the weighted employment by skill level. Mean wages were calculated by weighting each SOC code/occupation's mean wages by its US employment and averaging the total weighted wages by total employment by profiled skill level.

[13] The job profiles in ACT JobPro follow the O*NET taxonomy of occupational codes and can be aggregated for various analyses. An occupational profile reflects the aggregation of job profiles with the same occupational code. Analyses in this report aggregated jobs according to their Standard Occupational Codes (SOC) in order to tie in information about projected occupational growth. A work readiness benchmark (i.e., the skill level required for a given occupation) is the median skill level set for all job profiles with the same SOC. A median skill level for three WorkKeys assessments (Workplace Documents, Graphic Literacy, and Applied Math) was created for each SOC code.

[14] For more information about O*NET, visit: www.onetonline.org/. Additional information regarding the National Career Clusters® Framework can be found at www.careertech.org/career-clusters.

[15] Rolen, E. (2019). *Occupational employment projections through the perspective of education and training.* Washington, DC: US Bureau of Labor Statistics. Retrieved from https://www.bls.gov/spotlight/2019/education-projections/pdf/education-projections.pdf.

[16] Bureau of Labor Statistics. (2017). *Projections of occupational employment, 2016–26*. Washington, DC: US Department of Labor. Retrieved from https://www.bls.gov/careeroutlook/2017/article/occupational-projections-charts.htm; Bureau of Labor Statistics. (2019). *Occupational employment and wages—May 2018*. Washington, DC: US Department of Labor. Retrieved from https://www.bls.gov/news.release/pdf/ocwage.pdf.

[17] A full listing of ACT occupational profiles can be found at http://profiles.keytrain.com/profile_search/.

[18] Camara et al. (2015). *Beyond academics: A holistic framework for enhancing education and workplace success*.

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