



Educator/Employer Partnerships Make Progress in Ohio:

The Montgomery County Business Advisory Council

October 2022

At a Glance

This case study outlines how the Montgomery County Education Service Center (MCESC), in partnership with JFF's Pathways to Prosperity Network team, has worked to address the mismatch between education and labor market from 2018-2022. It outlines the importance of leadership through the regional Business Advisory Council, highlights the process of documenting skills and competencies for key industries in the region, and describes the development of pathway models that outline key aspects of pathways including labor market information, postsecondary options, college and career preparation opportunities, and coursework. It demonstrates how the region has successfully moved from discrete one-off education and training programs to well-developed regional infrastructure that supports college and career pathways that benefit students, employers, and the regional economy.

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Thank you to Shannon Cox (MCESC Superintendent), Bryan Stewart (MCESC Workforce Director), Tom Lasley (Professor and Dean Emeritus, University of Dayton).

We appreciate your partnership and look forward to continued work!

About Jobs for the Future

Jobs for the Future (JFF) drives transformation of the American workforce and education systems to achieve equitable economic advancement for all. www.jff.org

About JFF's Language Choices

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About the Pathways to Prosperity Network

JFF's Pathways to Prosperity Network is leading a national movement to reimagine how we prepare youth for the future of work. The network develops, implements, and scales college and career pathways to expand economic opportunity for all young people and meet regional talent needs. This forward-looking approach depends on strong cross-sector partnerships. The network mobilizes K-12 and postsecondary education leaders, policymakers, and employers, bringing together diverse stakeholders to build a future that works.

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Introduction

If you were to visit with Shannon Cox, superintendent of the Montgomery County Educational Service Center (MCESC) in Dayton, Ohio, you would undoubtedly notice several multicolored charts prominently displayed on the wall behind her desk. Created over several years, these charts are one result of a collaboration between the MCESC’s Business Advisory Council (BAC) and business, higher education, and public school partners. The charts, known as pathway models, map out pathways from high school to college to careers in three high-demand sectors of the regional economy: health science, computer science, and advanced manufacturing. Pathways start with eighth-grade classes and experiences and move through high school to a certification and/or an associate’s degree, with opportunities for further education. Each model details four categories of information that guidance counselors, teachers, students, and their families should grasp as they make decisions about the future: high school academic coursework; college and career preparation opportunities; postsecondary options (e.g.: certification, an associate’s degree, and bachelor’s degree transfer options); and selected occupations, wages, and job growth for each of the three broad fields (see Appendix).

Selected Postsecondary Options

Occupation	Pay Range	Median Wage	Job Growth (2014-2024)	Postsecondary Pathway	Required Education
Manufacturing Engineers	\$63,500 - \$102,500	\$82.50	10%	Bachelor's Degree	Yes
Manufacturing Technicians	\$21,000 - \$38,000	\$29.50	10%	High School Diploma or GED	No
Manufacturing Managers	\$58,000 - \$94,000	\$76.00	10%	Bachelor's Degree	Yes

What Is the MCESC Business Advisory Council?

The Montgomery County Educational Service Center (MCESC) facilitates the state-mandated Business Advisory Council (BAC) for both Montgomery and Warren counties’ public schools. The MCESC BAC’s mission is to ensure our workforce can compete by enhancing partnerships between schools, higher education, and employers. There are four main outcomes the MCESC BAC strives to achieve: ensuring student success and career readiness while in school, helping existing and new businesses thrive in our region, keeping talent in our region, and making Montgomery and Warren counties great places to live and work.

Note: To view all Pathways Models visit page 20.

Source: MCESC Business Advisory Council webpage, <https://www.mcesc.org/Content/workforce>

This case study tells the story of how these pathway models came to be, their intended use, and the impact they are expected to have on the career outcomes of young people in the MCECSC catchment area. In their finished state, these charts may look as if they were easily assembled using publicly available data and common sense, and that is how they should appear to the user. But, like many such documents, the charts represent hours of discussion, decision-making, and learning distilled into an easy-to-understand format. The charts are a tangible result of the MCECSC/BAC's investment over several years in a process in which people with diverse backgrounds and work experiences came to trust and understand one another because they shared three goals: better career preparation for young people; an ample, well-trained regional workforce; and thriving communities with opportunities for everyone, whether born within the county or outside of it.

In a country where business education partnerships are difficult to build and sustain, the story told here has broad lessons.

Successes Thus Far

Looking at the MCECSC/BAC's accomplishments, one might say that they occurred as a result of a light bulb going off in 2017 when Shannon Cox read about the state of Delaware's success with creating and implementing career pathways. "I want Montgomery County to be a model for the nation," she said. Delaware was among the first states to join the Pathways to Prosperity Network. Today, more than half of all high school students in the state—over 20,000 as of 2021—are in career pathways earning career-ready credentials. (See [Delaware Pathways](#) to learn more about the program.) The following are key successes of the MCECSC/BAC thus far:

- **Created a common vision.** From separate and disconnected education and career preparation activities in Montgomery County, the MCECSC/BAC has adopted a common vision and a framework for aligning resources into a regional system, rather than one-off opportunities.
- **Identified key competency expectations.** Working with industry partners, the MCECSC/BAC has mapped competencies in the aviation and aerospace, health sciences, IT, and skilled trade sectors in Montgomery County. The competency statements, developed in collaboration with industry experts and education leaders, are a tool to support the design of comprehensive college and career pathways for the region by aligning the skills students need for success in college with those needed for careers.
- **Designed defined industry pathways models to guide student career development.** Using the competency statements, the MCECSC/BAC has selected and

designed the first set of industry pathways for the region’s young people, to meet the needs of employers and take advantage the region’s major community college offerings. These have been vetted and validated by stakeholders and are available to guide implementation in schools and community colleges.

- ***Engaged business sector leaders and stakeholders.*** Although the BAC is dominated by educators, it has engaged business leaders and sector organizations in such a way as to have joint ownership and a sustained commitment to collaborative work.
- ***Took the guesswork out of what students should know and employers need by mapping curricula to industry sector skills.*** This means that when employers go to a computer science class, for example, seeking students for internships and jobs, they know that they will find the candidates and skills they are looking for.

These achievements are essential components of the Pathways to Prosperity strategy but are not easily accomplished. The presenting problem that clients and partners express most frequently to the JFF Pathways to Prosperity team is that they have many excellent programs but need help moving from disparate programs to a system of pathways. Far too many communities have a history of being program rich but systems poor. This was once the case in the MCECSC region but is no longer.

How the Pathways Movement Started

In 2011, JFF formed the Pathways to Prosperity Network with the Harvard Graduate School of Education (HGSE) as a response to a Harvard report that garnered significant national attention: [Pathways to Prosperity: Meeting the Challenge of Preparing Young Americans for the 21st Century](#). The report argued that on virtually all indicators of social and economic well-being, young people without some postsecondary credential—an associate’s degree or industry certification, at minimum—were less well off than their counterparts who prepared for good careers in college.

In surveys of high school seniors asking about plans after high school, over 80 percent said they would be going to college. The following October, over two-thirds of graduates were in fact enrolled in some form of postsecondary education, but many drop out before earning a credential. Far too many young people reach their mid-20s without the capacity to earn good wages, support a family, and participate in civic life.

Soon after the Pathways to Prosperity Network launched, a number of states, cities, and regions joined as paying members. JFF’s pathways work is sustained by a five-lever framework that has

been modified only slightly since its original formulation and is the foundation of pathways strategies.

5 Key Levers for Successful Pathways



Secondary-
Postsecondary
Integration



Career
Navigation
Systems



Intermediaries



Leadership and
Policy



Work-Based
Learning

Today, a pathways movement influenced by JFF's work continues to grow, with participation from a variety of nonprofit organizations, education institutions, state and regional policymakers, and business communities in states, regions, and cities across the nation. The pathways team at JFF continues to push ahead on the policy and funding changes needed to increase the uptake of career pathways approaches, the latest being a provocative policy paper titled [The Big Blur: An Argument for Erasing the Boundaries Between High School, College, and Careers—and Creating One New System That Works for Everyone](#).

The MCESC Today

With the first pathways designed for the health science, IT, and advanced manufacturing, the initiative is poised for the MCESC's team trained in implementation science to assist school districts in building or refining pathways. The BAC can turn to the next pathways model needed—aviation and aerospace. The BAC and the MCESC have an effective working relationship, with shared responsibilities and leadership. In addition, multiple BAC committees are in place, there is an established routine for creating pathways models, and, most important, the first set of key industry models are ready for implementation. Businesses are eager for newly trained job candidates and are more open than in the past to collaborating with education institutions. Indeed, the BAC's tagline is more appropriate than ever: "Tomorrow's workers . . . *They are right here.*"

The following brief vignette of the BAC at work should shed some light on the dynamics of the pathway development process. On May 5, 2022, the BAC annual meeting was attended by 60 business, education, workforce, and community leaders. Cox presided over the meeting, along with Bryan Stewart, the MCESC workforce director. Cox has been at the MCESC since 2012, and Stewart arrived in 2019 to help structure workforce development efforts and lead the BAC,

having spent the previous four years at Dayton City Hall. They work closely with Tom Lasley, emeritus dean of education at the University of Dayton and, until recently, the CEO of Learn to Earn Dayton. Lasley is a nationally respected leader who has worked for decades to improve education and career outcomes for young people. Focusing on high school students (7,000 county students graduated in June 2022), Cox and Stewart updated the group on MCEC/BAC resources provided to those young people to set them up for success.

Emphasizing a message still not accepted widely enough across the country, Cox noted that all young people need “not college *or* career, but college *for* career,” a catchy slogan with an important evidence base: Almost everyone needs some postsecondary education to begin a good career that pays a living wage. Cox and Stewart also reminded the group that three or four weeks into the COVID-19 pandemic, the MCEC/BAC put in place a plan of action. It included endorsing the JFF Pathways to Prosperity framework and setting up the first BAC committee meetings to address pathways development for health science and computer science. All this was accomplished against the odds with the COVID-19 pandemic in full force.

For example, as Lasley reported recently, a major hospital system in the region came to him looking for help designing pathways into health care to meet the shortage of nurses and other direct service health professionals. Lasley was pleased to take out the health science pathways model, already completed, and hand it to the hospital staff. “We wouldn’t have had anything to show three years ago,” Lasley noted. “We have only a few health pathways models in the county. [Kettering Public Schools](#), a large school district, has sophisticated career tech programs, including an allied health curriculum; there are a few pathways in other school districts. Across the county, pathways need to be put in place, students recruited, and those fledgling pathways that exist need substantial upgrading to meet business and workforce sector needs.” This is the work needed moving forward.

The second prong of pathways implementation—work-based learning—is also at an early stage of development. Stewart shared this about the context in which the BAC is working:

Workforce development is on everyone’s tongue right now, but the county hasn’t had a strategy to coordinate efforts. Schools aren’t built up to do that work. They may have informal networks and place some students, but there’s no formal mandate. We need to start with companies that are coming to us with their needs and build back to community college and high school. We’re slowly building a culture to meet employers where they’re at. The challenge is that the region went from almost no strong workforce development resources to dozens of organizations engaged. It makes collaboration more challenging.

And here's how the BAC took the next step with one industry sector that was hungry for local talent. In June 2022, the BAC convened its computer science partners, with a goal of generating the internships needed to fill the many open jobs in the industry. There is an insatiable need for job candidates with computer science skills. According to code.org, Ohio had nearly 20,000 openings in September 2022, but there's a disconnect between what companies want and the steps they could and should take to address their hiring gaps.¹ Companies are still skeptical about the BAC strategy of providing high school and community college students with paid internships as a way of creating a talent pipeline. To generate understanding and then commitment, the attendees at the meeting—employers, members of the [Technology First](#) computer science association, and educators from both K-12 and postsecondary education—reviewed the pathways models and discussed a shared one- and five-year visions. The visions include increased opportunities for young people to develop both technical and employability skills through their coursework, project-based learning, and work-based learning. While there are currently a small number internship programs with a handful of high school students, the county recognizes these companies as early adopters and knows success will involve scaling these programs to be a robust, stable strategy for talent development.

While the BAC annual meeting and the computer science meeting had enthusiastic audiences, and the pathways models earned general admiration, Stewart saw challenging next steps ahead for him and all those who were invested in workforce development. He noted that the county needed additional “lighthouse” school districts and companies, with “real time” models that could demonstrate how the school/community college/business connections work together to produce results.

Stewart shared two examples of such lighthouses. [Northmont City Schools](#), a district in Montgomery County created a staff position to be paid for by the Chamber of Commerce and the district to make career connections happen. The result: High school seniors are exposed to career pathways, more than 50 mentors have been identified and placed, and work-based learning is expanding. The staff person, an authoritative member of the BAC, has seen both young people and employers benefit from the connections she has facilitated. Nearby, CareSource, a multistate health care provider that has been based in Dayton for the past 30 years, is ramping up high school internships. It started with three interns and was pleased with how well it worked out; it now has 10 interns. CareSource received support for its work-based learning design and implementation from the [Strategic Ohio Council for Higher Education](#) (SOCHE). SOCHE created job descriptions, advertised internships, screened candidates, provided payroll and insurance services.

The Problem MCECSC Pathways Initiative Is Addressing: Mismatch Between Education and the Labor Market

In the MCECSC/BAC's estimation, like many economic regions across the U.S., the Dayton metropolitan area and Montgomery County more broadly suffer from a mismatch between the knowledge and skills that the area's employers seek and the outcomes of high school and higher education. This situation existed before COVID-19 and is starker today as employers face shortages of candidates to fill many open positions.

To understand the mismatch in more detail, the MCECSC/BAC needed to consider the education levels of county adults, the economic sectors with the largest number of open job postings, qualifications for entry-level positions, anticipated turnover rates and retirements, entry-level salaries, and opportunities for advancement. To use a phrase from a 1988 report published by the William T. Grant Foundation, Montgomery County has a "forgotten half"—young people and adults who do not have the education and experience needed to make a successful transition into a quality job that pays a living wage, which is essential for their personal success and for the region's economy to thrive.² The state has adopted the goal of having 65 percent of the population of 25-to-64-year-olds possess a degree, certificate, or other postsecondary workforce credential by 2025. The current rate is 49.5 percent, putting Ohio 34th among all U.S. states. Of the Montgomery County population age 25 and older, only 35.9 percent have earned an academic degree.³ In 2021, of the 25-to-34-year-olds in the county—a group that represents the future of the regional economy—11 percent had an associate's degree, 21 percent had a bachelor's degree, and 9 percent had a graduate degree; all of those percentages are below the national averages.⁴

Level of education has an impact on earnings. [In 2019](#), across the United States, [44 percent of adults](#) who earned below the median income of \$47,500 had no education beyond high school; only 19 percent of adults with no education beyond a high school diploma earn above the median wage. For states and regions developing pathways, an initial challenge is to agree on the "best bet" career areas, given the local economy. Labor market analysis for Montgomery County shows that the highest percentage of jobs are in health care and manufacturing, which generally require at least an industry certification or associate's degree and pay reasonably well. The third-highest employment category is retail, in which many jobs don't require a certification or degree but also are much less likely to pay a living wage. Health care is growing more rapidly than the others categories, with wages improving as well.⁵ As for job postings, computer science and IT are required in every sector of the economy, whether automotive, health care, manufacturing, or the tech industry itself. In addition, Intel has just moved into Ohio, making the largest business investment in the state's history. With a massive semiconductor factory under construction in Licking County promising 3,000 jobs, the need for manufacturing skills will become even

greater. Most of the open and new positions require education beyond high school; some but not all higher-paying positions require a bachelor’s degree.

JFF’s labor market analyses identify in-demand jobs that are appropriate for young adults and pay well at entry-level, including jobs attainable for candidates with an associate’s degree. JFF also looks for jobs that come with the possibility of advancement, including employer-supported educational opportunities for those who wish to earn a bachelor’s or graduate degree. The chart below is the labor market analysis JFF provided to regional pathway stakeholders as background for the pathways model in health science. Health science is an industry where we see a correlation between wages and education: there are many low-wage jobs that don’t require lots of formal education, living wage jobs that require some postsecondary that isn’t necessarily a bachelor’s degree, and many high-wage jobs that require an advanced degree. The health science committee, the Greater Dayton Area Hospital Association education subcommittee, is currently having conversations about how to create career ladders for in-demand jobs that are traditionally difficult to advance from, such as home health aide.

Selected Occupations, Wages, and Job Growth

The health science careers listed below are projected to grow in the region. The living wage is from the MIT Living Wage Calculator for one adult and one child in Montgomery County. Note that some jobs in the table do not pay a living wage and do not easily stack to further credentials, making economic advancement difficult.

Typical Job	Pays Living Wage (\$23.16)	Median Hourly Earnings	Preferred Education	Stackable Credential	Positions (2020)	Expected Growth (2020–2030)	
						Positions	Percent
Home Health and Personal Care Aides	No	\$11.33	Short-Term Home Health Aide Certificate	Not typically stackable	3,458	860	25%
Medical Assistants		\$16.53	Medical Assistant Technology (AAS)		1,701	432	25%
Emergency Medical Technicians and Paramedics		\$16.53	Emergency Medical Services (AAS)		502	159	32%
Phlebotomists		\$16.85	Short-Term Phlebotomy Certificate		742	144	19%
Medical and Health Services Managers	Yes	\$47.22	Health Information Management/Administration (BS)	Health Administration (MS)	808	116	14%
Respiratory Therapists		\$28.60	Respiratory Care (AAS)	Respiratory Care (BS)	584	71	12%
Radiologic Technicians		\$28.24	Radiographic Technology (AAS)	Radiation Science Technology (BS)	626	43	7%
Diagnostics Medical Sonographers		\$35.77	Diagnostic Medical Sonography (AAS)	Diagnostic Medical Sonography (BS)	284	39	14%
Dental Hygienists		\$34.00	Dental Hygiene (AAS)	Expanded Function Dental Auxiliary (EFDA) License	644	20	3%
Registered Nurses	Yes	\$32.61	Nursing (BS)	Nursing (MS)	10,190	611	6%
Nurse Practitioners		\$51.02	Nursing (MS)	Terminal degree for this occupation	672	174	26%
Physicians	Yes	\$101.08	Doctor of Medicine (MD)	Terminal degree for this occupation	1,220	141	12%

Source: Montgomery County Health Science Pathway, <https://www.mcesc.org/userfiles/770/My%20Files/MCESC%20BAC%20%20Health%20Science%20Pathway%20Framework%207%2019%202021.pdf?id=4356>

The MCESC used a structure of industry committees and empowered representatives from ground-level teams to develop the pathway models. The question for the next case study is

whether the career pathways can move from model to reality through high-quality implementation and scaling efforts across the county high schools and higher education partners. The MCESC/BAC will offer implementation supports, but the choice is up to the provider. Today the county has the required pathways infrastructure in place to support transitions from education to career. Three years from now, will a sufficient number of schools, colleges, and employers have signed on so that the county sees a significant improvement in high school completion, college enrollment, student retention, and degree attainment? Will there be evidence that the credentials students earned are leading them to well-paying entry-level positions in the county?

Looking Back: The Montgomery County Education Services Center Joins the Pathways Network (2018-19)

Cox remembers her first encounter with the Pathways to Prosperity vision, framework, and strategy levers. “I was in Seattle in 2017, waiting for an airport shuttle after a meeting and reading an article on my phone that someone had sent about pathways. ‘This is it,’ I said to Tom [Lasley], who was with me. This is what we need to make a system.’ Then I read [the Delaware case](#) describing their strategy and progress” as a Pathways to Prosperity Network member. As Cox said, JFF’s pathway levers (see *“How the Pathways Movement Started”*) helped them realize that they were on the right track. They meant something.

Once they were home, Cox and Lasley found out all they could about JFF’s Pathways to Prosperity Network. Convinced that the pathways approach

From the 2019-20 MCESC BAC Joint Statement of Work

In October, a working group attended the 2019 Fall Pathways to Prosperity Institute in Cambridge, Massachusetts. Our group consisted of superintendents and staff from Sinclair College and Learn to Earn Dayton, as well as economic development professionals from the Dayton Development Coalition and Montgomery County Business Services. We heard about exciting career-readiness efforts taking place across the country and presented on the visionary work we’re pioneering in social-emotional learning and how it links with our career-connections work. The Pathways to Prosperity team is leading our local initiatives to ensure young people get the knowledge and skills that employers with in-demand jobs require. As we continue our learning about the ever-changing competencies needed in the 21st century workforce, our educators will respond and adjust. Since January 2020, we have been working with our in-state Pathways to Prosperity Network partners to explore ways we can better link to statewide efforts and further leverage our work.

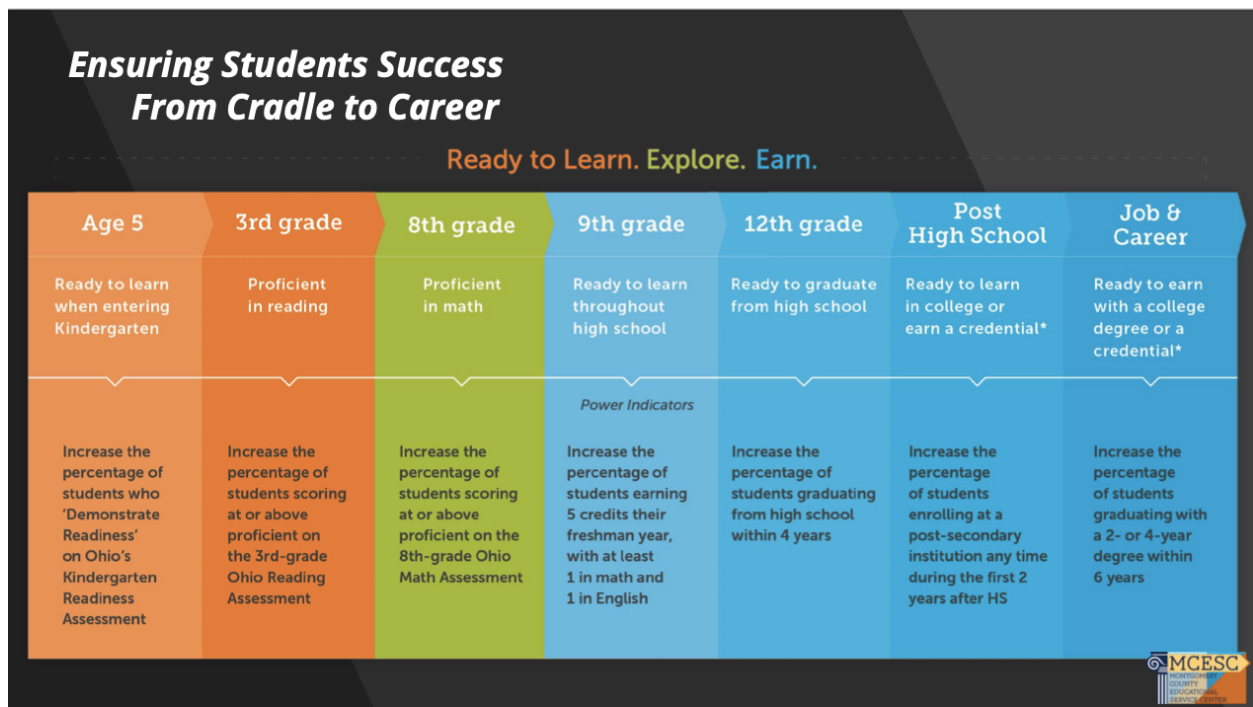
would aid their work, they set out to assemble a team that could adapt the lessons from the national pathways movement to the needs and interests of Montgomery County. They started by making the case to the BAC that it should join the Pathways to Prosperity Network. The BAC was a relatively new entity. As mandated through state policy, each school district was to create its own business advisory council, but Cox realized that while the spirit of the mandate was right, overlap and competition among stakeholders would be unavoidable. Consequently, she spoke with leadership in each of the MCECSC's 16 districts (and one career technical center) and proposed that the MCECSC assemble one council to serve the region, a strategic decision that allows the BAC to “backward-map” from the needs of the labor market and develop a coalition of stakeholders. Hence, the MCECSC BAC was set up to ensure that the regional workforce could compete. The goal was and is to enhance partnerships between schools, higher education, and employers.

By the fall of 2018, the MCECSC BAC had done sufficient due diligence to agree to join the Pathways to Prosperity Network. Its membership dues entitled the BAC to a menu of services to support its work. There are four main outcomes the MCECSC BAC strives to achieve: ensuring student success and career readiness while in school; helping existing and new businesses thrive in the region; keeping talent in the region; and making Montgomery County and the contiguous Warren County, which is also a part of the BAC, great places to live and work. Career pathways that span eighth grade through an associate's degree and include career exploration, culminating in a work experience, contribute to these four outcomes. Lasley commented on the importance of being a part of the Pathways to Prosperity Network as well as working with a pathways team that brought an impartial perspective to the regional workforce efforts: “We needed technical assistance that was not vested in our local efforts. Pathways to Prosperity provided that essential technical assistance.”

Competency Mapping: Putting the Puzzle Pieces Together (2019-20)

In 2019, with a commitment to improving career readiness for all students, the MCECSC BAC began working to establish a common vision and framework and proceeded to systems development and pathways design. The 2019-20 MCECSC BAC joint statement of work announced, “We’ve moved from planning to action—promoting system-level change across our community. Over the next 12 months, we will continue to stand up new career-connection opportunities for students and build deeper relationships with our region’s in-demand industries.”⁶ One step was to identify the current programs and initiatives—the puzzle pieces—that were currently serving to enhance young people’s career awareness and career building. The high-quality assets were many and existed in the MCECSC as well as in libraries, youth-serving organizations, the Dayton Development Coalition, and the local chamber of commerce, and among educators and in the broader community. Examples include the following:

- The MCECSC developed a K-5 career awareness curriculum called “I Can Be Anything I Want to Be: A to Z.”
- Workforce-sector middle and high school courses were offered in key economic sectors—advanced manufacturing, aerospace, health care, and construction—in addition to two middle school career adventure courses, in health care and aerospace.
- [Learn to Earn Dayton](#), a local collective impact organization, has a goal to improve college and career pathways practices in schools across Montgomery County and the region in general. Learn to Earn has implemented supports for high school students for postsecondary and career planning so that every student will have the opportunity to attain a two- or four-year college degree or an industry credential with market value, or enlist in the military.



Source: <https://www.learntoearnadayton.org>

State policy reinforced the MCECSC BAC’s strategy. For example, since 2016, Sinclair Community College, the largest two-year institution in the region, has been providing dual-enrollment options under Ohio’s College Credit Plus policy.⁷ Today, Sinclair serves 130 high schools, enrolling 7,300 high school students in college courses.

Another example is the state’s Career Connections web-based resources, launched in 2018, which include a career pathways framework, suggested curriculum maps, and information on work-based learning and jobs in demand in Ohio.⁸

These assets were key markers that the state and, most importantly, the county had been paying attention to and committing resources to for career preparation.

But the first step to making stronger connections between education and career was not about school or colleges, or knitting the assets outlined above into a system, but about the labor market. Pathway designers too often proceed from high school to college to work—a logical sequence—but are also responsible for much of the misalignment of education with labor market needs. To avoid such misalignment, JFF recommends the *backward mapping cited above*.

Accordingly, the MCEC's Stewart, in collaboration with the JFF team, began by working with industry sectors to produce a resource that defines the skills and abilities (competencies) necessary for a high school student to successfully advance into higher education, specialized industry training such as an apprenticeship, or an entry-level position in an industry. The resource contains technical competencies for four industries in the Montgomery County region: aviation and aerospace, health science, information technology, and the skilled trades (construction). The competencies were developed through an iterative process involving industry leaders, educators, and experts from across Montgomery County from June 2019 to January 2020. JFF and the MCEC/BAC co-led the process. All four industry areas used the same competency mapping process:

1. Interview local human resources and talent acquisition professionals in each “best bet” industry to fully understand regional labor market demand
2. Analyze national research and data from Ohio-based human resource professionals and collaborate with local experts to incorporate the regional context
3. Review and synthesize state and/or regional entry-level job descriptions and identify trends and implications
4. Write a white paper on the findings and make available for public comment

As part of step 2, the team collected broad-based industry feedback through a digital survey and also put in place a two-month open comment period for community members, families, education leaders, and industry stakeholders. The survey was completed by over 100 human resources managers, talent acquisition specialists, education professionals, and community members. JFF and MCEC then worked with the steering committees to analyze and incorporate the feedback and finalize the competencies.

The table below offers sample of some of the health science competencies.

Health Science Technical Competencies

Customer service and patient focus	Students can use their understanding of communication, active listening, and conflict resolution to identify and meet the needs of a patient or customer.
Health professional licensure	Student can use their understanding of appropriate industry education requirements, licensure, and certification to ensure adherence to regulations that guide service delivery.
Healthcare industry ethics	Students can use their understanding of confidentiality, morality, and legal concepts to evaluate and apply the merits, risks, and social concerns to workplace decisions.
Healthcare safety systems and environment	Students can use their understanding of health and safety procedures and protocols to ensure a safe, secure, and healthy work environment.
Medical terminology	Students can use their understanding of basic medical terminology, including abbreviations, acronyms, and diagnostic terms, to communicate effectively with healthcare personnel and patients.
Computer applications, records, and data recording	Students can use their understanding of keyboarding, data entry, and work processing to accurately record information on health technology systems.
Healthcare sanitation	Students can use their understanding of health cleanliness regulations and sanitation procedures to ensure that healthcare facilities and tools meet standards for cleanliness.

Source: <https://bit.ly/3TfjvmT>

Multiple stakeholders can use these competencies to support the process of designing college and career pathways that help students succeed in their educational and career goals. These competencies formed the foundation for the next stage of work—developing pathways models.

Selecting and Designing Industry Pathways Models: COVID-Era Accomplishments (2020-21)

By 2020-21, the MCECSC/BAC had made progress despite the setbacks of the pandemic. As Cox explained, “Three or four weeks into the pandemic, the BAC put together a plan of action and a one-pager that highlighted all the options. We virtually convened 50 leaders to plan for developing an IT and computer science talent pipeline through pathways.” The intention was to outline a common set of experiences for students in the selected career pathways, including coursework, potential postsecondary programs, and potential career outcomes. The frameworks thus aligned the components of each industry pathway so that the interests and needs of regional stakeholders, including employers, higher education, K-12 students and educators, and the workforce, were represented.

One important decision that forecast the work to come was the BAC’s formation of industry-specific committees in health care and computer science. These committees were able to work virtually and, as a result, the BAC’s Joint Statement of Work 2021-22 was able to share the following: “Our Pathways team has assisted us in supporting our monthly Greater Dayton Area Hospital Association Education Subcommittee and our quarterly meetings with Technology First’s Workforce Subcommittee. These industry-led groups have been instrumental in the recent progress our BAC has made. We appreciate our Pathways to Prosperity support in the implementation of this plan. In December [2021], we completed our third pathway focused on advanced manufacturing. This work was supported by Jobs for the Future’s Pathways to Prosperity Initiative.”

The JFF pathways team guided the pathways model development according to a process developed over years of working with employer-led design teams across the United States. In short, the process that the BAC followed for each of the three now completed industry areas (health science, IT and computer science, and advanced manufacturing) had the following backward-mapping steps, starting with the end goal—meeting labor market needs.

1. Analyze labor market information (real time and from O*Net) for the selected occupations, including projected job openings, median wages, education requirements, work experience required, and demographic information (age, gender, and race), and identify the top 10 jobs that pay a living wage and are attainable with a credential below a bachelor’s degree (i.e., certification or an associate’s degree).
2. Select postsecondary options to ascertain what college-level courses will give students the skills to succeed in the workforce; what courses fulfill requirements for credentials that lead to high-growth, high-wage careers; and how students can

save time and money in completing their postsecondary degree (e.g., access to College Credit Plus).

3. Identify assets that support college and career preparation and navigation, drawing on the resources already adopted in the county, including the BAC Employer Engagement Menu of ways to work with students, the high school career curriculum, and the like. Identify gaps in the supports that are needed.

Even with hours of commitment from the MCEC staff and JFF, the work that went into convening these groups, consulting them to ascertain what employers required for the job openings, and then working with the community college to align coursework took many months. As JFF's Sarah Jenness, who led the work with colleague Ronesha Williams, reported:

Each of these industry areas had their own challenges. We started with health care, which is both in high demand and, while complex enough, has relatively standardized roles and position descriptions with education requirements spelled out and licenses as a final step. Advanced manufacturing was the most time-consuming and difficult, since Montgomery County mirrors the national problem: manufacturing has a bifurcated labor market, with multiple low-wage jobs that require manual dexterity and little to no postsecondary education, and multiple openings for engineering positions that pay quite well but require workers to have a bachelor's degree.

Not all went according to plan. For a number of reasons, the design team needed to put the creation of a pathways model for the aviation and aerospace industry on hold. For one thing, COVID-19 was demanding more time than the industry representatives had anticipated. In addition, while JFF had substantial expertise and resources to draw on in designing pathways models in health care, IT, and advanced manufacturing, aerospace would require more research and consultation, since few high school to college to career pathways exist. In addition, aerospace in Montgomery County comprises a dizzying array of opportunities in multiple fields. [Wright Patterson Air Force Base](#) is the largest employer in the county and the largest single-site employer in the state, with over 30,000 military and civilian employees.⁹ It generates \$4.2 billion a year for Ohio, and includes a worldwide logistics system and a world-class research laboratory all needing a wide range of mechanics and engineers. The Base also staffs a shopping mall, day care and medical facilities. Settling on the best approach is a task for the next phase of work, along with developing additional career pathways models. The next phase will also reflect a revised process based on lessons learned over the past several years.


The Way Forward

Insight into the future of MCECSC BAC's efforts can be found in the "[2021-2022 Joint Statement of Work](#)":

It's 2022, and we've entered the next phase of our efforts. We've aligned funding to support our BAC districts with new resources, tools, and programs. We can now explore new ways to scale and track the great workforce efforts going on around our region. Each spring we have about 7,000 students set to graduate. That is 7,000 high school graduates looking to their next step in their career journeys. We're at a pivotal moment but we have the right partners at the table to ensure these students find their next steps. As we close out this school year, it will be critical we test out these new tools and tinker with existing efforts like In-Demand Jobs Week. We look forward to expanding programs and incorporating more student voices into these efforts as well!

When asked about next steps, Cox acknowledges the work that lies ahead. "When you make progress, you also always end up realizing how much more there is to get done. That's where we are as we head into the 2022-23 school year." However, she added, reflecting on the status of the MCECSC/BAC today, "the spirit of collaboration is alive and well, and together we will not only build additional new opportunities for young people in our county, we'll also continue the hard work of shifting mindsets. We still have a good way to go."

Appendix: Pathway Models



**Montgomery County
Advanced Manufacturing Pathway**

Regional pathway models support the alignment of stakeholders including employers, higher education, K-12, and workforce, to ensure pathways prepare young people for careers with family-supporting wages and build a robust talent pipeline for employers. Pathway models demonstrate a vision from 8th grade to career including high school coursework, college and career preparation activities, potential postsecondary programs, and in-demand jobs in the regional labor market. This is a living document that will need to be updated regularly to reflect current education programs and workforce needs.

Academic Coursework

This general coursework is recommended for all students in the advanced manufacturing pathway.

	Grade 8	Grades 9 and 10	Grade 11	Grade 12
Career Focused Courses		Foundational Advanced Manufacturing or CCP Course such as: + MET 1131–Personal Computer Applications for Engineering Technology + CAM 1109–Fundamentals of Tooling and Machining	Strategic CCP Course such as: + EET 1120–Introduction to DC and AC Circuits + EGR 1106–Basic Mechanical and Technical Skills	Strategic CCP Course such as: + COM 2211–Effective Public Speaking
English	Grade 8 English	English I English II	English III	English IV + ENG 1101–English Composition I
Math	Grade 8 Math or Algebra I	Algebra I Geometry	Algebra II	Trigonometry/Calculus + MAT 1470–College Algebra
History	Social Studies	World History	US History	US Government
Science	Physical Science	Biology	Chemistry	Physics

+ College Credit Plus (CCP) courses apply to a broad range of postsecondary programs in advanced manufacturing. The credits apply to both high school and postsecondary requirements, saving students time and money.

College and Career Preparation

These additional activities support students in preparing for both college and career. Work-based learning enables students to apply their academic learning in a real-world setting. Advising supports students in making decisions that align best with their strengths and future goals. Competencies describe the technical skills students need for a successful career in advanced manufacturing.

	Grade 8	Grades 9 and 10	Grade 11	Grade 12
Work-Based Learning	Career Exploration: • Workforce Sector Course—Advanced Manufacturing • Work-Site Tours • Power Lunches • Pathway Fairs	Career Planning: • Job Shadow • HR Interview • Virtual Pathway Mentor • Resume Prep	Career Planning: • Internship • Career Fair • Mock Interview	Career Planning: • Internship • Career Fair • Mock Interview
Advising	• YouScience	• Individualized College and Career Plan (ICCP) • Confirmation of Pathway • Identification of Credentials and College Options • Revisit ICCP	• Financial Literacy Course • College Application Prep Work • Industry Recognized Credential Examination	• Free Application for Federal Student Aid (FAFSA) • Complete Ohio Means Jobs (OMJ) Readiness Seal • College and Career Signing Day
Competencies	• Employment Skills	• Equipment Safety • Manufacturing Environment • Personal Health and Safety • Spatial Reasoning • Process, Design, and Development • Installation	• Customer Focus • Quality Assurance and Continuous Improvement • Digital Manufacturing • Supply Chain Logistics	• Individualized Specialization

Manufacturing Competencies

- Equipment Safety**
Students can use their understanding of equipment usage, practices, and procedure to maintain a healthy, safe, and secure work environment.
- Manufacturing Environment**
Students can use their understanding of workstations, tools, and equipment operations to safely navigate a manufacturing environment.
- Personal Health and Safety**
Students can use their understanding of personal safety and environmental regulations to comply with local, federal, and company health/safety demands.
- Spatial Reasoning**
Students can use their understanding of objects in relation to one another to understand three-dimensional imaging.
- Process, Design, and Development**
Students can use their understanding of technical drawings and schematics to complete the design and development process.
- Installation**
Students can use their understanding of tools to assemble and disassemble simple tools.
- Customer Focus**
Students can use their understanding of communication and project management to understand client needs and complete projects accordingly.
- Quality Assurance and Continuous Improvement**
Students can use their understanding of product and process to meet quality systems requirements as defined by customer specifications.
- Digital Manufacturing**
Students can use their understanding of digital manufacturing tools and computer-based programs to complete the development and design for implementation processes.
- Supply Chain Logistics**
Students can use their understanding of materials, suppliers, and internal systems to plan and monitor movement and storage of materials and products.

Selected Postsecondary Options

The selected postsecondary credentials in advanced manufacturing are based on program options and transfer agreements at Sinclair Community College, except for the welding program, offered through Hobart Institute. Some education paths have credentials that easily stack or build from the previous credential, while others are not as easily stackable. Stackable credentials can help an individual progress in their career pathway or move up a career ladder to different or higher paying jobs.

	Initial Credentials	Stackable Credentials	Potential Occupational Outcome
Engineering Technology	• Industrial Engineering Technology Associate of Applied Science Students eligible to take the following certification exam: Six Sigma Green Belt Certification	• Bachelor of Science in Industrial Engineering Technology (with additional transfer courses)	• Engineering Technicians • Quality Control Technicians • Production Supervisors • Continuous Improvement Specialists
	• Mechanical Engineering Technology Associate of Applied Science Students eligible to take the following certification exam: Certified SolidWorks Associate (CSWA) IRC	• Bachelor of Science in Mechanical Engineering • Bachelor of Science in Mechanical and Manufacturing Engineering Technology	• Mechanical Engineering Technicians
	• Automation and Control Technology with Robotics Students eligible to take the following certification exam: FANUC Handling Tool		• Control System Technician and Designer • Systems Engineering Technician • Industrial Equipment Professional
Welding (Hobart Institute)	• Pathway Welding Program Students eligible to take four nationally recognized certifications: AWS® D1.1 Shielded Metal Arc Welding, AWS® D1.1 Flux Cored Arc Welding, AWS® D1.6 Gas Tungsten Arc, AWS® D1.1 Gas Metal Arc Welding Pulsed Spray Transfer	• Welder-Fabricator Pathway Students eligible to take two additional nationally recognized certifications: AWS® D1.1 Gas Metal Arc Welding Pulsed Spray 3G, AWS® D1.1 Flux Cored Arc Welding Self-shielded	• Welder
Computer Aided Manufacturing	• Computer Aided Manufacturing/CNC Technology Associate of Applied Science		• Machinist/CNC Machinist • Process Improvement Specialist
Guided Transfer	• Engineering and Engineering Technology University Transfer Associate of Science	Several options including, but not limited to: • Bachelor of Science in Civil Engineering • Bachelor of Science in Electrical Engineering • Bachelor of Science in Mechanical Engineering • Bachelor of Science in Industrial Engineering	• Engineer

Selected Occupations, Wages, and Job Growth

The advanced manufacturing careers listed below are projected to have job openings over the next five years in the region. The living wage (\$28.66/hour) is from the MIT Living Wage Calculator for one adult and one child in Montgomery County in 2022. Like all industries, many high-wage jobs in advanced manufacturing require a bachelor's degree or beyond. However, there are a few jobs below that don't require a four-year degree and pay over \$20/hour. In manufacturing, there are few defined career advancement opportunities, but one such opportunity is moving into a managerial/supervisory role. The last column in the table shows the occupation's risk of being affected by automation, a factor to consider as individuals plan for their careers.

Typical Job	Pays Living Wage (\$28.66)	Median Hourly Earnings	Entry Level Wages	Positions (2021)	Average Annual Openings	Expected Growth (2021-2026)	Typical Education Required	Higher-than-Average Risk of Automation
Electronics Engineers	Yes	\$53.67	\$42.73	1,388	87	-2%	Bachelor's degree	No
Software Developers and Software Quality Assurance Analysts and Testers	Yes	\$44.13	\$26.68	5,640	482	11%	Bachelor's degree	No
Mechanical Engineers	Yes	\$43.37	\$34.38	1,213	79	4%	Bachelor's degree	No
Industrial Engineers	Yes	\$38.47	\$31.96	1,114	85	8%	Bachelor's degree	No
Electrical and Electronics Repairs	Yes	\$31.38	\$28.24	78	7	6%	Postsecondary certificate	No
Supervisors/Managers	Yes	\$30.77	\$24.53	2,052	190	2%	High school diploma or equivalent	No
Machinist/CNC Machinist	No	\$23.20	\$17.88	2,050	206	4%	High school diploma or equivalent	Yes
Welders, Cutters, Solderers, and Brazers	No	\$20.89	\$17.72	663	82	8%	High school diploma or equivalent	Yes
Maintenance Repair Workers	No	\$19.80	\$16.09	3,277	320	0%	High school diploma or equivalent	Yes
Inspector/Quality Assurance Auditor	No	\$18.93	\$16.21	1,855	196	-6%	High school diploma or equivalent	Yes

This document was developed by JFF, Learn to Earn Dayton, and the Montgomery County ESC. Special thanks to Sinclair Community College, Hobart Institute of Welding Technology, and the Dayton Region Manufacturers Association for their feedback and contributions.

January 2022

Montgomery County
Information Technology/Computer Science Pathway

Regional pathway models support the alignment of stakeholders including employers, higher education, K-12, and workforce, to ensure pathways prepare young people for careers with family-supporting wages and build a robust talent pipeline for employers. Pathway models demonstrate a vision from 8th grade to career including high school coursework, college and career preparation activities, potential postsecondary programs, and in-demand jobs in the regional labor market. This is a living document that will need to be updated regularly to reflect current education programs and workforce needs.

Academic Coursework

This general coursework is recommended for all students in the IT/computer science pathway.

	Grade 8	Grades 9 and 10	Grade 11	Grade 12
Career Focused Courses	Information Technology Networking Programming	Foundational IT/Comp Sci or CCP Course such as: + CIS 1107-Introduction to Operating Systems + BIS 1120-Introduction to Software Applications + BIS 1105-IT Fundamentals	Strategic CCP Course such as: + CIS 1130-Network Fundamentals + CIS 1111-Introduction to Problem Solving and Computer Programming	Strategic CCP Course such as: + CIS 1140-Information Systems Analysis and Design + CIS 2165-Database Management
English	Grade 8 English	English I English II	English III	English IV + ENG 1101-English Composition I
Math	Algebra I	Geometry + MAT 1470-College Algebra	Algebra II	Trigonometry/Calculus
History	Social Studies	World History	US History	US Government
Science	Physical Science	Biology	Chemistry	Physics

Note: College Credit Plus courses apply to both high school and postsecondary requirements, saving students time and money. Students who complete the following six courses can earn the IT Fundamentals Certificate at Sinclair Community College: BIS 1120, CIS 1107, CIS 1111, CIS 1130, CIS 1140, CIS 2165

College and Career Preparation

These additional activities support students in preparing for both college and career. Work-based learning enables students to apply their academic learning in a real-world setting. Advising supports students in making decisions that align best with their strengths and future goals. Competencies describe the technical skills students need for a successful career in information technology and computer science.

	Grade 8	Grades 9 and 10	Grade 11	Grade 12
Work-Based Learning	Career Exploration: • Career Adventures Course-IT • Work-Site Tours • Power Lunches • Pathway Fairs	Career Planning: • Job Shadow • HR Interview • Virtual Pathway Mentor • Resume Prep	Career Planning: • Internship • Career Fair • Mock Interview	Career Planning: • Internship • Career Fair • Mock Interview • Exposure to Related Software Languages
Advising	• YouScience	• Individualized College and Career Plan (ICCP) • Confirmation of Pathway • Identification of Credentials and College Options • Revisit ICCP	• Financial Literacy Course • College Application Prep Work • Industry Recognized Credential Examination	• Free Application for Federal Student Aid (FAFSA) • Complete Ohio Means Jobs (OMJ) Readiness Seal • College and Career Signing Day
Competencies	• Employment Skills Course	• User and Customer Support • Principles of Data and Documentation • Logic and Fundamentals of Computer Languages • Principles of Software • Word Processing, Spreadsheet, and Presentation Software	• Security, Compliance, and Risk Management • Routing and Network Configurations • Servers and Storage • Fundamentals of Cloud Computing and Virtualization	• Individualized Specialization

IT/Computer Science Technical Competencies

<p>User and Customer Support Use understanding of the range of services and customer-focused approaches used to provide assistance and technical support in order to help users solve problems and implement solutions related to IT.</p> <p>Principles of IT Systems and Concepts Use understanding of fundamental IT concepts, systems, platforms, and tools to understand the common roles and career trajectories of IT professionals.</p>	<p>Principles of Data and Documentation Use understanding of numerical sequencing, information flow, data, and record keeping in order to understand the role of technology in converting data into organized content and maintaining accurate records.</p> <p>Logic and Fundamentals of Computer Languages Use understanding of how computer languages communicate to build basic mobile and web applications.</p>	<p>Principles of Software Use understanding of designing, writing, testing, and maintaining source code of computer program to manage, maintain, and edit software.</p> <p>Word Processing, Spreadsheet, and Presentation Software Use understanding of Microsoft Office and Google Suite to create written documents, organize data, and develop visual presentations.</p>	<p>Security, Compliance, and Risk Management Use understanding of malware, firewall, IDS, and legal or regulatory requirements to recognize basic threats to networked computers and ensure procedures are in place for compliance.</p> <p>Routing and Network Configurations Use understanding of common networking protocols to explain the purpose of routing, monitoring, and network configurations.</p>	<p>Servers and Storage Use understanding of data backup systems to store and recover information.</p> <p>Fundamentals of Cloud Computing and Virtualization Use understanding of the features, benefits, and concepts of virtualization to differentiate among types of cloud services.</p>
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Selected Postsecondary Options

The selected postsecondary credentials in IT/computer science are based on program options and transfer agreements at Sinclair Community College. Some education paths have credentials that easily stack or build from the previous credential, while others are not as easily stackable. Stackable credentials can help an individual progress in their career pathway or move up a career ladder to different or higher paying jobs. Within the fields of IT and computer science, a particular education credential can prepare students for a variety of occupations.

	Potential Initial Credential	Stackable Credentials	Typical Occupational Outcome	
Computer Information Technology	<ul style="list-style-type: none"> • CompTIA A+ • CompTIA IT Fundamentals+ 	<ul style="list-style-type: none"> • Computer Information Systems—User Support Associate of Applied Science Students eligible to take the following certification exams: A+, Network+, Security+, MCSA Exam TestOut Client Pro • Computer Information Systems—Network Engineering Associate of Applied Science Students eligible to take the following certification exams: CCNA, Security+, A+, MCSA Exam TestOut Server Pro 2016: Install and Storage* *This credential is connected to an optional elective course, students need to take that specific elective in order to take the certification exam. • Computer Information Systems—Software Development Associate of Applied Science Students eligible to take the Network+ certification exam 	<ul style="list-style-type: none"> • Computer Information Systems Bachelor of Science 	<ul style="list-style-type: none"> • Computer Network Support Specialist • Computer User Support Specialist • Network Administrator • Network Security Analyst • Network Engineer • Software Developer • Web Developer • Help Desk Analyst • Network Administrator • User Support Specialist • Network Security Analyst • Network Engineer
Cybersecurity: Prevention and Investigation Technology	<ul style="list-style-type: none"> • CompTIA IT Fundamentals+ • CompTIA A+ • MTA 	<ul style="list-style-type: none"> • Computer Information Systems—Secure System Administration Associate of Applied Science Students eligible to take the following certification exams: Network+, Linux+, Security+, MCSA Exam TestOut Server Pro 2016: Install and Storage, MCSA Exam TestOut Server Pro 2016: Networking, MCSA Exam TestOut Server Pro: Identify, Securing Windows Network Environment 2016 Exam • Cyber Investigation Technology Associate of Applied Science Students eligible to take the following certification exams: A+, Network+, Linux+, Security+, MCSA Exam TestOut Server Pro 2016: Install and Storage, Securing Windows Network Environment 2016 Exam 	<ul style="list-style-type: none"> • Information Technology and Cybersecurity Bachelor of Science 	<ul style="list-style-type: none"> • Cybersecurity Analyst/Technician • Cyber Crime Analyst/Investigator • Incident Analyst/Responder • IT Auditor • Intelligence Analyst • IT Specialist • Systems Administrator • Network Engineer • Information System Security Manager • Cyber Security Incident Response Specialist • Private Investigator
Guided Transfer	<ul style="list-style-type: none"> • CompTIA IT Fundamentals+ • CompTIA A+ • CompTIA Security+ 	<ul style="list-style-type: none"> • Computer Science Associate of Science 	<ul style="list-style-type: none"> • Computer Science Bachelor of Science 	<ul style="list-style-type: none"> • Software Developer • Software Engineer • Data Engineer

Selected Occupations, Wages, and Job Growth

The IT and computer science careers listed below are projected to grow in the region. The living wage (\$23.16/hour) is from the MIT Living Wage Calculator for one adult and one child in Montgomery County in 2021. Note that all occupations included have median hourly earnings above a living wage, but that some jobs have a large pay range; this means that employees who have less experience, credentials, and skills can be paid significantly less than the median wage, which can be seen in the "entry level wages" column. The last column shows national data on how many workers in these positions have a bachelor's degree or higher, indicating that for some positions, a four-year degree is an important credential.

Typical Job	Alternate Job Titles	Pays Living Wage (\$23.16)		Expected Growth (2020-2025)			Typical Work Experience Required	Workers with a Bachelor's or Higher*
		Median Hourly Earnings	Entry Level Wages	Positions (2020)	Positions	Percent		
Software Developers	• Application Developers • Systems Engineer	\$44.13	\$26.68	5,561	646	12%	None	85%
Computer Systems Analysts	• Information Technology Analyst	\$42.09	\$26.36	1,740	127	7%	None	73%
Computer and Information Systems Managers	• Application Development • Director IT Director	\$63.86	\$41.01	943	92	10%	5+ Years	73%
Computer User Support Specialists	• Desktop Support Technician • Help Desk Analyst	\$25.39	\$15.82	2,129	71	3%	None	48%
Information Security Analysts	• Information Security Officer • Network Security Analyst	\$47.61	\$27.32	373	65	17%	Less Than 5 Years	67%
Network and Computer Systems Administrators	• Network Administrator • Systems Administrator	\$37.41	\$23.56	955	27	3%	None	54%
Computer Network Architects	• Network Analyst • Network and Security Engineer	\$43.36	\$28.72	293	23	8%	5+ Years	57%
Web Developers	• Web Designer • Webmaster	\$38.45	\$27.03	750	6	1%	None	68%

This document was developed by JFF, Earn to Earn Dayton, and the Montgomery County ESC. Special thanks to Sinclair Community College and the Technology First Workforce Committee for your feedback and contributions.

August 2021



Montgomery County Health Science Pathway

Regional pathway models support the alignment of stakeholders including employers, higher education, K-12, and workforce, to ensure pathways prepare young people for careers with family-supporting wages and build a robust talent pipeline for employers. Pathway models demonstrate a vision from 8th grade to career including high school coursework, college and career preparation activities, potential postsecondary programs, and in-demand jobs in the regional labor market. This is a living document that will need to be updated regularly to reflect current education programs and workforce needs.

Academic Coursework

This general coursework is recommended for all students in the health science pathway.

	Grade 8	Grades 9 and 10	Grade 11	Grade 12	
Career Focused Courses	Health Science and Technology	Foundational Health Science or CCP Course such as: + ALH 1101-Introduction to Healthcare Delivery	Strategic CCP Course such as: + HIM 1101-Medical Terminology	Strategic CCP Course such as: + PSY 1100-General Psychology	College Credit Plus (CCP) courses apply to a broad range of postsecondary programs in health science. The credits apply to both high school and postsecondary requirements, saving students time and money.
English	Grade 8 English	English I, English II + ENG 1101-English Composition	English III + COM 2206-Interpersonal Communication	English IV + COM 2206-Interpersonal Communication	
Math	Grade 8 Math or Algebra I	Algebra I, Geometry + MAT 1470-College Algebra	Algebra II	Trigonometry/Calculus + MAT 1470-College Algebra	
History	Social Studies	World History	US History	US Government	
Science	Physical Science	Biology + BIO 1107-Human Biology	Chemistry	Physics + BIO 1141-Principles of Anatomy & Physiology I	

College and Career Preparation

These additional activities support students in preparing for both college and career. Work-based learning enables students to apply their academic learning in a real-world setting. Advising supports students in making decisions that align best with their strengths and future goals. Competencies describe the technical skills students need for a successful career in the health sciences.

	Grade 8	Grades 9 and 10	Grade 11	Grade 12	
Work-Based Learning	<ul style="list-style-type: none"> Career Exploration: <ul style="list-style-type: none"> Career Adventures Course—Healthcare Work-Site Tours Power Lunches Pathway Fairs YouScience 	<ul style="list-style-type: none"> Career Planning: <ul style="list-style-type: none"> Job Shadow HR Interview Virtual Pathway Mentor Resume Prep Individualized College and Career Plan (ICCP) <ul style="list-style-type: none"> Confirmation of Pathway Identification of Credentials and College Options Revisit ICCP 	<ul style="list-style-type: none"> Career Planning: <ul style="list-style-type: none"> Internship Career Fair Mock Interview Financial Literacy Course College Application Prep Work Industry Recognized Credential Examination 	<ul style="list-style-type: none"> Career Planning: <ul style="list-style-type: none"> Internship Career Fair Mock Interview Free Application for Federal Student Aid (FAFSA) <ul style="list-style-type: none"> Complete Ohio Means Jobs (OMJ) Readiness Seal College and Career Signing Day 	
Advising					
Competencies	<ul style="list-style-type: none"> Employability Skills Computer Applications, Records, and Data Recording Professional Working Environments Healthcare Rules and Regulations Healthcare Industry Ethics Healthcare Confidentiality 	<ul style="list-style-type: none"> Healthcare Rules and Regulations Use understanding of basic laws and regulations (Patient Bill of Rights, CLIA, EMTALA, OSHA, etc.) to meet accreditation standards and obey the law. Healthcare Industry Ethics Use understanding of confidentiality, morality, and legal concepts to evaluate and apply the merits, risks, and social concerns to workplace decisions. 	<ul style="list-style-type: none"> Healthcare Confidentiality Use understanding of HIPAA in order to adhere to legal requirements and maintain confidentiality. Medical Terminology Use understanding of basic medical terminology, including abbreviations, acronyms, and diagnostic terms, to communicate effectively with healthcare personnel and patients. 	<ul style="list-style-type: none"> Customer Service and Patient Focus Use understanding of communication, active listening, and conflict resolution to identify and meet the needs of a patient or customer. Healthcare Safety Systems and Environment Use understanding of health and safety procedures and protocols to ensure a safe, secure, and healthy work environment. 	<ul style="list-style-type: none"> Health Professional Licensure Use understanding of appropriate industry education requirements, licensure, and certification to ensure adherence to regulations that guide service delivery. Healthcare Sanitation Use understanding of health cleanliness regulations and sanitation procedures to ensure that healthcare facilities and tools meet standards for cleanliness.

Health Science Technical Competencies

Computer Applications, Records, and Data Recording
Use understanding of keyboarding, data entry, and word processing to accurately record information on health technology systems.

Professional Working Environments
Use understanding of the importance of a sequence of tasks, cross-functional working environments, and professional communication to successfully work as part of a team.

Healthcare Rules and Regulations
Use understanding of basic laws and regulations (Patient Bill of Rights, CLIA, EMTALA, OSHA, etc.) to meet accreditation standards and obey the law.

Healthcare Industry Ethics
Use understanding of confidentiality, morality, and legal concepts to evaluate and apply the merits, risks, and social concerns to workplace decisions.

Healthcare Confidentiality
Use understanding of HIPAA in order to adhere to legal requirements and maintain confidentiality.

Medical Terminology
Use understanding of basic medical terminology, including abbreviations, acronyms, and diagnostic terms, to communicate effectively with healthcare personnel and patients.

Customer Service and Patient Focus
Use understanding of communication, active listening, and conflict resolution to identify and meet the needs of a patient or customer.

Healthcare Safety Systems and Environment
Use understanding of health and safety procedures and protocols to ensure a safe, secure, and healthy work environment.

Health Professional Licensure
Use understanding of appropriate industry education requirements, licensure, and certification to ensure adherence to regulations that guide service delivery.

Healthcare Sanitation
Use understanding of health cleanliness regulations and sanitation procedures to ensure that healthcare facilities and tools meet standards for cleanliness.

Selected Postsecondary Options

The selected postsecondary credentials in health science are based on program options and transfer agreements at Sinclair Community College. Some education paths have credentials that easily stack or build from the previous credential, while others are not as easily stackable. Stackable credentials can help an individual progress in their career pathway or move up a career ladder to different or higher paying jobs.

	Potential Initial Credential	Stackable Credentials	Typical Occupational Outcome	
Allied Health	Radiographer	Associate of Applied Science in Radiologic Technology—students eligible to take the ARRT exam	Advanced Imaging Certifications e.g.: Computed Tomography (CT), Magnetic Resonance Imaging (MRI), and Mammography Bachelor of Radiation Science Technology Bachelor of Science in Healthcare Administration	Radiologic Technician
	State Tested Nurse Aide (STNA)	Associate of Applied Science in Respiratory Care	Bachelor of Science in Respiratory Care Bachelor of Health Sciences Bachelor of Science in Healthcare Administration	Respiratory Therapist
	Certified Dental Assistant	Associate of Applied Science in Dental Hygiene—students eligible to take state board exams and apply for state licensing	Expanded Function Dental Auxiliary (EFDA) Continuing Education Programs e.g.: Local Anesthesia and Nitrous Oxide for Dental Hygiene	Dental Hygienist
Nursing	State Tested Nurse Aide (STNA) Licensed Practical Nurse (LPN)	Associate of Applied Science (AAS) in Nursing—students eligible to take RN exam	Bachelor of Science in Nursing (BSN) Master of Science in Nursing (MSN)	Nurse
Guided Transfer (pre-med, pre-dentistry, or other advanced degree track)	State Tested Nurse Aide (STNA)	Associate of Science in Pre-Professional Studies	Bachelor of Science Doctoral Degree	Physician (Doctor or Dentist)

Selected Occupations, Wages, and Job Growth

The health science careers listed below are projected to grow in the region. The living wage (\$23.16/hour) is from the MIT Living Wage Calculator for one adult and one child in Montgomery County in 2021. Note that some jobs in the table do not pay a living wage and do not easily stack to further credentials, making economic advancement difficult.

Typical Job	Pays Living Wage (\$23.16)	Median Hourly Earnings	Preferred Education	Stackable Credential	Expected Growth (2028-2030)		
					Positions (2020)	Positions	Percent
Home Health and Personal Care Aides	No	\$11.33	Short-Term Home Health Aide Certificate		3,458	860	25%
Medical Assistants	No	\$16.53	Medical Assistant Technology (AAS)	Not typically stackable	1,701	432	25%
Emergency Medical Technicians and Paramedics	No	\$16.53	Emergency Medical Services (AAS)		502	159	32%
Phlebotomists	No	\$16.85	Short-Term Phlebotomy Certificate		742	144	19%
Medical and Health Services Managers	Yes	\$47.22	Health Information Management/Administration (BS)	Health Administration (MS)	808	116	14%
Respiratory Therapists	Yes	\$28.60	Respiratory Care (AAS)	Respiratory Care (BS)	584	71	12%
Radiologic Technicians	Yes	\$28.24	Radiographic Technology (AAS)	Radiation Science Technology (BS)	626	43	7%
Diagnostics Medical Sonographers	Yes	\$35.77	Diagnostic Medical Sonography (AAS)	Diagnostic Medical Sonography (BS)	284	39	14%
Dental Hygienists	Yes	\$34.00	Dental Hygiene (AAS)	Expanded Function Dental Auxiliary (EFDA) License	644	20	3%
Registered Nurses	Yes	\$32.61	Nursing (BS)	Nursing (MS)	10,190	611	6%
Nurse Practitioners	Yes	\$51.02	Nursing (MS)	Terminal degree for this occupation	672	174	26%
Physicians	Yes	\$101.08	Doctor of Medicine (MD)	Terminal degree for this occupation	1,220	141	12%

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August 2021

Endnotes

¹ <https://code.org/promote/oh>, accessed Oct. 3, 2022.

² *The Forgotten Half: Pathways to Success for America's Youth and Young Families* (Washington, DC: Youth and America's Future: The William T. Grant Commission on Work, Family and Citizenship, November 1988), <https://www.aypf.org/wp-content/uploads/2014/12/The-Forgotten-Half-Optimized.pdf>.

³ The data comparisons are imperfect. Some data include industry certifications in counting credentials, while other data count only degrees (associates, bachelor's, etc.). See "Educational Attainment in Montgomery County, Ohio (County)," Statistical Atlas, October 3, 2022, <https://statisticalatlas.com/county/Ohio/Montgomery-County/Educational-Attainment>.

⁴ Montgomery County, Ohio Education Data, "Figure 11: Montgomery County, OH Detailed Education Attainment Breakout by Age Group (Age 18+)," TownCharts, accessed October 3, 2022, <https://www.towncharts.com/Ohio/Education/Montgomery-County-OH-Education-data.html>.

⁵ The U.S. Census Bureau's Quarterly Workforce Indicators, as cited in *Ohio Economic Profile: Montgomery County* (Columbus, OH: Ohio Department of Job and Family Services, Office of Workforce Development, July 2021), <https://ohiolmi.com/docs/EconomicProfiles/Montgomery-County.pdf>.

⁶ *Montgomery County ESC Business Advisory Council 2019-20 Joint Statement of Work* (Dayton, OH: Montgomery County Educational Service Center, 2020), http://www.mcesc.org/userfiles/770/My%20Files/MCESC20_BAC%20joint%20statement_final.pdf?id=2295.

⁷ "Sinclair Works With Nearly 130 High Schools to Provide Students Pathways to a College Education," Sinclair College, accessed October 3, 2022, <https://www.sinclair.edu/news/article/sinclair-works-with-nearly-130-high-schools-to-provide-students-pathways-to-a-college-education>.

⁸ "Career Connections," Ohio Department of Education, accessed October 3, 2022, <https://education.ohio.gov/Topics/Career-Tech/Career-Connections>.

⁹ "Wright-Patterson Air Force Base," Dayton Development Coalition, accessed October 3, 2022, <https://daytonregion.com/defense/dayton-region-defense-installations/wright-patterson-air-force-base>.