



# Resources and Guidance for Supporting Young Women in Manufacturing

A Scaling Transformative Advanced Manufacturing Pathways Toolkit

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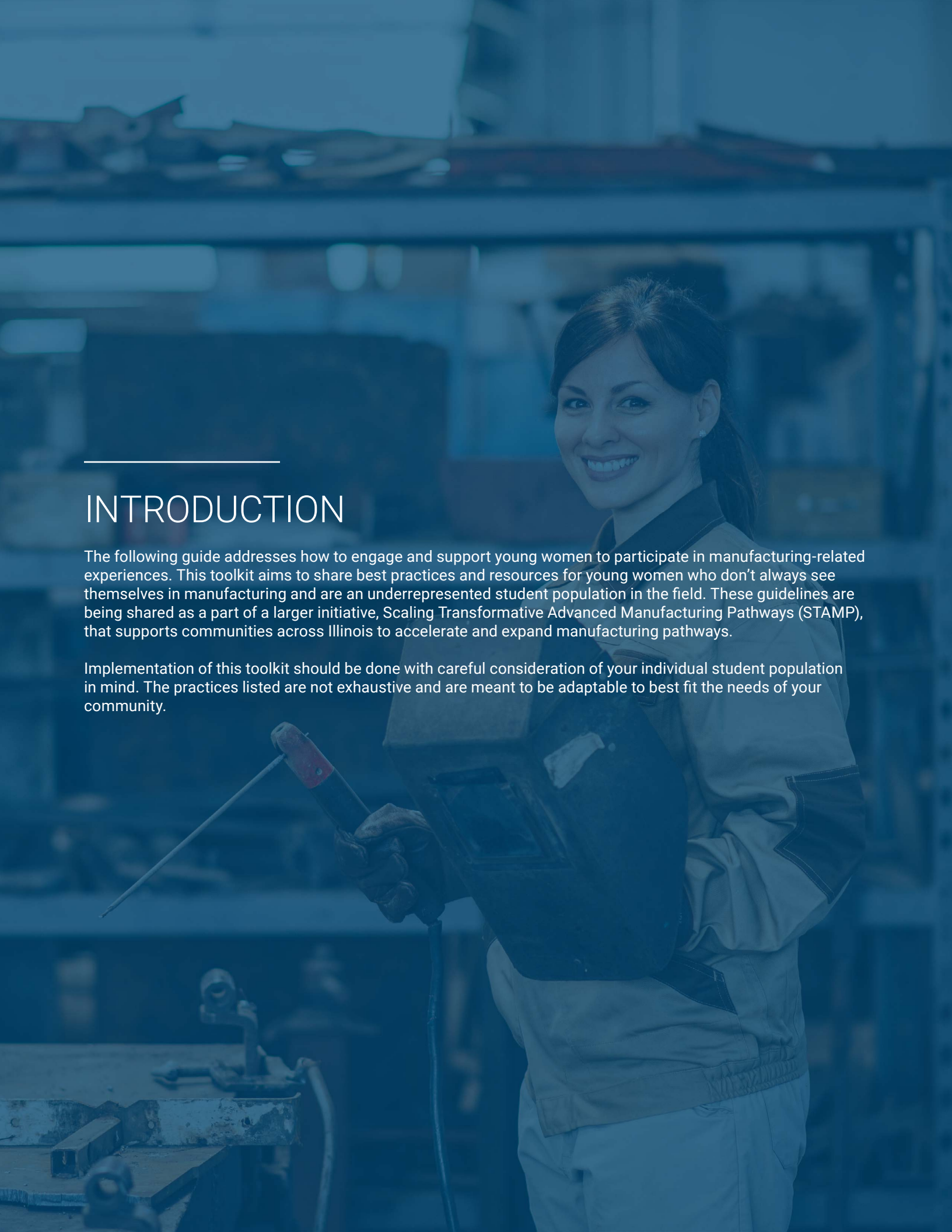
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## INTRODUCTION

The following guide addresses how to engage and support young women to participate in manufacturing-related experiences. This toolkit aims to share best practices and resources for young women who don't always see themselves in manufacturing and are an underrepresented student population in the field. These guidelines are being shared as a part of a larger initiative, Scaling Transformative Advanced Manufacturing Pathways (STAMP), that supports communities across Illinois to accelerate and expand manufacturing pathways.

Implementation of this toolkit should be done with careful consideration of your individual student population in mind. The practices listed are not exhaustive and are meant to be adaptable to best fit the needs of your community.



## What is STAMP?

Manufacturing is a cornerstone of the Illinois economy. The Illinois Manufacturers' Association (IMA) publishes a biannual economic analysis report titled "Manufacturing Matters: Our Impact in Illinois" that summarizes its economic analysis of the manufacturing industry's impact on Illinois and its communities. IMA's economic analyses demonstrate that the labor market remains tight, and manufacturers continue to report large numbers of open positions. As of June 2021, the manufacturing industry had more than 800,000 unfilled positions nationally.

The IMA and EdSystems partnered in spring 2022 to launch the [Scaling Transformative Advanced Manufacturing Pathways](#) (STAMP) to help meet the demand for skilled manufacturing workers in Illinois while advancing equity. The goals of STAMP are to:

- Increase secondary enrollment in manufacturing pathways, particularly by underrepresented students.
- Increase dual credit offerings and enrollment in manufacturing pathways.
- Increase the number of students who complete a manufacturing pathway, earning a College and Career Pathway Endorsement and industry credentials.
- Increase matriculation into postsecondary manufacturing programs and the workforce.

## Why Empower Young Women in Manufacturing?

Empowering young women to pursue manufacturing not only lifts up women; but also the entirety of the field. Young women are often not represented in manufacturing, and investing in them brings new perspectives and novel approaches to efficiency, community, and improvement in the workplace.

Supporting young women to consider manufacturing careers provides them the opportunity to pursue a skill associated with long-term stability and impact.

- When a young woman is trained in manufacturing, she acquires skills that will be invaluable throughout her life. Gaining proficiency in [manufacturing technical competencies, alongside the cross-sector essential employability skills](#) crucial for students pursuing any career path, will benefit her in any chosen field, whether it be within the manufacturing sector or elsewhere.
- The landscape of manufacturing has been shifting from traditional manual jobs to the operation of highly automated equipment, making the field more accessible to women than ever.
- Manufacturing provides immediate job prospects.
- Manufacturing training programs also allow trainees to work for pay while pursuing certifications.
- Manufacturing is a stable job with an average salary of \$79,409 in Illinois.<sup>1</sup>
- Manufacturing directly or indirectly supports almost 30% of all jobs in Illinois.<sup>1</sup>
- Manufacturing jobs are projected to grow faster than all other occupations in Illinois.<sup>1</sup>

These opportunities for stable job prospects with steady growth provide young women the option of good financial standing, steady work-life balance, the ability to provide for themselves, and the capacity to make meaningful contributions to their community.

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1 [IMA Manufacturing Matters 2022](#)

## What Are Young Women Commonly Hearing About Manufacturing?

Consider the messages and perspectives that young women might be hearing about what it means to work in manufacturing:

“It’s a dirty job.”

“Manufacturing is a man’s job.”

“Working in manufacturing is dangerous.”

“Manufacturing is ‘unskilled labor’ and ‘does not provide for a stable future.’”

Even when young women are considering a pathway in manufacturing, the barrier to entering the field can seem continuously high. Maker classes in school, such as woodshop, computer design, and other manufacturing training courses often have very few women in them. This signals to young women that manufacturing is not a space for them. Communicating that manufacturing is a space for women at the classroom level and at the career level is vitally important to the success and comfort of women in this field.

Inside the classroom, female students may be hearing messages from their male peers that question female students' capabilities to complete tasks, suggesting that they need help from a male in order to do so. Instructors need to ensure that classrooms are a welcoming and safe space where women are seen to be just as capable as their male peers at successfully engaging in the tasks and content of the manufacturing courses.

## What Should Young Women Be Hearing Instead?

Now consider the messages and perspectives that young women should be hearing about what it means to work in manufacturing:

“Women can weld.”

“Women can have any job in manufacturing.”

“We need the perspective of women in the field of manufacturing.”

“Manufacturing is skilled labor.”

“Manufacturing is not dangerous if done correctly.”

### STUDENT VOICES

Hear what young women in manufacturing have shared about their experiences:

- [Sauk Valley Area Empathy Interviews with Young Women in Manufacturing](#)

### SEEING WOMEN IN MANUFACTURING

The following resources show great examples of strong women in the field of manufacturing:

- The Iowa Workforce Development created the [“Workforce Spotlight: Women In Manufacturing”](#) video featuring women in a variety of manufacturing positions share what they love about what they do.
- The Sounds of Automation podcast released the [“Women in Manufacturing”](#) episode featuring Meaghan Ziemba, host of the [Mavens of Manufacturing](#) podcast, who discusses the gender gap in manufacturing.
- KETV NewsWatch 7 released the [“Women Have a Place Here.”](#) a news segment showcasing the stories of women in a local manufacturing organization in Nebraska.



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## TOOLKIT

The following pages highlight practical steps to take to communicate positive and inclusive messages and support young women to pursue experiences in manufacturing.

# Supporting Young Women in Manufacturing

For young women to see themselves in the field of manufacturing, they need to be connected with women in the field. Young women considering a career in manufacturing need community and mentorship, so one of the best things to do to support young women considering this career path, is to ensure that they see women in their desired positions.

A good place to start is to **look for local organizations** that support women in manufacturing. There may already exist an organization that works in your region to connect young women to manufacturing organizations, support in-school initiatives, put on career nights, etc. Do some research into which organizations already exist to support your young women, and consider connecting with them. A few examples include [Women in Manufacturing](#), [Sparkshop](#), [Greater Chicago Advanced Manufacturing Partnership](#), and [Nerdy Girl Success](#).

There are many levels that young women can engage with manufacturing throughout coursework and work-based learning as a part of the [College and Career Pathway Endorsement framework](#). The [Model Program of Study in Manufacturing and Engineering](#) outlines the high school and postsecondary courses, as well as postsecondary pathways and priority occupations in manufacturing. The [Illinois Work-Based Learning Innovation Network](#) (I-WIN) provides community models and resources across the work-based learning continuum for manufacturing.

## The Importance of Starting Early

Having an awareness of career options in a woman’s younger years expands what they believe that they can pursue post-schooling. It is vital to introduce women to an array of career opportunities and allow them the opportunity to imagine themselves in a variety of roles. Help young people understand that **everything is manufactured**—from iPhones to Barbies to any product they may use—there is a process undergone by skilled workers that leads to many of the things we hold today.

Manufacturers are **makers**. Manufacturers create many things we interact with and enjoy. Bringing young women’s awareness of the importance of manufacturing in our modern world not only broadens their career options but makes them more aware of the world around them. For this reason, it is important to encourage students to learn about how things around them are made and even give them the opportunity to **see and create** at a young age.

**The following practices describe how young women can be supported along different parts of the work-based learning continuum.**

*Work-Based Learning Continuum*



### RESOURCES FOR DESIGNING WORK-BASED LEARNING

Consider these resources for the overall design of a work-based learning continuum in manufacturing:

- [Orientation to College and Career Pathway Endorsements](#)
- [Definition of WBL Continuum Components in the Illinois Career Pathways Dictionary](#) (pp.10–11)
- [Video Outline of WBL Continuum](#)

### COMMUNITY MODEL: FEMALE-CENTERED RECRUITMENT MATERIALS

At Township High School District 211, staff created customized posters with school colors and logos to promote college and career pathways, including a [manufacturing poster featuring female leaders](#) in the industry.



## Career Awareness

While there is no formal definition in the Illinois [Career Pathways Dictionary](#), career awareness refers to the process by which students in work-based learning programs broaden their scope of potential careers and gain a deeper understanding of the different paths they can take toward a fulfilling future. Career awareness is a valuable opportunity to connect an individual's interests and values to related career opportunities. This experience occurs at the start of the work-based learning continuum and is helpful for exposing students to a variety of industry areas and unpacking the occupations and education pathways within them. Career awareness should help set the stage for what a student is interested in pursuing more hands-on and getting connected to industry professionals/organizations moving forward.

## Embed Within Your Manufacturing Courses

- Enlist a female instructor.
- Encourage young women to sign up for the courses. Engage with advisors to address any bias that may be occurring in who is referred to classes.
- If you do not have a maker space, an Introduction to Manufacturing class can be largely theoretical. Include videos and consider field trips to local manufacturing plants or local maker spaces at other schools or colleges.
- Whether you have a maker space or not, prioritize engaging in hands-on activities where students can interact with materials and create.

## Prioritize Representation in Videos

It can't be emphasized enough how much it matters for young women to see women in manufacturing roles to then imagine themselves in that role. A first step can be prioritizing videos featuring women manufacturers, such as these examples:

- ["Manufacturing Engineer"](#) from Alignment Rockford
- ["Operations Engineer"](#) from Alignment Rockford
- ["Mechanical Engineer"](#) from Alignment Rockford
- ["Production Floor"](#) from Alignment Rockford
- ["Vice President of Engineering"](#) from Alignment Rockford
- ["Test Technician"](#) from California Building Industry Association
- ["Mechanical Engineer"](#) from California Building Industry Association

There are many roles in manufacturing, and broadening the scope of what a student thinks of when they approach manufacturing may increase their likelihood to connect to it. Consider the following when selecting a video:

- Show videos which highlight different parts of the process as well as different roles in manufacturing.
- Keep the item relevant to the students' ages and interests. Allow them to see something they interact with often being created.
- Show students items that may be made in their community.
- Show students the full process of an item being made.
- Discuss the impact of the manufactured item with your students. Some example questions to lead discussion include: What item was manufactured? What is that item used for? Who benefits from this item?

### COMMUNITY MODELS

Explore the [I-WIN Resources: Manufacturing WBL Continuum](#) for a compilation of community models specific to manufacturing across the work-based learning continuum.

### ARTICLE EXAMPLE

["A Conversation with Marsha Serlin of United Scrap Metal"](#) from CLR. This interview celebrates a woman who was a self-starter and did not come from a manufacturing family which may be particularly inspiring to young women in your community who have no current connection to manufacturing.

## Interact with Female-Centered Manufacturing Media

In addition to videos, media such as books, articles, and podcasts can help students engage with stories of women in manufacturing to learn about both the successes and challenges of navigating the industry as a woman. Select media that highlights women from a variety of backgrounds and host discussions with young women on the history of women in manufacturing and how women are influencing the current industry. Media examples include:

- [“Steel Toes and Stilettos: A True Story of Women Manufacturing Leaders and Lean Transformation Success.”](#) a book by Shannon Karels and Kathy Miller
- [“20 Women in Manufacturing That Are Influencing the Industry.”](#) an article by Jessica Califano
- [“Maker Multipliers: Meet our Makers.”](#) a website featuring Q&As with staff from the Connecticut Center for Advanced Technology
- [Hear Her Story](#), a podcast by the Women in Manufacturing Association
- [Mavens of Manufacturing](#), a podcast hosted by Meaghan Ziemba, founder and owner of Z-Ink Solutions, LLC
- “5 Influential Women Who Affected Manufacturing for Women’s History Month,” an article from Maker’s Row

## Provide Spaces for Students to Be Makers

Intentionally encourage females to partake in woodworking, robotics, jewelry-making, and other maker classes, if they exist at your school. This includes:

- Saving spots for women in the classroom.
- Keeping class sizes small enough for women new to the maker space to get individualized attention from the instructor.
- Not framing maker classes as “filler classes;” instead, emphasize the importance of the skill that students will be learning.
- Verbally emphasizing that maker classes are for women.

If there are no formal classes or extracurriculars at your school, **consider connecting with local schools, colleges, or organizations to host workshops.** As part of your outreach, request a female instructor and/or students.

There are many low-cost ways to encourage students to be makers with limited resources; it does not take a maker space and a manufacturing class to ignite students’ excitement for using their hands. **Low-cost, hands-on activities include making models out of popsicle sticks.** To help underwrite costs, look for organizations such as the Illinois Career and Technical Student Organization [Science Olympiad](#) that are dedicated to providing funding for bettering STEM programs at schools.

### FUNDER EXAMPLES

The [IMA Education Foundation](#) supports Manufacturing Month, which works with manufacturing employers and school districts each October, in addition to the STAMP program and scholarships.

[TMA Manufacturing Education Foundation](#) offers a variety of grants, including those that support education and women in manufacturing.

## Career Exploration

[Career Exploration is defined as](#) an activity such as a job shadow, attendance at a career exposition, or employer site visit providing an individual with the ability to engage directly with employers for the purpose of gaining knowledge of one or more industry sectors or occupations.

When designing Career Exploration activities, connect students with women in a variety of manufacturing roles and allow them to learn about the postsecondary pathways and opportunities within the field directly from female manufacturers.

- If possible, allow students to interact with the process on the assembly line. Some plants may give students the opportunity to make something. If you do this, ask for a female instructor and focus on items relatable to students.
- Guide students through questions about their experience to get them to reflect on what they learned from the experience, what they liked about the experience, what they may not have liked about the experience, and whether or not they could see themselves in this space (see [“Reflection Questions for Young Women in Manufacturing”](#)). If the young women have follow-up questions, be sure to get the answers for them or connect them to someone who may be able to help.
- If your students are unable to go on a tour of a manufacturing plant, consider a [virtual field trip](#).

Students who are interested in manufacturing want to see that postsecondary programs include the hands-on activities that have excited them in K-12. It is important for students to see this in action in college classrooms and address any misconceptions they have about postsecondary programs not being hands-on.

## Host Female Manufacturers at an Event

Bring in women that work in a variety of manufacturing areas (assemblers, machinists, fabricators, etc.). Ask the women to be authentic and share honest reflections on their experiences as women in the field. Talking points include:

- How did you break barriers in a male-dominated industry? What changes have set precedent for the women to come after them?
- How does it feel to be a "minority" in manufacturing gender-wise?
- How did your mentor or role model help you along your path?
- Do you have any advice on professional dress do's and don'ts?
- What were some challenges you have encountered due to your gender?
- Do you ever code-switch at work?
- Why aren't there more women in manufacturing? What do you think is holding them back?
- Do you believe you have ever been given or lost an opportunity because you're a woman? How did you handle it?
- Have you experienced workplace harassment? Do you have any advice to young women who are experiencing similar challenges?

### COMMUNITY MODEL

Chicago Public Schools offers two unique Career Exploration opportunities intentionally designed for young women, which they shared about at an I-WIN session:

- [Women in Manufacturing and Engineering Expo](#)
- [CTE Women in the Trades](#) speaker series

### FOSTERING CONNECTIONS

Ask women manufacturers at your Career Exploration events to share their business cards or contact information with students, so any interested young women may connect following the event.

# Reflection Questions for Young Women in Manufacturing

Name of manufacturing career exploration experience:

Who did you meet? What are their roles and what companies are they with?

What are two things you heard that excited you or were interesting?

1.

2.

What are some things you liked about the experience?

What are two things you heard that you didn't necessarily like or were confused by?

1.

2.

Could you see yourself in the manufacturing space? Why or why not?

What are some follow-up questions you have?

## Connect Young Women with Women in Manufacturing

In the Career Exploration phase of the work-based learning continuum, continue to **find and share stories** of successful women manufacturers (see the [“Prioritize Representation in Videos”](#) and [“Interact with Female-Centered Manufacturing Media”](#) sections above for examples).

**Build relationships with your local manufacturing organizations** and ask them to connect with your students. Take it one step further by establishing a Manufacturing Advisory Board at your school to sustain your relationship with local manufacturing organizations. Begin by reviewing the [“Proposed Guidelines for Connecting Schools and Manufacturing Organizations”](#) from the Technology and Manufacturing Association (TMA). Consider creating and engaging young women in a sustained mentorship model with women in the manufacturing industry.

Through your relationships with postsecondary partner, give your students the opportunity to **observe a manufacturing course at a local college**. Take it one step further by offering college manufacturing as a dual-credit course. Best practices in Career Exploration include a collaboration among industry and postsecondary partners to show students both the careers available and the postsecondary pathways that allow them to access those opportunities.

## Touring a Manufacturing Plant

- Ask for a female tour guide.
- Ensure the guide understands the students’ age and general background.
- Keep the item relevant to the student’s age if possible. Allow them to see something they interact with often being created.
- Show students items that may be made in their community.
- Show students the full process. Ensure that the tour guide is clearly explaining the steps to the students.

Give students a pre-assignment to watch this item being made or to read an article about this item. This way, they can have a full experience of seeing something they studied or watched at home come to life.

## Team-Based Challenge

[A Team-Based Challenge is defined as](#) a group problem-based learning project relating to an individual’s career area of interest that involves a problem relating to employers within that area, including mentoring from adults with expertise in that area, and requires the individual to present the outcomes of the project.

## Encourage Young Women to Engage in Manufacturing-Related Team-Based Challenges

- Enlist a female mentor from a local manufacturing organization to work with students in your team-based challenge.

### IDEAS FOR INSPIRATION

Explore [ideas for Team-Based Challenges](#) specific to Manufacturing, Engineering, Technology, and Trades.



- Connect with local maker spaces and encourage students engaging in the team-based challenge to utilize available resources to get hands-on experience with machinery as a part of their problem-solving process.
- Go one step further: Look for local maker competitions and encourage students to enter. Structure the competition preparation similarly to a team-based challenge. Some examples of maker competitions include:
  - [Impact Center](#) at the Boys & Girls Clubs of Dundee Township
  - TMA's [Precision Machining Competition](#)
  - Ridgewood High School's [Fluid Power Action Challenge](#)

## Career Development Experience

A [Career Development Experience \(CDE\)](#) is defined as a supervised work experience relating to an individual's career area of interest that:

- Occurs in a workplace or under other authentic working conditions;
- Is co-developed by an education provider and at least one employer in the relevant field;
- Provides compensation or educational credit to the participant;
- Reinforces foundational professional skills, including, at a minimum, those outlined in the Essential Employability Skills framework; and
- Includes a Professional Skills Assessment that assesses skill development and is utilized as a participant feedback tool.

Designing a high-quality CDE that gives young women an authentic and welcoming work experience is critical to helping them transition to a postsecondary program or career in manufacturing. Consider the following:

- Be intentional about connecting young women with female mentors at the host site; whenever possible, pair young women with a mentor that is representative of their identity. If the direct supervisor of the student is not a woman, determine whether a co-mentor at the space can be provided who is a woman.
- Connect young female students to a manufacturing organization that has woman-focused initiatives, such as women's committees such as the [Women in TMA Committee](#).
- Connect with local organizations that have women on their leadership team and demonstrate a true commitment to supporting women in the field.
- Check in often with young women in manufacturing CDEs. Consider utilizing [empathy interviews](#) to better understand their thoughts and experiences in the space and respond to their concerns.
- Encourage young women to reflect on their experiences often and come to you with questions or concerns (see "[Reflection Questions for Young Women in Manufacturing](#)").
- Encourage students and employers to conduct meaningful check-in conversations throughout the CDE (see the "[Host and Participant Check-In Meetings](#)" template, a resource from EdSystems' Career Development Experience Toolkit).

### COMMUNITY MODELS: MENTORING AND INTERNSHIP PROGRAMS

At an [I-WIN convening](#), leaders from Clairemont High School in San Diego, California, shared the school's continuum of work-based learning, including a mentor program and internship opportunities available to students. The presentation includes a plethora of resources that communities can adapt and customize to design their own experiences.

## Engaging Your Employers

Ensuring your employers are aware of best practices for supporting young women in manufacturing may help mentors feel more prepared to provide personalized guidance to new mentees and make the CDE experience more engaging for young women. Work closely with your employer partners that are hosting the Career Development Experience, guiding them to:

- Actively recognize that bringing women into the workforce strengthens every organization and the workforce as a whole and take action to do so. Investing in them brings new perspectives and novel approaches to efficiency, community, and improvement in the workplace. When young women are given the chance to excel in manufacturing, they not only benefit personally but also contribute to the industry's growth and competitiveness on a global scale. Gender diversity increases worker morale and employee retention, and improves creativity in the workplace by including new ideas and perspectives. (Learn more from the U.S. Department of Commerce's blog posts: "[Manufacturing Opens More Doors to Women](#)" and "[Making a Place for Women in Manufacturing](#)".)
- Have continual conversations on culture within the workplace about the value of bringing women into manufacturing spaces. Changing the culture of manufacturing begins from within a manufacturing organization. There is a responsibility upon employers to create environments that welcome women into the manufacturing space.
- When interacting with students in any capacity, make sure you're including your female employees in the conversation. Bring female manufacturers to career fairs, encourage them to lead tours, etc.
- Include your female employees in your marketing materials, and be sure to have women highlighted on your website.
- Create initiatives that empower women inside your manufacturing organization, as well as support women considering entering the field.
- Consider applying for grants that are dedicated to creating a welcoming and productive environment for women.

For more information on engaging with your employers, please see the Host Engagement section in the [Career Development Experience Toolkit](#).

### RESOURCES FOR EMPLOYERS

- Article: "[Attracting Women for a Stronger Workforce](#)" from Bright Horizons
- Article: "[The Sound of Automation: Women in Manufacturing](#)" by Bryan Powrozek
- Grant: [Women in Apprenticeship and Nontraditional Occupations \(WANTO\)](#)
- Community Model: [Chicago Women in Trades](#)
- Community Model: [Women in TMA Committee](#)

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# SUMMARY

Four next steps towards implementing inclusive supports for women in manufacturing.



## Key Takeaways

**Women considering a career in manufacturing need to connect with women in manufacturing.** It is essential that young women interact with stories of women in the field, connect with female manufacturers, and understand that gender should not be a barrier. Women can do and are present in ALL manufacturing jobs.

**Ask for female role models.** If you are bringing a manufacturer to your school or organization, ask that it be a woman. If you are taking your students to a manufacturing organization, ask for a female tour guide. Find female instructors, have females run team-based challenges, etc.

**Hands-on engagement should be prioritized.** Students interested in manufacturing tend to be tactile learners and need to be engaged to the extent possible to be hands-on whether they are learning about a concept, career, or postsecondary opportunities. They need to see how hands-on various careers and courses are as they continue to navigate where they see themselves in the manufacturing field. Provide as many hands-on opportunities as possible for them to develop essential employability and technical competencies to keep them connected and excited about the key skills needed for success in manufacturing.

**Follow through!** After every experience that a young woman in manufacturing has, encourage her to reflect on her experience in the space. If a student is interested in continuing, help connect them to further opportunities, such as local manufacturing plants that offer apprenticeships, manufacturing training programs, and scholarships for women in manufacturing.

### SCHOLARSHIPS FOR WOMEN IN MANUFACTURING

- [Lynne Mohr Scholarship](#) from the Illinois Manufacturers' Association
- [Women in TMA Grant](#) from the Technology and Manufacturing Association
- [Manufacturing Pathway Scholarship](#) from the IMA Education Foundation and EdSystems

