



Education Report

Mathematics and Statistics

California



Definition of Mathematics and Statistics, CIP 27.0503..... 3
Occupation Crosswalk 4
Occupation Details 5
Employment by Industry 6
Geographic Distribution 7
Demographic Profile..... 8
California Regional Map 9
FAQ 10

Definition of Mathematics and Statistics, CIP 27.0503

A program with a general synthesis of mathematics and statistics or a specialization which draws from mathematics and statistics. Includes instruction in calculus, linear algebra, numerical analysis and partial differential equations, discrete mathematics, probability theory, statistics, computing, and other related topics.

Occupation Crosswalk

The below table lists all occupations linked with the program, Mathematics and Statistics, CIP 27.0503.

		Education and Training Requirements			Educational Attainment				
		Typical Education Needed for Entry	Work Experience in a Related Occupation	Typical On-the-Job Training Needed to Attain Competency in the Occupation	No College	Some College, No Degree	Associate's Degree	Bachelor's Degree	Postgraduate Degree
11-9121	Natural Sciences Managers	Bachelor's degree	5 years or more	None	2%	3%	3%	33%	59%
15-2011	Actuaries	Bachelor's degree	None	Long-term on-the-job training	0%	2%	0%	60%	37%
15-2021	Mathematicians	Master's degree	None	None	1%	4%	3%	38%	53%
15-2041	Statisticians	Master's degree	None	None	1%	4%	3%	38%	53%
25-1022	Mathematical Science Teachers, Postsecondary	Doctoral or professional degree	None	None	2%	2%	2%	16%	78%

Education and training requirements are from the Bureau of Labor Statistics (BLS); educational attainment mix are regional data modeled by Chmura using Census educational attainment data projected to 2020Q3 along with source data from the BLS

Definition of Natural Sciences Managers (11-9121)

Plan, direct, or coordinate activities in such fields as life sciences, physical sciences, mathematics, statistics, and research and development in these fields. Excludes "Architecture and Engineering Managers" (11-9041) and "Computer and Information Systems Managers" (11-3021).

Definition of Actuaries (15-2011)

Analyze statistical data, such as mortality, accident, sickness, disability, and retirement rates and construct probability tables to forecast risk and liability for payment of future benefits. May ascertain insurance rates required and cash reserves necessary to ensure payment of future benefits.

Definition of Mathematicians (15-2021)

Conduct research in fundamental mathematics or in application of mathematical techniques to science, management, and other fields. Solve problems in various fields using mathematical methods.

Definition of Statisticians (15-2041)

Develop or apply mathematical or statistical theory and methods to collect, organize, interpret, and summarize numerical data to provide usable information. May specialize in fields such as bio-statistics, agricultural statistics, business statistics, or economic statistics. Includes mathematical and survey statisticians. Excludes "Survey Researchers" (19-3022).

Definition of Mathematical Science Teachers, Postsecondary (25-1022)

Teach courses pertaining to mathematical concepts, statistics, and actuarial science and to the application of original and standardized mathematical techniques in solving specific problems and situations. Includes both teachers primarily engaged in teaching and those who do a combination of teaching and research.

Occupation Details

As of 2020Q3, total employment for occupations linked to Mathematics and Statistics in California was 23,225. Over the past three years, linked occupations added 2,269 jobs in the region and are expected to need in aggregate approximately 15,765 newly trained workers over the next seven years.

Snapshot of Occupations Linked to Mathematics and Statistics in California¹

SOC	Occupation	Empl	Mean Ann Wages ²	Current			3-Year History			7-Year Forecast			
				LQ	Unempl	Unempl Rate	Online Job Ads ³	Ann %	Total Demand	Exits	Transfers	Empl Growth	Avg Ann Growth %
11- 9121	Natural Sciences Managers	9,944	\$188,700	1.35	352	3.5%	1,395	5.1%	6,703	1,500	4,787	415	0.6%
25- 1022	Mathematical Science Teachers, Postsecondary	5,624	\$126,600	0.99	544	8.9%	74	-0.7%	3,035	1,426	1,772	-163	-0.4%
15- 2041	Statisticians	5,273	\$110,200	1.10	184	3.5%	497	6.5%	4,523	764	2,506	1,252	3.1%
15- 2011	Actuaries	1,943	\$117,500	0.69	14	0.8%	121	1.6%	1,201	165	733	304	2.1%
15- 2021	Mathematicians	441	\$106,500	1.28	4	0.9%	6	0.1%	304	59	195	50	1.6%
Total - Linked Occupations		23,225	\$148,300	1.11	1,099	4.7%	2,093	3.5%	15,765	3,914	9,993	1,858	1.1%
Total - All Occupations		18,024,128	\$62,400	1.00	1,743,085	9.0%	722,523	-0.3%	15,378,777	5,566,993	9,125,424	686,359	0.5%

Source: [JobsEQ®](#)

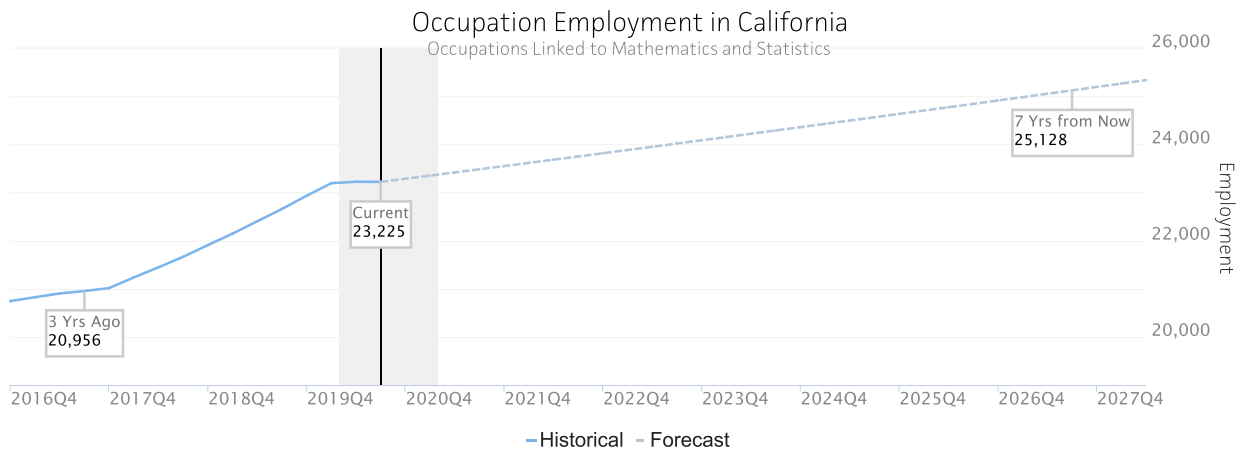
Data as of 2020Q3 unless noted otherwise

Note: Figures may not sum due to rounding.

1. Data based on a four-quarter moving average unless noted otherwise.

2. Wage data are as of 2019 and represent the average for all Covered Employment

3. Data represent found online ads active within the last thirty days in the selected region; data represents a sampling rather than the complete universe of postings. Ads lacking zip code information but designating a place (city, town, etc.) may be assigned to the zip code with greatest employment in that place for queries in this analytic. Due to alternative county-assignment algorithms, ad counts in this analytic may not match that shown in RTI (nor in the popup window ad list).



Occupation employment data are estimated via industry employment data and the industry/occupation mix. Industry employment data are derived from the Quarterly Census of Employment and Wages, provided by the Bureau of Labor Statistics and currently updated through 2020Q2, imputed where necessary with preliminary estimates updated to 2020Q3. Wages by occupation are as of 2019 provided by the BLS and imputed where necessary. Forecast employment growth uses national projections from the Bureau of Labor Statistics adapted for regional growth patterns. Occupation unemployment figures are imputed by Chmura.

Employment by Industry

The table illustrates the industries in California which most employ occupations linked to Mathematics and Statistics. The single industry most employing these occupations in the region is Scientific Research and Development Services, NAICS 5417. This industry employs 6,172 workers in the linked occupations—employment which is expected to increase by 764 jobs over the next ten years; furthermore, 5,525 additional new workers in these linked occupations will be needed for this industry due to separation demand, that is, to replace workers in this occupation and industry that retire or move into a different occupation.

Industry Distribution for Occupations Linked to Mathematics and Statistics in California

NAICS Code	Industry Title	Current			10-Year Demand		
		% of Occ Empl	Empl	Exits	Transfers	Empl Growth	Total Demand
5417	Scientific Research and Development Services	26.6%	6,172	1,312	4,214	764	6,289
6113	Colleges, Universities, and Professional Schools	13.4%	3,119	1,075	1,595	227	2,897
6112	Junior Colleges	13.3%	3,095	1,073	1,340	-370	2,042
3254	Pharmaceutical and Medicine Manufacturing	7.3%	1,706	365	1,169	151	1,685
5416	Management, Scientific, and Technical Consulting Services	5.7%	1,330	262	912	522	1,696
5241	Insurance Carriers	3.7%	868	117	482	175	774
5511	Management of Companies and Enterprises	2.8%	654	125	425	125	675
6221	General Medical and Surgical Hospitals	2.1%	477	102	315	90	508
5242	Agencies, Brokerages, and Other Insurance Related Activities	2.0%	458	59	251	89	399
5415	Computer Systems Design and Related Services	1.9%	445	99	326	247	671
9281	National Security and International Affairs	1.9%	432	86	277	12	374
9221	Justice, Public Order, and Safety Activities	1.8%	419	84	273	28	385
5413	Architectural, Engineering, and Related Services	1.6%	370	77	248	25	350
5419	Other Professional, Scientific, and Technical Services	1.3%	300	61	199	68	327
9211	Executive, Legislative, and Other General Government Support	1.2%	269	55	177	23	255
9261	Administration of Economic Program	1.1%	252	50	163	13	225
9231	Administration of Human Resource Programs	1.0%	242	49	158	18	224
9241	Administration of Environmental Quality Programs	0.7%	169	33	109	7	149
5613	Employment Services	0.6%	147	28	94	34	156
3391	Medical Equipment and Supplies Manufacturing	0.6%	145	31	99	13	143
	All Others	9.3%	2,156	450	1,457	504	2,410

Source: JobsEQ®

Data as of 2020Q3 except wages which are as of 2019. Note that occupation-by-industry wages represent adjusted national data and may not be consistent with regional, all-industry occupation wages shown elsewhere in JobsEQ.

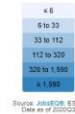
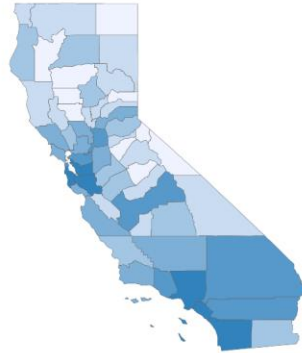
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Geographic Distribution

The map below illustrates the county-level distribution of employed workers in California in occupations linked to Mathematics and Statistics. Employment is shown by place of work.

California, Occupation Concentration by Place of Work for Occupations Linked to Mathematics and Statistics



Top Counties with Employment Linked to Mathematics and Statistics, 2020Q3

Region	Employment
Los Angeles County, California	4,728
San Diego County, California	3,269
Santa Clara County, California	2,034
Orange County, California	1,882
Alameda County, California	1,796
San Mateo County, California	1,591
San Francisco County, California	1,459
Sacramento County, California	988
San Bernardino County, California	519
Riverside County, California	475

Source: JobsEQ®

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Demographic Profile

The population in California was 39,283,497 per American Community Survey data for 2015-2019.

Of individuals 25 to 64 in California, 34.6% have a bachelor's degree or higher which compares with 33.5% in the nation. Per American Community Survey 2015-2019 estimates, the region has about 593,716 students enrolled in grade 12.

Summary¹

	Percent		Value	
	California	USA	California	USA
Demographics				
Population (ACS)	—	—	39,283,497	324,697,795
Male	49.7%	49.2%	19,526,298	159,886,919
Female	50.3%	50.8%	19,757,199	164,810,876
Median Age ²	—	—	36.5	38.1
Under 18 Years	23.0%	22.6%	9,022,146	73,429,392
18 to 24 Years	9.6%	9.4%	3,789,808	30,646,327
25 to 34 Years	15.2%	13.9%	5,967,864	45,030,415
35 to 44 Years	13.3%	12.6%	5,205,887	40,978,831
45 to 54 Years	13.0%	13.0%	5,101,422	42,072,620
55 to 64 Years	12.0%	12.9%	4,710,329	41,756,414
65 to 74 Years	8.1%	9.1%	3,172,271	29,542,266
Population Growth				
Population (Pop Estimates) ⁴	—	—	39,512,223	328,239,523
Population Annual Average Growth ⁴	0.7%	0.7%	255,099	2,146,799
People per Square Mile	—	—	253.6	92.9
Educational Attainment, Age 25-64				
No High School Diploma	15.9%	10.9%	3,337,617	18,550,150
High School Graduate	20.4%	25.7%	4,288,037	43,627,868
Some College, No Degree	21.2%	20.7%	4,449,808	35,174,790
Associate's Degree	7.9%	9.1%	1,655,194	15,526,064
Bachelor's Degree	22.0%	21.2%	4,627,242	35,997,848
Postgraduate Degree	12.5%	12.3%	2,627,604	20,961,560
Social				
Poverty Level (of all people)	13.4%	13.4%	5,149,742	42,510,843
Households Receiving Food Stamps/SNAP	8.9%	11.7%	1,164,713	14,171,567
Enrolled in Grade 12 (% of total population)	1.5%	1.4%	593,716	4,422,344
Disconnected Youth ³	1.9%	2.5%	38,474	423,273
Children in Single Parent Families (% of all children)	32.9%	34.1%	2,828,703	23,790,005
Uninsured	7.5%	8.8%	2,915,070	28,248,613
Speak English Less Than Very Well (population 5 yrs and over)	17.8%	8.4%	6,550,453	25,615,365

Source: [JobsEQ®](https://www.chmuraecon.com/jobseq)

1. American Community Survey 2015-2019, unless noted otherwise

2. Median values for certain aggregate regions (such as MSAs) may be estimated as the weighted averages of the median values from the composing counties.

3. Disconnected Youth are 16-19 year olds who are (1) not in school, (2) not high school graduates, and (3) either unemployed or not in the labor force.

4. Census 2019, annual average growth rate since 2009

California Regional Map



FAQ

What is CIP?

The 2010 Classification of Instructional Programs (CIP) is taxonomy of instructional program classifications and descriptions. It was developed and has been updated by the U.S. Department of Education's National Center for Education Statistics (NCES).

What is SOC?

The Standard Occupational Classification system (SOC) is used to classify workers into occupational categories. All workers are classified into one of over 804 occupations according to their occupational definition. To facilitate classification, occupations are combined to form 22 major groups, 95 minor groups, and 452 occupation groups. Each occupation group includes detailed occupations requiring similar job duties, skills, education, or experience.

What is training concentration?

Training concentration analysis compares local postsecondary training output to the national norm. As an example consider registered nurses. If in the nation, one RN award is granted for every twelve RNs employed, that 1:12 ratio is the national norm. If in your region your schools also grant one RN award for every twelve RNs employed, then your region will be right at the national norm, or we say at 100% of the national norm which is termed a 100% training concentration. If your region grants two RN awards for every twelve employed, your region would be at twice the national norm or have a 200% training concentration. Similarly, if your region grants one RN award for every twenty-four employed, your region would be at half the national norm or have a 50% training concentration. (Note that this analysis, relying on data provided by Title IV postsecondary schools, provides an incomplete training picture for occupations receiving much of their training from other sources.)

What is the program-to-occupation crosswalk?

Training programs are classified according to the Classification of Instructional Programs (CIP codes). For relating training programs, this report uses a modified version of the CIP to SOC crosswalk from the National Center for Education Statistics (NCES). While this is a very helpful crosswalk for estimating occupation production from training program awards data, the crosswalk is neither perfect nor comprehensive. Indeed, it is hard to imagine such a crosswalk being perfect since many training program graduates for one reason or another do not end up employed in occupations that are most related to the training program from which they graduated. Therefore, the education program analyses should be considered in this light.

As an example of the many scenarios that may unfold, consider a journalism degree that crosswalks into three occupations: editors, writers, and postsecondary communications teachers. Graduates with a journalism degree may get a job in one of these occupations—and that may be the most-likely scenario—but a good number of these graduates may get a job in a different occupation altogether (the job may be somewhat related, such as a reporter, or the job may be totally unrelated, such as a real estate agent). Furthermore, a graduate may stay in school or go back to school for a degree that will lead to other occupation possibilities. Still another possibility includes the graduate not entering the labor market (maybe being unemployed, being a non-participant, or moving to another region).

What is separation demand?

Separation demand is the number of jobs required due to separations—labor force exits (including retirements) and turnover resulting from workers moving from one occupation into another. Note that separation demand

does not include all turnover—it does not include when workers stay in the same occupation but switch employers. The total projected demand for an occupation is the sum of the separation demand and the growth demand (which is the increase or decrease of jobs in an occupation expected due to expansion or contraction of the overall number of jobs in that occupation).

What is a location quotient?

A location quotient (LQ) is a measurement of concentration in comparison to the nation. An LQ of 1.00 indicates a region has the same concentration of an occupation (or industry) as the nation. An LQ of 2.00 would mean the region has twice the expected employment compared to the nation and an LQ of 0.50 would mean the region has half the expected employment in comparison to the nation.

What is NAICS?

The North American Industry Classification System (NAICS) is used to classify business establishments according to the type of economic activity. The NAICS Code comprises six levels, from the “all industry” level to the 6-digit level. The first two digits define the top level category, known as the “sector,” which is the level examined in this report.

About This Report

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