Building Industry-Driven Career Pathway Systems in Colorado

A STEP-BY-STEP GUIDE

Colorado Workforce Development Council

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Executive Summary

In Colorado, industry-driven career pathways ensure that education, training, and workforce systems stay deeply attuned and responsive to the needs of the labor market, preparing students and workers with the skills and credentials they need for jobs and careers. This guide outlines a step-by-step approach to building industry-driven career pathway systems that align education and training programs with the needs of the regional economy to ensure that students and job seekers are prepared with the right skills and experiences to get jobs in the driving sectors of their local economies.

What is a career pathway system? A career pathway system aligns public partners and engages them in a continuous conversation that is led by industry to ensure that job seekers and students move seamlessly through and among support programs, educational institutions, training opportunities, and work-based experiences to build skills and credentials that meet industry demand and prepare them for jobs and careers. In Colorado, a sector partnership is the vehicle for building industry-driven career pathway systems, providing a forum for productive and ongoing collaboration with industry and among workforce, education, training partners, and other community partners. In Colorado, the statewide career pathway system aligns career pathway programs and systems developed throughout high demand industries in each economic development region of the state.

What's the difference between a career pathway system and a career pathway program? A career pathway program offers a clear sequence of stackable credits and credentials, combined with support services, which enables students and job seekers to secure industry-relevant skills, certifications, and credentials and advance to higher levels of education and employment in high demand occupations[1]. A career pathway system is made up of multiple career pathway programs that span educational institutions, workforce, and support service partners. These programs are all oriented around a shared understanding of the needs of industry. Often times, tools like career pathway maps are used to talk with students and job seekers about how they can progress through education and training experiences to obtain employment that meets his or her goals.

What is a sector partnership and why do they matter for career pathway systems? In Colorado we've defined a sector partnership as an industry-specific regional partnership led by business in partnership with public partners in economic development, education, workforce development, and community support partners. In Colorado, industry-led sector partnerships are the vehicle for aligning public partners with industries' needs in an effective, results-driven manner. They provide the "home" for career pathway systems-building, engaging industry leaders and public partners in a continuous dialogue to ensure that education and training systems respond to industry needs. Other industry-driven public-private partnerships such as statewide industry associations can also support the development of career pathway programs and systems development, in collaboration with regional sector partnerships.

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1   The WIOA definition of a career pathway refers to a career pathway program: "a combination of rigorous and high-quality education, training, and other services." WIOA also tasks Local Workforce Development Boards with facilitating the development of career pathway systems: "The vision for the Local Workforce Development Board (Local Board) is to serve as a strategic leader and convener of local workforce development system stakeholders." (Notice of Proposed Rulemaking §679.300). "The local board, with representatives of secondary and postsecondary education programs, shall lead efforts in the local area to develop and implement career pathways within the local area by aligning the employment, training, education, and supportive services that are needed by adults and youth, particularly individuals with barriers to employment. (WIOA, Sec. 107(d))."

Who Should Use this Guide?

The primary audience for this guide is workforce development, education, and training organizations who are jointly responsible for designing and building seamless career pathway systems that prepare students and job seekers for jobs and careers in their local economy.

This guide will also be useful to other partners, including industry partners, engaged in Colorado's emerging and active sector partnerships. The Colorado model of career pathways assumes that they are driven out of emerging and existing sector partnerships. If implemented, the steps in this guide should result in the following outcomes:

- ▶ An accurate, up-to-date understanding of the most critical occupations in a target industry;

- ▶ A career pathway map that shows students and job seekers employment opportunities in the targeted industry sector; their basic requirements; expectations; and wages at entry-, mid-, and advanced-levels;

- ▶ In-depth information about the knowledge, skills, and abilities of those occupations that education and training programs can use to update or create accurate programming and credentials;

- ▶ A shared action plan for education and training providers to close gaps, reduce duplication and build a seamless career pathway system; and

- ▶ An engaged group of industry partners willing to deepen their involvement in their sector partnership and with their education and training partners.

Overview: How to Build Regional Industry-Driven Career Pathway Systems.

Steps to Building Regional, Industry-led Career Pathways Systems

1. Build a regional, industry-lead sector partnership.

3. Identify critical occupations.
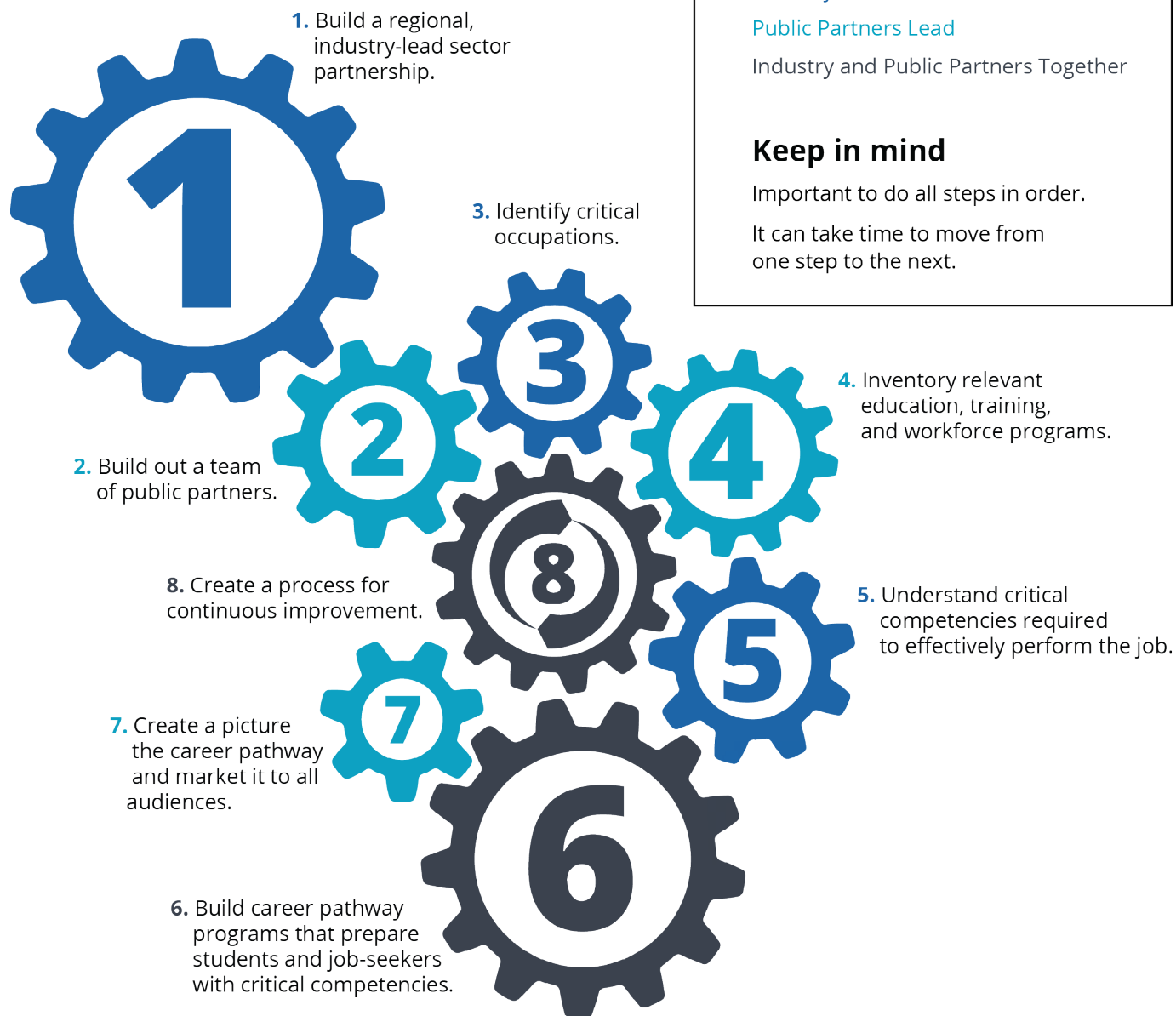
Key

Industry Leads

Public Partners Lead

Industry and Public Partners Together

Keep in mind

Important to do all steps in order.

It can take time to move from one step to the next.

4. Inventory relevant education, training, and workforce programs.

2. Build out a team of public partners.

8. Create a process for continuous improvement.

5. Understand critical competencies required to effectively perform the job.

7. Create a picture the career pathway and market it to all audiences.

6. Build career pathway programs that prepare students and job-seekers with critical competencies.

The products or results are active.

Pathways that didn't exist are created. Pathways already in existence are improved. Business has access to appropriately skilled talent pipeline. Individuals have access to the education, training, and work experience needed to enter careers.

1. Build a regional, industry-led sector partnership as the vehicle for productive engagement with industry leaders and the starting place for career pathways systems-building. Use the sector partnership—specifically, the education, talent, or workforce committee—as the driver of career pathways systems-building efforts.

▸ **GOAL:** Establish strong industry ownership over career pathway system development. Beyond asking for one-time input into a program, engage industry as full partners in building and contributing to a talent development system that will prepare the workforce they need, now and in the future.

▸ **OUTCOME:** A core group of committed industry leaders willing to champion the development of a career pathway system for industry.

▸ **ROLE OF BUSINESS LEADERS:** Identify and champion talent development as an important priority for the growth and competitiveness of their sector.

▸ **ROLE OF PUBLIC PARTNERS:** Working as a regional team, partners from education, workforce, and economic development collaborate with industry to launch and support an industry-led partnership. (See Colorado Sector Partnership Convener Guide for more detail).

2. Build out a career pathway support team of non-industry partners and prepare them with the right expectations. The team should include non-industry public partners who provide training, education, and supports to students and job seekers. For instance, the team might include key decision-makers in workforce development, secondary education, postsecondary education, human services, vocational rehabilitation, and other community partners. Prepare them with information about what they will get from employers: real-time information on critical occupations and competencies as well as a willingness to partner in providing work-based learning and other training resources. Also, provide the team with a clear explanation of how they're expected to work together as workforce, education, and training systems to respond to industry demand.

▸ **GOAL:** Build buy-in and support among workforce, education, training partners, and other community support partners preparing them to develop a coordinated response to industry's talent needs.

▸ **OUTCOME:** A career pathway support team made up of workforce, education, and training partners, human services, vocational rehabilitation, and other community support partners. This team will act as the joint decision-making body for responding to industry needs and determining how systems and programs should connect to one another at each level of a career pathway to support individuals in advancing into jobs and careers and collectively meet the needs of the targeted industry.

▸ **ROLE OF BUSINESS LEADERS:** None at this point.

▸ **ROLE OF PUBLIC PARTNERS:** Recruit workforce, education and training partners to participate on the career pathway support team, ensuring participation from key programs that prepare students and workers for in-demand careers in the targeted industry and provide them with the necessary supports to be successful in the career pathway.

3. Identify critical occupations based on labor market data and qualitative input from employers.

▸ **GOAL:** Target a set of occupations that industry leaders agree are critical.

▸ **OUTCOME:** A list of occupations that industry agrees are critical; new support team members who have roles to play in strengthening training for the targeted occupations.

▸ **ROLE OF BUSINESS LEADERS:** Convene to review labor market data and agree on a set of occupations that are critical to the industry.

▸ **ROLE OF PUBLIC PARTNERS:** Listen to industry-led conversations and consider opportunities to adapt programs to more closely align with industry needs as well as potential linkages across programs. Identify and recruit new support team members who train in and/or work with targeted occupations.

4. Inventory relevant education, training, and workforce programs that prepare students and workers for those occupations, mapping any existing linkages among those programs.

▸ **GOAL:** Identify what programs already exist and start to identify gaps that need to be filled in order to best meet the demands of industry, students, and workers. Build out the career pathway support team with leaders from those programs.

▸ **OUTCOME:** An inventory of education and training programs that prepare students and job seekers for the critical occupations identified by industry.

A support team including relevant workforce, education, training, and support programs.

- ▸ **ROLE OF BUSINESS LEADERS:** Vet the program inventory to ensure key partners are included.

- ▸ **ROLE OF PUBLIC PARTNERS:** Inventory and document all education, training, workforce programs, and other support programs that have a role to play in preparing students and job seekers for the targeted industry. Take stock of any existing linkages among programs (e.g. articulation agreements or dual enrollment) and begin to identify opportunities for stronger linkages among programs. Recruit new support team members, drawing from those programs.

5. Understand critical competencies required to perform effectively on the job. Industry-defined competencies are the specific knowledge, skills, and abilities that industry leaders have collectively identified as being critical to performing a specific occupation or group of occupations effectively. Based on these competencies, develop occupational descriptions that both inform employers' hiring practices as well as education and training partners in modifying curriculum and assessing students.

- ▸ **GOAL:** Get the real story from employers about what is required to perform on the job, identifying both foundational and task-specific competencies.

- ▸ **OUTCOME:** Occupational descriptions for each targeted occupation, written to inform employer hiring practices as well as curriculum, program design, and program offerings.

- ▸ **ROLE OF BUSINESS LEADERS:** For each targeted occupation, hiring managers and high-performing employees convene to identify competencies. Business leaders also identify ways to contribute work-based learning experiences to pathways.

- ▸ **ROLE OF COMMUNITY PARTNERS:** Partners listen in to sessions with hiring managers and high-performing employees to identify specific opportunities to strengthen existing programs and build stronger linkages across programs to align with industry needs. Take action to strengthen and better align programs with industry needs.

6. Build career pathway programs that prepare students and job seekers with critical competencies. Based on an understanding of what competencies are required to perform effectively and advance in the industry, build career

pathway programs that prepare students and job seekers with those critical competencies. This includes building linkages among programs and institutions, integrating support services into programs, and augmenting classroom training with work-based experiences throughout the pathway.

- ▸ **GOAL:** Develop seamless linkages among programs and institutions that support students and job seekers in building the competencies, credits, and credentials they need to secure jobs and careers in the targeted industry while addressing industry's critical talent needs.

- ▸ **OUTCOME:** Career pathway programs that target high-demand occupations or groups of occupations.

- ▸ **ROLE OF BUSINESS LEADERS:** Advise community support partners on career pathway program development. Contribute work-based learning opportunities.

- ▸ **ROLE OF COMMUNITY PARTNERS:** Build stronger connections across programs and institutions to help students move seamlessly through pathways and ensure that competencies are developed that meet the needs of businesses. Advise students and job seekers on pathways that include training and supports needed to be successful in critical occupations.

7. Create a picture of the career pathway and market it to all audiences.

- ▸ **GOAL:** Create a region specific picture or map that tells job seekers what skills they need to attain jobs within the industry and where they can build those skills and credentials. This picture serves as a career advisory tool for educators, guidance counselors, workforce development organizations, frontline staff in multiple programs, parents, and students.

- ▸ **OUTCOMES:** A tool to help students and job seekers identify industries of interest and map out a path that includes the relevant training and work experience to be successful in their chosen career. A connecting framework across the multitude of private and public education and training institutions responsible for guiding individuals onto a career path.

- ▸ **ROLE OF BUSINESS LEADERS:** Keep the map updated and reflective of changes in labor market demand.

- ▸ **ROLE OF PUBLIC PARTNERS:** Share the map widely

to guide and advise students and job seekers. Use the map as a shared framework for collaboration across public partners.

8. Create a system for continuous improvement. Use the sector partnership as the place to continuously develop and update your career pathways system. This includes ongoing conversations with employers to identify and understand high-priority workforce needs as they evolve, and continued collaboration among public partners to develop and update a systems approach in response.

▸ **GOAL:** Keep career pathway systems updated and relevant, ensuring education and training systems stay attuned and respond to the changing needs of the labor market.

▸ **OUTCOME:** Career Pathways Action Plan, with employer champions and support partners committed to specific actions that align education and training with industry needs and support students in building skills and earning credentials with labor market value.

▸ **ROLE OF BUSINESS LEADERS:** Provide on-going feedback to ensure career pathways programs are aligned with the current needs of industry. Hire students and job seekers and provide public partners feedback about skills and preparation of new employees. Continue to contribute to career pathway programs through work-based learning.

▸ **ROLE OF PUBLIC PARTNERS:** Continuously update career pathway programs to maintain relevance and alignment with industry needs. Have ongoing dialogue with other public partners to continue building and refining career pathway programs to ensure that they are responsive to the needs of industry and relevant and accessible to students and job seekers.

1. Build a Regional, Industry-Led Sector Partnership.

An industry-led sector partnership is the vehicle for engaging effectively and productively with business leaders to understand their talent needs and to partner with other education and training providers to build more responsive education and training systems. This is because sector partnerships play three critical roles in:

▶ **Harnessing the collective voice of industry to uncover the real-time workforce needs for the sector as a whole**. Since sector partnerships bring together a critical mass of business leaders from the targeted sector, they provide a venue for understanding the shared workforce needs across the sector.

▶ **Engaging business leaders as drivers of career pathway development.** Sector partnerships are all about engaging business fully as partners, not just customers or advisors. This level of engagement results in deeper and more sustained commitments from business leaders in hiring Coloradoans and contributing to the development of more responsive education and training programs to meet their talent needs.

▶ **Fostering collaboration across multiple education, training, and economic development organizations in a given region.** Sector partnerships act as a shared table where the range of regional education (K-12, community college, 4-year universities, and technical collage), workforce development, and economic development partners can work with industry and with one another to develop coordinated responses to the needs of the driving sectors of the economy, identifying complementary roles across programs.

If you have already developed a sector partnership in the targeted industry sector, use it—and, specifically, the talent or workforce committee of the partnership—as the driver of career pathway systems-building efforts.

If you do not yet have a sector partnership, build one. This will be the long-term home for your career pathway. Refer to the Colorado Sector Partnership Convener Guide which describes a step-by-step approach to launching and sustaining industry-led sector partnerships.

2. Build Out a Career Pathway Support Team of Non-Industry Partners and Prepare Them with the Right Expectations.

Industry-driven career pathway systems depend on active collaboration among regional education, training, and workforce development partners who work together in a coordinated way in order to respond to the needs of industry and build more seamless linkages to support students and job seekers in moving through their programs. This career pathway support team is the critical group that is ultimately responsible for implementing responsive and coordinated career pathway programs

Who's on the team?

In launching or establishing an industry-led sector partnership, you most likely engaged many of the key stakeholders needed to build your career pathway support team such as your local workforce development board, economic development organization(s), community college(s), K-12 school district(s), and other organizations. However, as you go further in building career pathway systems, you will likely need to recruit additional partners to be part of your career pathway support team. These include key decision-makers from the major systems and programs that have some role to play in preparing the workforce in the targeted sector, such as:

▶ Workforce development

▶ Secondary education (local school district superintendents, principals, and CTE faculty or program directors)

▶ Post secondary education (community college and 4-year university program leaders, deans and faculty members in relevant programs and departments)

▶ Human services

▶ Vocational rehabilitation

▶ Community-based organizations that provide services that support development

Setting the right expectations

Once you have identified the members of your career pathway support team, ensure they are prepared with the right expectations of what they will get from participating in the process and what they are expected to contribute:

▸ **WHAT PARTNERS CAN EXPECT TO GET FROM THIS PROCESS:**

- Real-time information on critical occupations and competencies in the targeted sector to ensure programs and services are relevant to the labor market and ultimately improve student and jobseeker job placement outcomes;

- Opportunities for deeper partnerships with industry, including contributions of work-based learning and other training resources to make programs more relevant and applied;

- An opportunity to create more seamless student and jobseeker experiences by partnering across programs providing support services, education, and training providers.

▸ **WHAT PARTNERS SHOULD EXPECT TO CONTRIBUTE TO THIS PROCESS:**

- Creative ideas and strategies for how existing programs or resources could be leveraged in new ways to be more responsive to industry demand, including how programs could more effectively connect to one another;

- A willingness to engage others from your organization, as needed, to contribute to the development of industry-driven career pathway programs;

- Strategies for aligning services to meet the personal needs and employability skills of job seekers and students who want to pursue a career pathway program, while ensuring programs align with industry demand;

- An open mind to make changes to existing programs or to develop new or augmented programs that align to labor market demands;

- A willingness to receive and incorporate feedback from industry partners on an ongoing basis in order to ensure programs are effectively meeting labor market demand.

In addition to these expectations, the career pathway support team should be prepared to embrace the role of listener in the early stages of the development of a career pathway system. In the next step in the process—engaging industry leaders in identifying critical occupations—it will be important for your support partner team to listen in and hear the same thing at the same time from industry leaders in order to get started in making changes to education and training programs and support services to align with industry demand.

3. Identify Critical Occupations Based on Labor Market Data and Qualitative Input from Employers.

Now that you have the two most important elements of career pathway systems-building in place: a strong, industry-led sector partnership and a team of support partners ready to work together in responding to industry demand, you are ready to get started in understanding the most critical workforce needs of the targeted sector.

Start by understanding the industry's critical occupations

Although labor market data is not a substitute for the kind of information you can glean through employer engagement, it is an important conversation starter. Now is the time to do just the right amount of analysis to give you prompts to use with employers in a conversation about their most critical occupations. You will want to look at:

▸ Past, current and projected growth of occupations in your target industry;

▸ Wage data across occupations;

▸ How occupations can be organized into rough categories of compatibility or occupational families (e.g. production occupations, transportation and material moving occupations, and sales and related occupations).

Present this data in a simple way (pie charts, bar graphs). For more detailed steps on how to analyze and present this data, see Appendix A.

POTENTIAL PITFALL: THE DATA Trap With so many available sources of labor market data, it can be easy to get hung up in the details. Beware of "analysis paralysis" where you get bogged down in analyzing multiple sources of data to understand the workforce needs of the targeted sector. Remember that data can only tell us so much of the story; there is no substitute for direct engagement with employers.Think of labor market data as a way of starting conversations with employers, not as a source of definitive information by itself.

Get the real story from employers

Occupational data, no matter its source and purported quality, tells only a small part of the actual talent landscape of a target industry. To truly get a handle on the real story, you need a conversation about critical occupations and competencies with employers. This is where your sector partnership's talent committee comes in. Work with that committee and other leaders from your sector partnership to convene a meeting of between 12 and 25 industry leaders (ideally C-Suite Executives who can speak from a strategic perspective) to collectively identify their industry's most critical talent needs. Invite your career pathway support team to attend in listen-only mode and set up the room to clearly differentiate between business leaders and support partners.
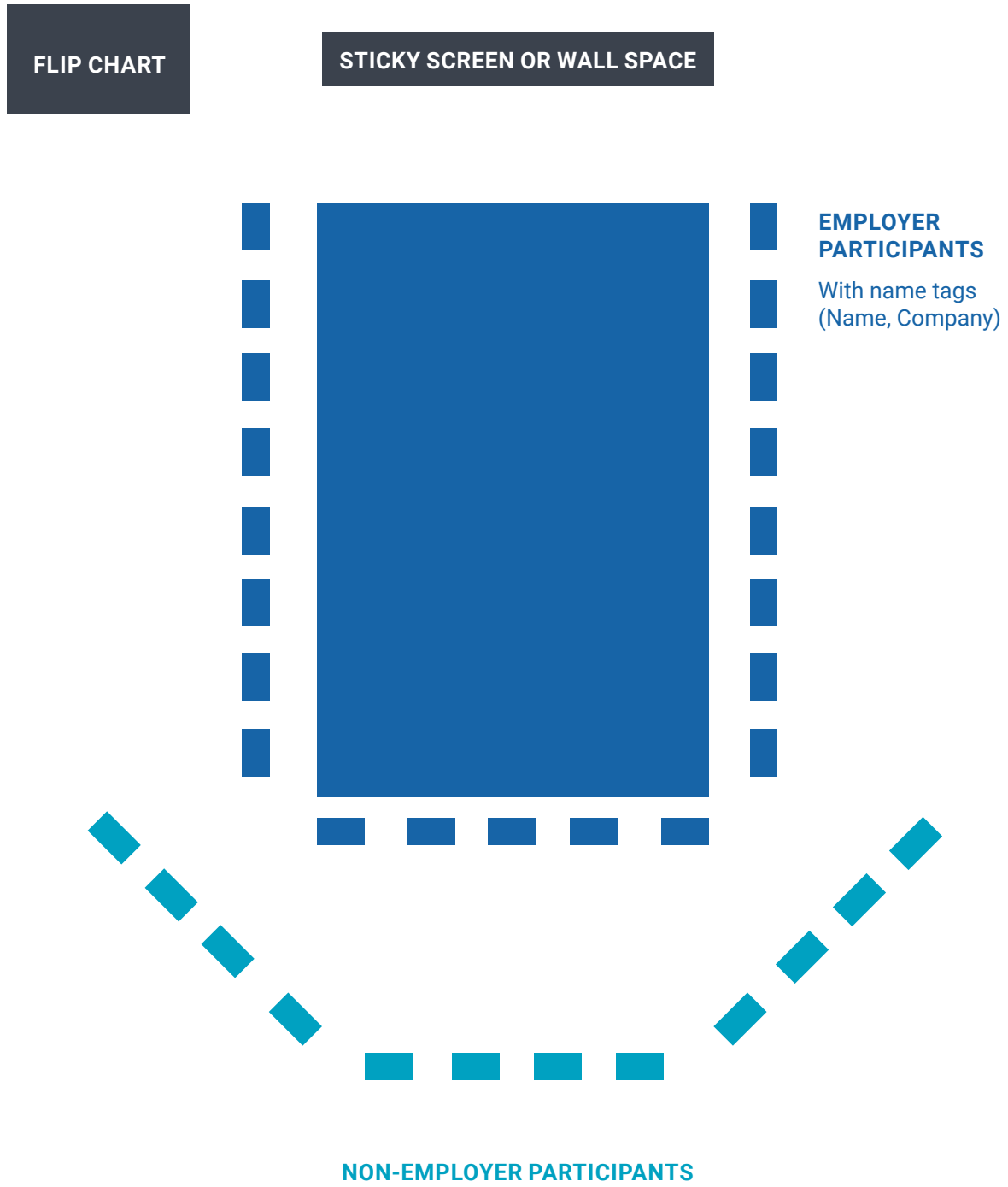
Sample meeting setup

Use your simple data charts as prompts, but expect to spend only a few minutes hearing their reactions and reflections. Then, facilitate a conversation that is driven purely by what employers in the room can tell you about their most critical occupations. Let them self-define "critical." It might be in terms of hardest to fill, highest turnover, highest output or profit. It may be based on the most number of workers in a specific occupation, or it may be a kingpin position filled by just one or two individuals that must function well for all other occupations to also function well. Let them tell you. As they are talking, find a creative way to map or storyboard their conversation to understand critical occupations as well as paths to progression within and among job families. You should end up with about three to five top critical occupations, but might get up to 10 depending on the industry.

This process can yield great information for public partners and for industry members participating in the conversation. It helps them understand what they have in common with other companies, and it helps them form a collective voice around needed skills and credentials. Make sure you send them a summary and a short set of expected next steps of what you'll do with this information, how it will be used, and when they can expect to be re-engaged. Consider also asking them to send you their official job descriptions for their critical occupations. This can be very useful information as you dig in deeper.

Figure 2 Sample Room Setup for Employer Focus Groups

FLIP CHART

STICKY SCREEN OR WALL SPACE

EMPLOYER PARTICIPANTS

With name tags (Name, Company)

NON-EMPLOYER PARTICIPANTS

SAMPLE FACILITATED CONVERSATION WITH EMPLOYERS: CRITICAL OCCUPATIONS

1. Invite employers to use index cards to write down their two most critical needs--in terms of specific positions/occupations—on index cards:

   a. Put another way, what two positions that if you can't adequately fill them will MOST hold back your ability to grow and stay competitive?

   b. Or, what two positions most concern you and keep you up at night?

2. Meanwhile, create occupational categories at the top of the blue screen, using a different color index card (for example, production, engineering, transportation, sales, office support, management). This is where your analysis of occupational data can be helpful in identifying some of the categories/occupational families that are likely to emerge from the discussion.

3. Collect the employers' cards and start to group them by category.

4. After you have done an initial sorting of the cards, ask employers to share more about each occupation for each major occupation on the sticky wall. Through this discussion, you may find that the same occupation looks quite different across companies. As you engage in this discussion, use a third color of card to make note of the most critical skills or competencies employers identify as being critical for various job categories. Try to create a pathway of entry, mid-, and advanced positions as the discussion progresses. The goal of the conversation is to paint an accurate picture of the talent landscape of these employers. Questions for discussion:

   ▸ Why did you list these positions as your most critical needs? Was it because:

      • You need a large number of them

      • They're the hardest to fill

      • They have the highest turnover

      • They have the biggest impact on company costs (e.g., turnover, recruitment, hiring

      • They have the biggest impact on company growth and profitability

   ▸ Where are your needs shifting the most?

      • Where are positions disappearing?

      • Where are positions transforming?

   ▸ What skills or competencies are most often lacking among entry-level candidates in these positions?

   ▸ Tell me about how a person advances inside your company.

      • Tell me generally about wage progression for these occupation

      • Where does it happen most now? Within categories? Across categories?

      • Where would you like it to happen more?

5. Invite employers to offer additional input, asking, "If you had had a third card, is there any other occupational need you would have identified?" Employers may identify occupations that are already on the wall or offer new additions.

6. As you begin the discussion, continue to move cards around in response to employer feedback.

7. To recap, ask employers to look at the sticky wall and consider whether, taken as a whole, this is an accurate depiction of the reality facing this sector in this region. Are there any major additions or caveats to note?

8. Finally, ask employers where they currently find qualified applicants.

   ▸ Do they recruit from any specific local programs? Do they have favorites?

   ▸ Do they hire from out-of-state? At what rate?

   ▸ Do they advance from within?

   ▸ Do they rely on word of mouth and train new hires on their own

Start acting right now to address specific occupational shortages

The remarkable outcome of this process is that your sector partnership's career pathway support team can act as you learn, i.e. start acting now to solve employers' needs and get job seekers into jobs. Almost inevitably your conversation with employers about critical occupations revealed some non-training issues that can be resolved quickly (immediate job matching, new hire recruitment) or some short-term training responses that can fill an immediate need (incumbent worker training for example). As a team you can be opportunistic, identify these areas, and show early results. High-performing sector partnerships balance short-term actions with longer term strategies. Being able to show early wins to member employers and community support partners is an essential element of creating the momentum needed to sustain and expand your ongoing career pathway efforts inside of your sector partnership.

Organize critical occupations by skill sets and levels

Based on input from employers, begin grouping critical occupations by skill sets, first based on the direct employer input, and then based on crosswalks with databases that categorize occupations based on their required knowledge, skills, and abilities. The most commonly used such database is the U.S. Department of Labor's Occupational Information Network, or O*NET. As a first step, do a simple crosswalk of the critical occupations named by employers with Standard Occupation Codes (SOC). Then crosswalk each critical occupation with the skill profiles in O*NET, and stack them by entry, mid- and advanced levels.

During this process, if using O*NET, you will find detailed profiles of each occupation, by their SOC, that breaks an occupation down by needed skills, knowledge, abilities, work styles, tasks, and tool use. You will also find suggested related occupations. This may take you outside the scope of your target industry, but that's okay. Make note of them. You are finding jobs potentially held by individuals with compatible, or transferrable, skills for your target critical occupations. This can be important information for multiple purposes, including recruitment of workers, re-training of dislocated workers, and creating or refining curriculum and credentials that might serve multiple industries.

TAKE STOCK

At this point in the process, you will have the bones of a career pathway:

▸ You have used industry data, employer input, and existing occupational profile information to understand a list of five to 10 critical occupations in your target sector.

▸ You have gathered a detailed O*NET profile for each of them, in addition to what employers told you.

▸ You have stacked each critical occupation roughly by entry-level, mid-level and advanced skill requirements.

4. Inventory Relevant Education, Training, and Workforce Programs.

At this stage, go back to your career pathway support team to develop a simple inventory of the existing education and training assets that apply to the target sector in your region and, in particular, the critical occupations that employers identified. Start with the programs that employers identified in your discussion of critical occupations. From there, list the training programs, certifications, and credentials that your community colleges, job centers, technical colleges, and universities offer in the targeted industry sector. This will help you understand the array of potential resources and partners that can help address some of the gaps employers identified. It will also help you recruit new members to your support team.

Identify existing education and training assets

In your inventory, consider full credit college programs, non-credit occupational training, the role of adult basic education, pre-college and incumbent worker programs, and formal on-the-job training. The inventory can take many forms, but it's important to at least include a few key pieces of information listed in the sample template below:

Institution/Organization	Program	Certification/Credential
Spring Valley Community College	Manufacturing Technology	Associate in Applied Science, Manufacturing technology; Machine Operations Skills Certificate; Manufacturing Essentials Certificate; Quality Technology Certificate; Tool and Die Making; Applied Welding Certificate
Springfield State University	School of Engineering	Bachelor of Engineering – Manufacturing Electrical, Plastics, Mechanical Design, Production Occupations
Spring County Workforce Investment Youth Council	Build a Boat Summer Camp	Certificate of Completion

Where it is easy to collect, also make note of length of trainings, associated costs to students, pre-requisite credentials, and job placement rates. You may also want to take stock of any existing linkages among programs (e.g. articulation agreements or dual enrollment) and begin to identify opportunities for stronger linkages among programs. Colorado's Eligible Training Provider List (ETPL) can provide you with much of this information. The ETPL can be accessed at cotrainingproviders.org. If you cannot find all of the information, don't worry right now. You may not be able to capture everything at this stage. The goal now is to develop a working inventory of the major education and training assets in your region that you will use later to compare against employers' training needs.

Recruit new members to your career pathway support team

With a more complete understanding of the programs in your region that prepare workers for the targeted industry, you may have some new ideas about who you want to engage on your career pathway support team. For example, if you discover that your 4-year university has an engineering program that employers often hire from, you may want to engage a dean or faculty member from that program to participate as part of your support team.

5. Understand Critical Competencies Required to Perform Effectively on the Job.

You are now at a critical step in the process of building a career pathway that requires hearing directly from employers about competencies or the knowledge, skills, and abilities required to perform critical occupations. This involves in-depth conversations with an expanded group of employers—hiring authorities for the critical occupations you've identified and/or high-performing employees in the occupations you're focusing on. It also involves engaging the full career pathway support team (now that it includes a broader array of education and training partners) to listen in on these conversations to directly hear from employers about the most critical competencies required in those occupations.

The result of this step will be:

▶ A deeper understanding of the competencies, or specific knowledge, skills, and abilities, that industry leaders have collectively identified as being critical to performing a specific occupation or group of occupations effectively. This will augment the information you have gleaned from using O*NET.

▶ Occupational descriptions for each targeted occupation that combines what you've learned from O*NET with what you've heard directly from employers. These descriptions will be critical in informing decisions about curriculum, program design, and program offerings.

Convene employer focus groups around each critical occupation

Starting with the occupations that your employer partners agreed were most critical to the success of the industry, hold focus groups with hiring authorities and employees themselves to go into depth in understanding what is really required to perform effectively on the job. This process helps to assess the KSAs of a critical occupation and to organize the information into a useable format for industry, education and training stakeholders. An effective employer convening requires a close, working relationship with employers who will be willing to not only give their time to a focus group, but give their employees' time too. This is where working within an established sector partnership proves advantageous, even essential.

▶ **Who to invite:** The goal of these focus groups is to deeply understand the most critical KSAs that are required to perform effectively on the job in the targeted occupation. Therefore, it's important to invite

employers who have direct knowledge of the targeted occupations. Ideally, each occupation will have two rounds of focus groups, first with hiring authorities and then with high-performing employees in those occupations.

- **Round One - Hiring authorities:** Those who have direct responsibility for hiring people into the targeted occupations have a good understanding of the skills and characteristics they look for in new hires. Hiring authorities are usually not recruiters or HR managers; instead, they are the supervisors who are directly responsible for managing people in the targeted occupation.

- **Round Two - High-performing employees:** Speaking directly with employees in the targeted occupation yields a highly accurate understanding of what the job entails and what KSAs are most critical to performing effectively. Work with your sector partnership to recruit a team of rock star employees in the targeted occupation to hear directly from them about what the job requires.

▶ **Preparing for the conversation: strawman descriptions of job tasks and functions:** To get the conversation started, prepare a simple description of the occupation you'll be discussing that includes job functions and tasks. Put simply, the goal is to describe what someone in this job does on a day-to-day basis. Create this strawman description using:

- Information you gathered from your first employer convening where you identified critical occupations;

- O*NET information on job tasks and functions for the targeted occupation;

- Job postings for the targeted occupation, ideally from employers in your region.

See Appendix C for an example of a strawman description.

▶ **Facilitating the discussion:** The discussion of critical competencies involves three components: 1) understanding career paths into and from the targeted occupation; 2) understanding tasks and functions for the targeted occupation, and 3) uncovering the underlying skills required to perform those tasks effectively.

1. **Understanding career paths:** Invite employers to give examples of what a typical path into the targeted occupation looks like. If you are speaking with high-performing employees, invite them to describe their personal path into their occupation. Dig in to where someone goes from this occupation. Are there common paths to advancement to other occupations?

2. Understanding tasks and functions: Start by reviewing the key functions and tasks you prepared in the strawman description, inviting feedback from employers to ensure the description accurately reflects what someone in that occupation does on a day-to-day basis.

3. Uncover underlying KSAs: Once you have agreement that the description is generally accurate, identify which tasks are most commonly under-performed and facilitate a discussion to uncover the underlying skills required to perform those tasks. Discussion questions include:

- What do workers need to know and be able to do to succeed on the job for this occupation?

- And how do we know when workers are performing this job well?

- If local education and training organizations were to improve training related to three of these tasks, which should they prioritize?

- For those tasks, describe what someone does if he/she is meeting the minimum requirements.

- What does progression look like for this particular task? What would a mid-level person be able to do that is different from entry-level?

▶ **Summarizing the results:** At the end of each discussion, you will have an updated and vetted description of job functions and tasks, competencies required, as well as information on paths into and from the targeted occupation. You will have also identified key skills gaps or areas where tasks are not consistently performed that should be prioritized by education and training partners. Summarize these results in updated job profiles and make note of the major skills gaps. Those will help you understand where to focus your efforts in building stronger career pathway programs.

6. Build Career Pathway Programs that Prepare Students and Job Seekers with Critical Competencies.

Now that you have an in-depth understanding of employers' needs—their most critical occupations, the KSAs required, as well as pathways to progression into and from those occupations—it's time to start making changes to education and training programs and support services to increase alignment with employers' needs. This is where your career pathway support team will take an active role in making changes to existing programs and/or building stronger linkages across programs to create more seamless career pathways into the targeted sector.

Start by describing the current state of play: education and training asset map

It's time now to re-visit your existing education and training programs. Using the inventory you developed earlier, begin developing a map showing the transferability and connections among the certifications, credentials, and degrees currently offered. Do not forget to include any programs that offer a work experience component, such as internships, on-the-job training, or apprenticeships.

Organize your map by entry, mid-, and advanced level credential attainment, and overlay what you now know about the needed skills of critical occupations. To do this, work with your career pathway support team to develop an initial draft and vet it with all key education and training partners. Similar to the storyboard or map you created during your facilitated discussion with employers in Step 6, create a visual that best represents the actual programs, their credentials and how they are connected.

Identify gaps

You heard from employers about where there are the most significant skills gaps. Now that you've mapped out your region's education and training programs, you can also see where there are gaps in training, areas of duplication, or areas where students or job seekers may struggle to build the right skills and credentials because of a lack of connections among programs or support services to enable seamless transition.

Using your education and training asset map as a starting place, work with your career pathway support team to answer the following questions:

▸ If we were to increase the number of students/ job seekers with the KSAs employers identified, what would it take?

▸ Where are there breakdowns in the talent pipeline currently? In other words, where are students/job seekers getting stuck?

▸ What support services are needed to ensure students and job seekers move seamlessly through programs, building the skills and credentials they need? What resources can we leverage from other partner organizations in the region to provide these kinds of services?

▸ What is the best way to integrate applied or real-world experiences into existing programs? (For example: guest speakers or instructors, internships, project-based case studies, or faculty externships). What is the most efficient way to match employers with education and training partners to contribute these kinds of experiences?

▸ Are there whole sets of skill sets or credentials currently not offered by any of our institutions?

▸ Which programs or credentials do we currently all offer?

▸ How do our total projected graduation or completion numbers match up with current or projected demand for the occupations in this pathway?

▸ Do certain programs do a better job at the entry-level, and others at the mid- or advanced-levels? How do we know (placement rates, etc.)?

▸ For the same credentials or programs teaching similar/related skill sets, are the costs and lengths of training the same? If not, by how much do they differ?

▸ For the same credentials or programs teaching similar/related skill sets, are the pre-requisites the same? If not, how do they differ?

▸ Do all of our institutions accept the same credentials on this pathway as pre-requisites? What about coursework and credits related to this pathway?

▸ Are any of our institutions experimenting with or accepting prior learning or work experience in place of credits or credentials related to this pathway?

▸ Are there any programs or credentials that appear to lead to a dead-end, i.e. no job or no clear next step in education or training?

▸ How are we including K-12 programming in this pathway? Where do we or should we offer dual enrollment?

Implement Solutions

It should now become clear where the gaps, duplications, and mismatches within the education and training system exist. All of these areas will require action. You may realize that no articulation agreements exist between important institutions along the career pathway from one credential to the next. You may realize the system offers duplicative credentials for one area and none in another. You may find coursework that leads to dead-ends (i.e. no occupation at all!). Clearly state these areas as an action step that resolves the gap or issue.

Once your support team has identified major gaps, now is the time to actually build career pathway programs that link multiple programs or institutions, integrate support services, and augment classroom training with work-based experiences throughout the pathway. The goal is to develop seamless linkages among programs and institutions that support students and job seekers in building the competencies, credits, and credentials they need to secure jobs and careers in the targeted industry.

This is the hard work of career pathway program development but you have a strong foundation to build from. Use your in-depth understanding of employers' needs to make the case for changes to existing programs and leverage your career pathway support team to build stronger support at all levels of your partner institutions (from faculty to deans, front line workforce center staff to program directors).

Develop a Career Pathways Action Plan to keep your efforts focused, outlining the specific actions that education and training partners, as well as employer champions, will take to continue to build stronger career pathway programs and align education and training with the needs of industry. This is an internal planning document, not a public document. Your Career Pathway Action Plan is what you as education and training partners can collectively use to guide how you close gaps, align curriculum and credentials, agree on which institutions will host which programs, clearly see

where articulation agreements or MOUs are needed, and stay up-to-date on changing skill needs and job market saturation points.

The Action Plan, in effect, becomes your strategy for building a seamless career pathway system that better serves the target industry and job seekers in your region. Once you have an initial sketch of the Action Plan, prioritize the actions. Find a way to agree across partners what represents early wins (i.e. the easy fixes), short term actions (3-6 months), or long term actions (6-12 months). To help prioritize actions, think about two criteria:

▶ Will the action yield high impact?

▶ Is it feasible to implement?

EXAMPLE: TROUBLESHOOTING THE TALENT PIPELINE

Employers identified a need for skilled welders, recognizing that a large proportion of their current welding workforce is nearing retirement. They cited the local community college welding program as being a good source of talent but the program is struggling to meet regional demand. Last semester, only 10 students graduated but employers reported (and labor market data confirmed) that they will need significantly more in future years.

The career pathway support team, made of the local workforce development board, the CTE dean from the local community college, the director of the welding program, and the CTE director from the local high school met to develop a more seamless career pathway program to meet regional demand for welding. This included:

▶ Identifying math skills as a major barrier to students successfully completing welding certificates. Since a large proportion of students enter community college at remedial math levels, many of them are placed into developmental math classes and fail to move on into more advanced courses that are requirements for a welding certificate. The community college engaged math faculty to design a contextualized industrial math course targeted toward remedial math students, designed in conjunction with manufacturing employers. This course was integrated into the welding program, providing a more seamless path into welding for students who enter community college at remedial math levels.

▶ Addressing resource constraints of the welding program. The career pathway support team discovered that the welding program has a waiting list of over 30 students who cannot enroll due to capacity constraints. If the program had the funding to hire an additional part-time instructor, these students could enroll. Working with the sector partnership talent committee, the career pathway support team developed a proposed solution: manufacturers agreed to contribute half the resources required to support the faculty position and the other half of the funding was raised through a statewide grant targeting manufacturing training programs.

▶ Creating a dual enrollment course with high school. To increase the number of students pursuing manufacturing-related careers and welding specifically, the community college worked with its local high school to create a dual enrollment "foundations in manufacturing" course which included some introductory welding concepts, creating a more seamless pathway for high school students interested in pursuing welding.

▶ Referring job seekers to welding program and using WIOA funds to pay for training. The workforce center directed eligible job seekers with appropriate skills to enroll in the welding program and provided individual training accounts for job seekers to obtain training.

7. Create a Picture of the Career Pathway and Market it to All Audiences.

You are now at a major milestone: you've understood the real career pathway within an industry directly from employers and have also made changes to education and training programs to ensure students and job seekers can efficiently build the skills and credentials they need for those occupations. Now is the time to create an actual picture or map that tells job seekers what skills they need to attain jobs within the industry and where they can build those skills and credentials.

The purpose of your career pathway map is:

▸ **To serve as a career advisory tool** for educators, guidance counselors, workforce development organizations, frontline staff in multiple programs, parents, and students. The map helps students and job seekers identify industries of interest and map out a path that includes the relevant training and work experience to be successful in their chosen career.

▸ **To support ongoing collaboration throughout your career pathway system,** or the network of education, training, and workforce development organizations that prepare people for jobs in the targeted industry. Your career pathway map acts as a connecting framework across the multitude of private and public education and training institutions responsible for guiding individuals onto a career path, ensuring that partners are playing complementary roles and aligning around industry demand.

Developing a career pathway map

When you overlay the skill needs and education levels for an industry's critical occupations with the programs and credentials that provide these skills and credentials, you get a scaffolded picture of the path a jobseeker must take to attain jobs at each level. How do you do this?

First, get creative. Consider the manufacturing example in this Guide from Kansas City. It provides just enough detail for a job seeker to quickly understand entry, mid- and advanced-level occupations in the industry, including level of required education, specific credentials, and needed technology skills, as well as market demand and average wages. You may also want to add a column for any relevant physical or environmental conditions of occupations. All this in one page! This is what you present to the public.

Next, you will need to dig into the specific skills needed for an individual to advance from a set of entry-level occupations to mid-level occupations and onto the advanced occupations. Re-visit the KSAs, and draft short descriptions for each critical occupation that capture the essence of what's needed to be successful on-the-job. Then do a cross-analysis between the levels in order to call out more explicitly the additional or higher level skills needed to go from one occupation up to the next. For example, an entry-level heavy equipment operator will need additional skills in repair, equipment maintenance, troubleshooting, reading, and math, and blueprint reading if he or she is to advance to a mid-level assembler.

Now find a way to insert actual projected demand in real numbers into your map. The pitfall at this point is not paying attention to just how many jobs exist within a certain occupational category, and potentially training too few job seekers or worse, over-saturating the labor market by training too many. Job seekers and students need to know if this pathway will result in a real job. And of course, do not forget to put average wages in your career pathway map. Job seekers care about this.

Figure 3 Sample Career Pathways Map Source: www.kcworkforce.com/Assets/ManufacturingCareersinKansasCity.pdf

MANUFACTURING | CAREER PATHWAYS AND DEMAND IN GREATER KANSAS CITY

Education	Job Description	Tools & Technology	Current Openings	Median Hour Wage	Certifications/ Degrees Offered
High School Diploma & Work Experience	**PRODUCTION OCCUPATIONS (PACKAGING, INSPECTORS, TESTERS)** Operate or tend machines to prepare industrial or consumer products for storage or shipment. Inspect, test, sort, sample, or weigh materials or assembled products.	GMP, QMS, ISO 9001, SAP Software, Excel	70 Job openings	$13.87(KC) $15.09(National)	Certified Production Technician, OSHA Safety, OSHA Forklift
	MAINTENANCE AND REPAIR WORKERS Perform work to keep machines, mechanical equipment, or the structure of an establishment in repair. Duties may involve pipe fitting; boiler making; insulating; welding; machining.	CAD, SAP Software, Oracle, PTC Creo Parametric	637 Job openings	$19.23(KC) $20.02(National)	Industrial Maintenance Certificate, Machine Tool Tech
	MACHINISTS Set up and operate a variety of machine tools to produce precision parts and instruments.	CNC Mastercam, ERP Software, Excel	40 Job openings	$20.75(KC) $21.17(National)	Machine Technology Certificate
Certification or Associate's Degree	**METAL WORKERS, WELDERS, CUTTERS** Use hand-welding, flame-cutting, soldering equipment to weld or join metal components.	EZ Pipe Software, Recordkeeping software, OmniFleet equipment maintenance	37 Job openings	$16.85(KC) $17.91(National)	Welding (MIG) Certificate, Welding (TIG/MIG) Certificate
	INDUSTRIAL MACHINERY MECHANICS Repair, install, adjust, or maintain industrial production and processing machinery or refinery and pipeline distribution systems.	CRM, LMS, PLC, Extranet Machine Tools Suite, SAP Software	39 Job openings	$22.57(KC) $22.48(National)	Advanced Computer Integrated Machining & Manufacturing Certificate
	WHOLESALE AND MANUFACTURING SALES REPRESENTATIVES Sell goods for wholesalers or manufacturers to businesses or groups of individuals where technical or scientific knowledge may be required.	CRM, SaaS, Oracle DBMS, IBM Notes, SAP Software	342 Job openings	$51.44 (KC) $55.26(National)	Applied Manufacturing Certificate
Bachelor's Degree	**INDUSTRIAL ENGINEERS** Design, develop, test, and evaluate integrated systems for managing industrial production processes including human work factors, quality control, inventory control, logistics and material flow, cost analysis, and production coordination.	Rockwell RSLogix, Microsoft Visual, Dassault Systems CATIA Software	306 Job Openings	$39.88 (KC) $42.26(National)	Industrial Engineering BS
	MECHANICAL ENGINEERS Perform engineering duties in planning and designing tools, engines, machines, and other mechanically functioning equipment. Oversee installation, operation, maintenance, and repair of equipment such as centralized heat, gas, water, and steam systems.	Sigmetrix CETOL 6 Sigma, Autodesk AutoCAD, Rapid Prototyping software	92 Job Openings	$39.88(KC) $41.73(National)	Mechanical Engineering BS, Mechanical Engineering Technology BETB-MT
	ELECTRICAL ENGINEERS Design, develop, test, or supervise the manufacturing and installation of electrical equipment, components, or systems for commercial, industrial, military, or scientific use.	CAD, Minitab software, Verilog, C++, SCADA, MATLAB	155 Job Openings	$43.87(KC) $45.63(National)	Electrical Engineering BS

DOCTOR OF NURSING PRACTICE OR PHILOSOPHY

ENTRY into pathway:

• M.S. in Nursing
• B..S. in Nursing

Institution	Length	Cost	Placement Rates
CU - Philosophy	41 credits 2.5 years	$22,000	n/a
CU - Nursing Practice	41 credits + dissertation	$22,000	n/a

DOCTOR OF NURSING
Philosophy or Practice
Yearly Metro Openings: 48

Colorado Annual Wages
Low ....varies
Median ....varies
High.................................varies

MASTER OF SCIENCE IN NURSING

ENTRY into pathway:

• B..S. in Nursing

Institution	Length	Cost	Placement Rates
CU College of Nursing	2 years	$26,500	92%

NURSE PRACTITIONER
Yearly Metro Openings: 81

Colorado Annual Wages
Low $60,300
Median $90,200
High..........................$141,300

MASTER OF SCIENCE IN NURSING

ENTRY into pathway:
HIGHLY COMPETITIVE

• High School Diploma
• GED
• Certified Nurse Aide
• Licensed Practical Nurse
• A.A.S. in Nursing
• B..S. in Nursing
• B..S. or B.A. in ohter field
• Military Experience As Medic
• Pre-requisite classes

	Institution	Length	Cost	Placement Rates
Integrated Nursing Pathway	CU College of Nursing	129 credits	$35,508	n/a
	CCA/CU	129 credits	$33,961	
Dual Enrollment Programs	ACC/MSUD	120 credits	$25,000	n/a
	CCA/MSUD	120 credits	$25,000	
	FRCC/MSUD	120 credits	$25,000	
CU Programs	Traditional	120 total credits (66 CU Nursing)	$26,000 (nursing only)	n/a
	Accelerated (prior Bachelor's degree)	66 credits	$26,000 (nursing only)	
	RN to BSN (online, for practicing RNs)	30 credits	$11,580	
MSUD Programs	Traditional	123 credits	$54,612	n/a
	Accelerated	63 credits	$37,000	
	RN to BSN	36 credits	$9,000	

REGISTERED NURSE
(Critical Care, Operating Room)
Yearly Metro Openings: 1,133

Colorado Annual Wages
Low $49,900
Median $68,1000
High............................$92,500

ASSOCIATE OF APPLIED SCIENCE IN NURSING

ENTRY into pathway:

• High School Diploma
• GED
• Licensed Practical Nurse
• Military Experience As Medic

Institution	Length	Cost	Placement Rates
ACC	80 credits	$10,699	54%
FRCC	71.5 credits 2 years	$13,073	96%
FRCC (LPN to AAS bridge program)	54.5 credits 1 year	$9,965	96%

REGISTERED NURSE
Yearly Metro Openings: 1,133

Colorado Annual Wages
Low $49,900
Median $68,1000
High............................$92,500

ASSOCIATE OF APPLIED SCIENCE IN NURSING

ENTRY into pathway:

• High School Diploma
• GED
• Certified Nursing Assitant
• Phlebotomist
• Medical Assitant
• Military Experience As Medic

Institution	Length	Cost	Placement Rates
EGTC (must have C.N.A.)	36 credits 11 mons	$8,244	87%
FRCC (exit option for RN program)	48 credits 60 weeks	$6,447	90%
ACC (exit option for RN program)	53 credits 60 weeks	$8,127	n/a

LICENSED (LPN)
PRACTICAL NURSE
Yearly Metro Openings: 269

Colorado Annual Wages
Low $34,300
Median $45,000
High............................ $58,000

8. Create a System for Continuous Improvement.

Now that you have developed an industry-led career pathway system, it's critical that you develop a process to ensure that system stays dynamic and continually responsive to changing labor market demand. The goal is to ensure your career pathway support team engages in continuous conversations with employers to identify and understand high-priority workforce needs as they evolve. Respond to those needs in a collaborative way, and measure success.

As you and partners begin to implement the strategy outlined in your Career Pathway Action Plan, use your sector partnership as the cross-system, employer-driven home for ongoing efforts. Establish employer champions to help chair the work; continue to draw on community support partners to contribute; use the discipline of action plans and timelines to stay on track.

Effective career pathways grow out of a strong and current understanding of industry's needs, as well as a deep understanding of how individuals access and progress through the labor market. The final, and highest risk, pitfall is to build a career pathway system that simply justifies the existing curriculum and credentials currently offered by education and training programs. Instead, you should continuously building a career pathway system that is the true reflection of advancement through an industry. Your sector partnership is critical here. Use your sector partnership to avoid this pitfall by:

▸ Keeping employers in the driver's seat;

▸ Regularly documenting and reporting progress and make adjustments along the way as needed;

▸ Act on short-term quick wins, while keeping the long-term in mind;

▸ Establishing a culture and protocol of being able respond and shift according to new information and opportunities.

Appendix A: Using and Organizing Data to Understand an Industry's Key Occupations.

There are many kinds of employment data to draw from, but this toolkit references the information provided in the Bureau of Labor Statistics Occupational Employment Survey (BLS OES). This is meant to be a very simple overview of how to think about this data as a tool that doesn't require a statistician to operate.

▶ **Know where your data comes from and what it can tell you:** The Bureau of Labor Statistics collects occupational data at the industry level on an on-going basis using a mail survey that solicits information from employers about what kinds of positions exist in their companies and how much they pay. Every two years the BLS releases 10-year projections, projecting the growth patterns of all occupations. Sample data is used to project both the current occupational levels as well as the 10-year projections. Because the OES employs a sample method, there is an implicit margin of error. Occupational data, especially at the regional level, is not meant to be an accurate census of all workers, but rather an overview of the industry composition. More information on the methodology of the OES is available here: bls.gov/oes/current/methods_statement.pdf

▶ **Identify the industries involved in your sector:** Data is sorted by two important codes. The North American Industry Classification System (NAICS) identifies a company's industry and sub industry at an increasing level of detail; each digit of a NAICS code offers more specificity on what it is that the firm does. The first two digits are the broader industry code. To gather information on a particular industry query data using the appropriate industry code. Codes for the 19 industries OES tracks are found here: bls.gov/oes/current/methods_statement.pdf.

▶ **Identify large and growing occupations:** Standard Occupational Classification codes (SOC codes) are associated with occupations within a given industry. For instance, Office Manager or Engineer are two occupations that exist in many industries. Each SOC code digit adds a layer of specificity to the given occupation Because of the limitations of sample data, especially at the regional level, SOC data at the 4 and 5-digit level often isn't very revealing or accurate.

• Identify large occupatons. To identify where the majority of occupations fall in a given industry, start by looking at SOC level 2 data and sort the data from the most workers to the least. These occupational categories are fairly broad but can point to where the majority of occupations lie. In occupation categories that are either very large or you know to be critical, you can expand your view to look at level 3 data, or occupations within.

• Identify growing occupations If the growth rate of a given occupation is not given, create a spread sheet that has both current and projected numbers for occupations. Sort by highest growth. Some times occupations with less workers in the current year make projected growth look particularly dramatic. While this may temper your interest it's an important line of inquiry to bring up with employers. Is this the result of sampling error or is something happening?

• A note on sorting SOC code data. When looking at SOC data it is best to make sure you are only seeing one level of data at a time. Occupations are replicated at each level of information so when you are looking at a complete data set you are seeing the same jobs represented up to 5 times with a growing level of detail. For instance, when you are looking at SOC Code level 2 data all the codes should look like XX-0000. There are many ways of sorting and filtering this information in Excel – help yourself out by narrowing the amount of information you see at one time. Create visualizations of the data that communicate what you see. This is a step that is individual to the data, but some important charts you might want to create are:

º A bar or longitudinal chart that shows the change in level 2 occupations over the 10-year period within a given industry.

º Pie charts or compositional charts that show the relative proportions of different occupations in the industry now and projected.

º Projected growth information at SOC code level 3-detail on occupations that are large and/or fast growing.

Appendix B: Defining Terms.

Career pathway system —A career pathway system engages education and training providers in a continuous conversation with one another and with industry to ensure that students move seamlessly through and among educational institutions and work-based experiences to build skills and credentials that meet industry demand and prepare them for jobs and careers.

Career pathway program — A career pathway program is a set of stackable credits and credentials, combined with support services, that enables students to secure industry-relevant skills, certifications, and credentials and advance to higher levels of education and employment.

Career pathway map — An online or paper map of how occupations connect to one another and what education and training is needed to prepare students or job seekers for occupations. Statewide career pathway maps focusing on the top industries in Colorado will be accessed on careers in Colorado.

Sector partnership — An industry-specific regional partnership led by industry in partnership with public partners.

Public partners — A regional group of non-industry partners engaged in a sector partnership who work together to develop a coordinated response to the needs of industry. Partners include decision makers in workforce development, secondary education, post secondary education, human services, vocational rehabilitation, and other community partners.

Industry-defined competencies — The specific knowledge, skills and abilities that industry leaders have collectively identified as being critical to performing a specific occupation or group of occupations effectively. These competencies are both foundational and task specific.

Work-based learning — Learning opportunities that occur in part or in whole in the workplace and provide the learner with hands-on, real world experience. Work-based learning opportunities include but are not limited to: internships, apprenticeships and residencies.

Appendix C: Sample Strawman Description of Job Tasks and Functions.

TECHNICAL SALES REPRESENTATIVE FUNCTION AND TASK MATRIX

Job Functions	Develop and sell business case for product	Manage and generate business relationships with customers	Maintain internal customer records and feedback	Evaluate technical product details and market trends
Tasks	Answer customers' questions about products, prices, availability, or credit terms.	Maintain strong professional relationships with customers and ensure excellent customer service through regular email, phone, and in-person communication.	Prepare and submit sales contracts for orders.	Develop thorough technical knowledge of company product lines.
	Compute customer's installation or production costs and estimate savings from new services, products, or equipment.	Develop a sales strategy, including investigating new target customers/companies that could be interested in product.	Enter and maintain customer activities and records (e.g. sales calls, quotes, meetings, contracts), using automated systems.	Emphasize product features based on analyses of customers' needs and on technical knowledge of product capabilities and limitations.
	Quote prices, credit terms, or other bid specifications.	Contact/visit new and existing customers to discuss how specific products or services can meet their needs or to promote product.	Complete regular internal reports on activities and attend and participate in company meetings.	Keep informed on product lines, market trends and competitors' product lines, such as by reviewing technical materials, attending seminars, and reviewing publications.
	Negotiate prices or terms of sales or service agreements.	Develop and deliver presentations to customers about product.	Work as a liaison with other departments to resolve product issues.	
	Consistently close sales deals and achieve activity and revenue goals.	Provide product recommendations to customers and respond to technical questions.		

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