

CTE: THE KEY TO ECONOMIC DEVELOPMENT

Biosciences:



Improve human, animal and plant life

Generate

\$370 billion

in U.S. revenue¹

Pay almost **\$95,000** annually, on average²

What is the pathway to these fulfilling and essential careers?

Career and Technical Education!



Proud supporters of ACTE.



Association for Career and Technical Education
1410 King Street, Alexandria, VA 22314
Phone: 800-826-9972 // Fax: 703-683-7424
www.acteonline.org // Connecting Education and Careers

Biosciences

Advancing innovation, the biosciences sector:

- includes drugs and pharmaceuticals; medical devices and equipment; research, testing and medical laboratories; agricultural feedstock and chemicals; and distribution of bioscience products³
- is a high-growth industry in many states
- relies on skilled employees

What jobs are available in biosciences?

Advances in the biosciences improve lives through new vaccines, safer pesticides and groundbreaking gene therapies, among other accomplishments. The sector employed almost 1.7 million Americans across more than 77,000 businesses in 2014, and skilled workers will be needed in the future to accommodate the pace of innovation.⁴ Growth in the biosciences is not confined to major metropolitan areas: In recent years, 35 states have experienced a net increase in biosciences jobs.⁵ Demand for forensic science technicians who assist in criminal investigations will increase by 17 percent through 2026.⁶ Opportunities will grow by at least 10 percent in the same time frame for biological technicians, biochemists and biophysicists, driven by demand in medical and pharmaceutical research and manufacturing.⁷ In addition, agricultural and food science technicians will be needed to support improvements in crop yields and food safety.⁸

Employees in the biosciences sector earn more than twice the national average.⁹ Individuals who work in the distribution of bioscience products earn approximately \$90,000 per year, while those employed in the agricultural feedstock and chemicals sub-sector and the medical devices and equipment sub-sector make about \$80,000.¹⁰

Most jobs in the biosciences require education beyond high school, including postsecondary certificates and associate degrees that prepare students for the many technician positions available. Occupations in this sector require academic, technical and employability skills, not only for research, development and manufacturing but also in quality control, sales, marketing and IT. Below is a small sampling of biosciences occupations:

- pharmaceutical sales representatives
- agricultural and food science technicians
- market research analysts
- biomedical engineers
- forensic science technicians
- medical equipment wholesalers
- first-line supervisors for medical instrument manufacturing
- bioinformatic scientists



Endnotes

1. Bioeconomy Capital. (2018). *Bioeconomy Dashboard: Economic Metrics*. Retrieved from <http://www.bioeconomycapital.com/bioeconomy-dashboard>.
2. BIO, TEconomy Partners, LLC & PMP Public Affairs Consulting, Inc. (2016). *The Value of Bioscience Innovation in Growing Jobs and Improving Quality of Life: 2016*. Retrieved from https://www.bio.org/sites/default/files/BIO%202016_Report_FINAL_DIGITAL.pdf.
3. Ibid.
4. Ibid.
5. Ibid.
6. U.S. Bureau of Labor Statistics. (n.d.). *Forensic Science Technicians*. Retrieved from <https://www.bls.gov/ooh/life-physical-and-social-science/forensic-science-technicians.htm>.
7. U.S. Bureau of Labor Statistics. (n.d.). *Biological Technicians*. Retrieved from <https://www.bls.gov/ooh/life-physical-and-social-science/biological-technicians.htm>; U.S. Bureau of Labor Statistics. (n.d.). *Biochemists and Biophysicists*. Retrieved from <https://www.bls.gov/ooh/life-physical-and-social-science/biochemists-and-biophysicists.htm>.
8. U.S. Bureau of Labor Statistics. (n.d.). *Agricultural and Food Science Technicians*. Retrieved from <https://www.bls.gov/ooh/life-physical-and-social-science/agricultural-and-food-science-technicians.htm>.
9. BIO, TEconomy Partners, LLC & PMP Public Affairs Consulting, Inc. (2016). *The Value of Bioscience Innovation in Growing Jobs and Improving Quality of Life: 2016*. Retrieved from https://www.bio.org/sites/default/files/BIO%202016_Report_FINAL_DIGITAL.pdf.
10. Ibid.
11. Dane County School Consortium. (n.d.). *Biotechnology*. Retrieved from <http://www.dccsc.org/programs/stem/bio-tech>.
12. HOSA–Future Health Professionals. (n.d.). *Competitive Events Update 2017-2018*. Retrieved from <http://hosa.org/sites/default/files/CE%20Update%202017-2018%20Sept10.pdf>; Technology Student Association. (n.d.). *High School Competitive Events Overview*. Retrieved from <http://tsaweb.org/High-School-Competitions>.
13. Webster University College of Arts & Sciences. (2014, March 19). "Webster University signs biotechnology articulation agreement with St. Louis Community College System." *Global Thinking*. Retrieved from <http://blogs.webster.edu/globalthinking/2014/03/19/webster-university-signs-biotechnology-articulation-agreement-with-st-louis-community-college-system>.
14. Austin Community College. (2017, August 14). *ACC Offers New Medical Device Manufacturing Degree*. Retrieved from <https://sites.austincc.edu/newsroom/acc-offers-new-medical-device-manufacturing-degree>; Austin Community College. (n.d.). *Manufacturing Technology – Medical Devices Technology Specialization*. Retrieved from <https://sites.austincc.edu/electronics/medical-devices-technology-specialization>.
15. Butler Tech. (n.d.). *Bioscience Center*. Retrieved from <https://www.butlertech.org/teen-education/high-school-programs/bioscience>; Clark, Michael D. (2017, July 21). "Butler Tech moves ahead with rapid expansion plan." *Dayton Daily News*. Retrieved from <https://www.daytondailynews.com/news/local-education/butler-tech-moves-ahead-with-rapid-expansion-plan/9KIh6OhKWjz8TfietM4ta0>; Levingston, C. (2016, September 24). "Butler Tech bioscience campus combines classrooms, private businesses." *Journal-News*. Retrieved from <https://www.journal-news.com/news/butler-tech-bioscience-campus-combines-classrooms-private-businesses/RjMsroKv0vWSaH8kB2CabK>.



Proud supporters of ACTE.



Association for Career and Technical Education

1410 King Street, Alexandria, VA 22314

Phone: 800-826-9972 // Fax: 703-683-7424

www.actonline.org // *Connecting Education and Careers*

How does CTE prepare the biosciences workforce?

Career and technical education prepares high school, postsecondary and adult students for careers in the biosciences through:

- the national Career Clusters Framework—including Career Clusters® and pathways in STEM; health science; agriculture, food and natural resources; and manufacturing—which outlines course progressions that help students explore career options and prepare for college and career success
- CTE courses in biotechnology, pharmacology, biomedical innovation, agricultural biotechnology and biotechnical engineering, integrated with rigorous academics and potentially supported by third-party resources such as the Curriculum for Agricultural Science Education (CASE) and Project Lead the Way's biomedical science curriculum
- work-based learning experiences, such as a two-year youth apprenticeship in biotechnology offered by Wisconsin's Dane County School Consortium and the Biopharmaceutical Technology Center Institute¹¹
- career and technical student organization enrichment experiences, such as industry-based competitive events in biomedical and biotechnology topics offered by HOSA–Future Health Professionals and the Technology Student Association¹²
- opportunities to earn industry certifications and stackable postsecondary certificates and degrees, such as the associate in applied science degree in biotechnology at St. Louis Community College, which articulates seamlessly to a bachelor of science degree at Webster University¹³

What are promising programs in biosciences?

To help Texans take advantage of job opportunities with more than 75 medical device and diagnostic businesses in the Austin area, **Austin Community College** has recently launched a program in medical device manufacturing, leading to a variety of stackable postsecondary certificate and degree options. The program educates students on the entire process of device design and development, graduating workers with skills in rapid prototyping, data analysis, verification and troubleshooting and with knowledge of relevant regulations. Central Texas biotechnology businesses contributed to developing the curriculum and provide students with opportunities to take part in internships and research projects. According to the Texas Workforce Commission, job growth for biomedical engineering technicians is projected at more than 35 percent over the next decade.¹⁴

The state-of-the-art **Bioscience Center** in West Chester Township, Ohio, puts students on the pathway to further education and careers in the biosciences. The center is part of **Butler Technology and Career Development Schools**, which provide education to high school students and adults at a number of campuses and through affiliated school districts. Eleventh- and twelfth-graders can attend the Bioscience Center full time, taking part in classroom and online learning and in work-based experiences. Programs include biomedical science as well as health care, dental and exercise sciences. The center has partnered to offer job shadowing and internships with local hospitals and medical companies such as drug manufacturer AstraZeneca and medical device manufacturers AtriCure Inc. and DRT Medical–Morris. All students participate in HOSA–Future Health Professionals, complete a capstone project and have the opportunity to earn up to 60 college credits as well as industry certifications. The center opened in 2015 and is already expanding to meet demand from students and employers in the region.¹⁵