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# 5G

## Information

### ***Educator Preparation Committee***

#### **Update on the Work Group on Career Technical Education**

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**Executive Summary:** This agenda item provides an update on the work group convened by the Commission on Teacher Credentialing, in collaboration with the California Department of Education and the Comprehensive Assistance Center at WestEd to review Career Technical Education in California.

**Recommended Action:** For information only

**Presenters:** Bob Loux and Jake Shuler, Consultants, Professional Services Division

#### **Strategic Plan Goal**

##### ***I. Educator Quality***

- a) Maintain expectations for educator preparedness and performance that are responsive to the needs of California's diverse student population and promote 21<sup>st</sup> century teaching and learning.

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# **Update on the Work Group on Career Technical Education**

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## **Introduction**

This agenda item provides an update on the work group convened by the Commission on Teacher Credentialing (Commission) and the California Department of Education (CDE) to review Career Technical Education (CTE) in California. The item presents ideas from the work group and potential next steps to improve CTE and address the CTE teacher shortage for the Commission's discussion and potential direction to staff to help ensure that California public school students in CTE courses are taught by qualified and effective teachers.

## **Background**

A shortage of CTE teachers in California has developed in recent years due to a combination of factors. The CDE has introduced a college and career indicator within the dashboard developed for the state's accountability system. This seems to be encouraging more districts to offer CTE courses and pathway programs. In addition, there has been an increase in CTE funding at both the state and federal level, which is also encouraging more districts to increase their CTE offerings. On the supply side, there continues to be a shortage of teachers across all CTE fields. Concerns have been expressed by those with industry experience about preparation requirements being too onerous, and by teachers holding single subject credentials about gaining the required industry experience being too difficult to do while teaching.

Since 2015, Commission staff have met with various CTE stakeholders, explored ideas to increase the supply of CTE teachers, and presented these ideas to the Commission. These ideas have included streamlining the processes for general education teachers or community college faculty who seek to earn CTE credentials. Commissioners and interested stakeholders have not supported these potential options, identifying the need to ensure an acceptable level of required industry experience or K-12 classroom preparation for aspiring CTE teachers. In order to address these concerns, Commission staff have continued to engage stakeholders and to identify a set of ideas that has broad support.

At the June 2018 Commission meeting ([Item 4E](#)), the Commission gave guidance to staff to move forward with a proposed plan to collaborate with WestEd and the California Department of Education (CDE) to organize a statewide work group of veteran CTE educators and stakeholders. The group's mission was to identify possible approaches to addressing issues and challenges related to CTE in California, including the shortage of CTE teachers. In response, staff from the Commission, CDE and WestEd began working in partnership to address this directive. Staff from the two agencies readily agreed that addressing the shortage of CTE teachers is an important part of the effort to ensure that students throughout California have access to, and can benefit from, high-quality CTE.

### **Convening the 2018-19 CTE Work Group**

An invitation was shared statewide in early October 2018 to submit applications to serve on the CTE work group. More than 170 applications were received, demonstrating broad interest in the effort. Commission and CDE staff reviewed the applications and selected members of the work group in November 2018. The work group members selected ([Appendix A](#)) were knowledgeable about CTE-related issues, represented a large cross-section of teachers and other educators throughout California, and represented the diverse population of the state. Many of the work group members served on previous work groups related to CTE. The work group also had representatives of each of the major policy groups and associations in the state, including the California School Boards Association, the California Teachers Association, the Association of California School Administrators, the California County Superintendents Educational Services Association, the University of California, the California State University, and the Association of Independent California Colleges and Universities. Commissioners Bonnie Klatt and Kevin Kung served as liaisons to the work group.

The work group met four times for a full day in January, March, April and May 2019. Midway through the process, Commission staff provided an update on the progress and outcomes of the first two meetings of the work group to the Commission at its April 2019 meeting ([Item 4F](#)). After the fourth meeting a survey was developed and sent to all applicants and a large group of CTE stakeholders to respond and comment on the work group's ideas.

### **Work Group Ideas**

Initial instructions to the work group invited members to consider the largest roadblocks that hinder efforts to recruit and retain high quality CTE teachers, and to identify potential ideas to address those roadblocks. Specifically, the work group was instructed to consider *what* challenges needed to be addressed, rather than specific solutions or *how* the challenges were to be resolved. When previous groups of CTE advocates developed specific solutions, concerns were raised that not all relevant stakeholders were present. This often led to solutions not being widely accepted by the broad CTE community. The 2019 CTE work group instead focused on identifying specific challenges, roadblocks, or areas of concern with the intent that a broad representation of CTE advocates, educators, and industry experts would be convened in the future to address each identified issue. The intent was that these ideas would indicate areas for future in-depth work and collaboration to resolve the specific issues.

The work group developed ideas in the areas of: (1) credentialing, (2) workforce recruitment and retention, and (3) industry partnerships. The full text of each idea is included below. It should be noted that many of these ideas address concepts similar to what has previously been presented to the Commission, but not acted on for various reasons. A number of the ideas the group came up with are not within the direct areas of Commission responsibility, and therefore are not being proposed in this item. Future work on these ideas requires the involvement and leadership of other policy-making bodies (e.g., the California Department of Education, State Board of Education and state Legislature).

1. Credentialing
  - a. Create a streamlined process for teaching candidates to earn a CTE credential while they are pursuing an Multiple Subject/Single Subject/Education Specialist credential.
  - b. Create a streamlined process for teachers who already have an Multiple Subject/Single Subject/Education Specialist credential to earn a CTE credential.
  - c. Create a streamlined process for CTE teachers to earn an Multiple Subject/Single Subject/Education Specialist credential.
  - d. Create a streamlined process for college faculty/lecturers to earn a CTE credential.
  - e. Create authorizations to teach CTE courses or general education courses without a separate credential.
  - f. Develop industry informed competencies to allow multiple options for showing expertise in the industry area (i.e. portfolio or competency based assessment).
  - g. Provide clarification on the required industry work experience to teach in each industry sector.
2. Recruiting and Retention
  - a. Explore strategies to increase compensation for CTE teachers.
  - b. Explore benefits such as health care for part time CTE teachers and loan forgiveness.
  - c. Explore options for CTE teachers to use years of work experience as credits to move up on the pay scale.
  - d. Explore options for CTE teachers to transfer years of work experience credits between districts for compensation.
  - e. Explore strategies to address the reduction of social security payments for industry professionals who retire and become CTE teachers.
  - f. Establish a statewide effort to recruit high quality potential CTE teachers.
  - g. Establish a statewide effort with incentives to diversify the CTE teaching force.
  - h. Create a CTE teacher induction program for all new CTE teachers to address support and retention.
  - i. Create a CTE teacher professional development program that includes industry externships.
3. Industry Involvement
  - a. Explore ways to involve industry partners in defining the criteria and qualifications for CTE credentials.
  - b. Explore incentives for industry partners to provide additional support for CTE teachers, including externships, professional development, and curriculum development.
  - c. Explore incentives for industry partners to provide additional support for CTE students through work based learning, internships, and allowing employees to go offsite to work with students in classrooms.

### **Survey Outcomes**

Following the final meeting of the work group, Commission staff conducted a survey of the field to gauge the level of support for the work group's ideas. The survey was sent out to every

Commission-approved CTE program in California, the more than 170 individuals who applied to be part of the work group, and all members of the work group.

The majority of the work group ideas received a high level of support in the survey results. On a scale of 1-5, with 5 being “strongly support,” the mean value response for 17 of the 19 ideas was 4.2 or higher. The two ideas with mean values below 4.2 were (1) streamlining the process for college faculty to earn a CTE credential and (2) creating authorizations to teach CTE without a credential. Both of these ideas were presented to the Commission in past years and had been met with concerns then as well.

### **Efforts Moving Forward**

Given the shared goal to improve CTE for all students in California, the Commission and CDE staff are proposing that the agencies begin to follow up on two of the ideas presented by the work group:

- (1) The Commission and CDE would work together to create and promote clear and consistent statewide guidance on allowable industry work experience toward the current 3000 hour requirement.
- (2) The Commission would collaborate with industry partners and veteran CTE educators to develop industry-informed competencies deemed necessary to effective teaching in a CTE context. Commission staff recommends that this work begin with four of the fifteen industry sectors closely related to the career areas of Science, Technology, Engineering and Math (STEM):
  - Engineering and Architecture,
  - Health Science and Medical Technology,
  - Information and Communication Technologies,
  - Energy, Environment and Utilities.

A full list of the 15 CTE industry sectors, the pathways, and occupations is provided in [Appendix B](#).

These two concepts are being proposed to the Commission at this time because they are within the purview of the Commission and include efforts that staff could begin work on shortly. Further information on both concepts is provided below to support the Commission’s discussion.

### ***Statewide Guidance on CTE Requirements***

Commission staff recommend working with staff in the Career and College Transition office at CDE along with experts in the field to develop clear guidance for CTE preparation program sponsors and employers of CTE teachers on the current work experience requirements for all industry sectors. The goal will be to create consistency between programs and employers on acceptable ways to meet the work experience requirements.

Work group members brought forward numerous examples in the field of different CTE preparation programs allowing or disallowing the same work experiences to count toward the

required industry experience. For example, an individual who designs websites for a part time business might be allowed to count this work experience at one program but not another.

Subsequent to the development of this guidance, staff from the Commission and CDE would develop a plan to share the guidance with all CTE preparation programs in the state and facilitate conversations amongst programs and employers on acceptable ways to meet the work experience requirements.

### ***Industry-Informed Competencies***

The current CTE preparation program standards set identical expectations across all 15 industry sectors, including the minimum hours of work experience needed in the industry and completion of required coursework in instructional strategies, working with English learners and special populations, and lab safety. This one-size-fits-all approach may not be the best approach or fit for CTE, an umbrella under which very different areas of work are ever evolving to address changes in technology, industry and practice. Developing and piloting industry-informed competency requirements as a basis for credentialing would allow the Commission and the field to consider the viability of this approach to the CTE credential.

The development of industry-informed competency requirements for the four industry sectors related to STEM will require the recruitment of industry partners and veteran CTE educators to determine what kinds of competencies are most critical for beginning CTE teachers, as well as appropriate options for demonstrating competency, which could include some kind of modified teaching performance assessment. Moving to a competency-based system of credentialing requirements could prove to be a better way of ensuring relevant industry experience, and may result in options for candidates to demonstrate industry competency in multiple ways.

### **Commission Discussion**

Staff requests that the Commission discuss the following future efforts that Commission staff has proposed:

1. Coordinating with CDE to create and promote clear and consistent statewide guidance on allowable industry work experience toward the current 3000-hour requirement.
2. Engaging with industry partners and veteran CTE educators to develop industry-informed competency requirements for four of the fifteen industry sectors closely related to the career areas in STEM.

### **Next Steps**

If the Commission directs staff to move forward with the proposed next efforts, staff would develop a work plan, move forward with this activity, and provide updates to the Commission on the progress and outcomes of the work.

## Appendix A

### Work Group Membership

Name	Affiliation
Stephanie Houston	ACSA Representative – Colton-Redlands-Yucaipa ROP
Annie Johnston	UC Representative – UC Berkeley
Tiffany Morse	CCESSA Representative – Ventura COE
Cheryl Ney	CSU Representative – CSU Los Angeles
Colin Davis	CTA Representative – Bellflower USD
Eric Bakke	CSBA Representative – Legislative Advocate
Keith Howard	AICCU Representative – Chapman University, Orange
Bonnie Klatt	Commission Liaison – Teacher, Natomas Charter School
Kevin Kung	Commission Liaison – Teacher, Palisades Charter High School
Jared Amalong	Sacramento COE
Roger Andersen	Encorps STEM Teachers Program
Debbie Anderson	Southern Regional Education Board
Katie Bennett	Campbell UHSD- San Jose
Kendra Bradford	Alhambra USD
Tiffany Burkle	Sequoia UHSD- Redwood City
Paul Goins	Hacienda La Puente Adult Education, San Dimas- LA
Mona Klein	Family and Consumer Sciences Teachers Association
Nancy Wagner	Los Angeles COE
Bridget Mondt	Orange COE
Gayle Nicholls-Ali	La Canada USD- Pasadena
Bryanna Norton	San Diego COE
Matt Patton	California Agricultural Teachers Association
Marie Perotti	Coachella Valley USD
Nicole Rice	California Manufacturers & Technology Association
Sheryl Ryder	Placer COE
Esther Soliman	Los Angeles USD
Anne Stanton	Linked Learning
Valerie Vuicich	Fresno ROP
Dennis Walters	California Teachers Association
Paul Watters	Butte COE
Matt Wells	Mountain Desert Career Pathways Joint Powers- Snowline USD

Staff Facilitating the Group	Affiliation
Rose Owens-West	Comprehensive Assistance Center at WestEd
Michelle McIntosh	California Department of Education
Bob Loux	Commission on Teacher Credentialing
Jake Shuler	Commission on Teacher Credentialing

## Appendix B

### Career Technical Education Industry Sectors With Pathways and Occupations

#### Agricultural and Natural Resources Pathways & Occupations Table

Pathways	Occupations
<ul style="list-style-type: none"> <li>• Agricultural Business</li> <li>• Agricultural Mechanics</li> <li>• Agriscience</li> <li>• Animal Science</li> <li>• Forestry and Natural Resources</li> <li>• Ornamental Horticulture</li> <li>• Plant and Soil Science</li> </ul>	<ul style="list-style-type: none"> <li>• Agriculture business management and marketing</li> <li>• Agriculture mechanics</li> <li>• Animal care</li> <li>• Animal control</li> <li>• Animal production</li> <li>• Crop production</li> <li>• Floriculture and floristry</li> <li>• Forestry, natural resources and rural recreation</li> <li>• Landscaping</li> <li>• Ornamental nursery operation</li> </ul>

#### Arts, Media, and Entertainment Pathways & Occupations Table

Pathways	Occupations
<ul style="list-style-type: none"> <li>• Design, Visual, and Media Arts</li> <li>• Performing Arts</li> <li>• Production and Managerial Arts</li> <li>• Game Design and Integration</li> </ul>	<ul style="list-style-type: none"> <li>• Commercial art</li> <li>• Commercial photography</li> <li>• Game Design Occupations</li> <li>• Multimedia production</li> <li>• Performing arts occupations</li> <li>• Stage technology</li> <li>• Theatrical occupations</li> </ul>

#### Building and Construction Trades Pathways & Occupations Table

Pathways	Occupations
<ul style="list-style-type: none"> <li>• Cabinetry, Millwork, and Woodworking</li> <li>• Engineering and Heavy Construction</li> <li>• Mechanical Systems Installation and Repair</li> <li>• Residential and Commercial Construction</li> </ul>	<ul style="list-style-type: none"> <li>• Boat building</li> <li>• Carpentry</li> <li>• Civil Engineer</li> <li>• Concrete placing and finishing</li> <li>• Construction equipment operation</li> <li>• Construction inspection</li> <li>• Drafting occupations</li> <li>• Drywall installation</li> <li>• Electrician</li> <li>• Fire sprinkler installation</li> <li>• Floor covering installation</li> <li>• Foundry work</li> </ul>

Pathways	Occupations
	<ul style="list-style-type: none"> <li>• Furniture making, finishing and refinishing</li> <li>• General contracting</li> <li>• Glazing</li> <li>• Hazardous materials occupations</li> <li>• Heating, air conditioning, and ventilation installation and service</li> <li>• Heavy Equipment Operator</li> <li>• Interior maintenance (residential and commercial)</li> <li>• Lathing</li> <li>• Masonry</li> <li>• Mechanical Engineer/Technician</li> <li>• Millwork and cabinet making</li> <li>• Motor sweeper operator</li> <li>• Painting-construction</li> <li>• Pipefitting and steam fitting</li> <li>• Plastering</li> <li>• Plumbing</li> <li>• Pool and spa service</li> <li>• Refrigeration installation and maintenance</li> <li>• Residential and commercial repair and remodeling</li> <li>• Roofing</li> <li>• Sheet metal fabrication</li> <li>• Structural and reinforcement ironwork</li> <li>• Structural pest control</li> <li>• Tile setting</li> <li>• Upholstering</li> <li>• Welding</li> <li>• Woodworking</li> </ul>

**Business and Finance Pathways & Occupations Table**

<b>Pathways</b>	<b>Occupations</b>
<ul style="list-style-type: none"><li>• Business Management</li><li>• Financial Services</li><li>• International Business</li></ul>	<ul style="list-style-type: none"><li>• Accounting occupations</li><li>• Auditor</li><li>• Banking</li><li>• Business Computing Specialist</li><li>• Business management</li><li>• Chief Financial Officer</li><li>• Customs Inspector/Broker</li><li>• Export Sales</li><li>• Financial management and services</li><li>• Human Resources Specialist</li><li>• Income tax preparation</li><li>• Insurance occupations</li><li>• International Business</li><li>• Investment Consultant</li><li>• Legal office occupations</li><li>• Office occupations</li><li>• Personnel administration occupations</li><li>• Purchasing Agent</li><li>• Secretarial/stenography occupations</li><li>• Tax preparation specialist</li><li>• Small business ownership and/or management</li></ul>

**Education, Child Development, and Family Services Pathways & Occupations Table**

<b>Pathways</b>	<b>Occupations</b>
<ul style="list-style-type: none"><li>• Child Development</li><li>• Consumer Services</li><li>• Education</li><li>• Family and Human Services</li></ul>	<ul style="list-style-type: none"><li>• Child care</li><li>• Child Care Psychologist</li><li>• Consumer Services</li><li>• Counselors</li><li>• Education Administrators</li><li>• Elderly care services (non-medical)</li><li>• Family and human service occupations</li><li>• Librarian</li><li>• Personal Financial Advisor</li><li>• Preschool Teacher</li><li>• Social Outreach Director</li><li>• Teacher</li><li>• Teacher aide</li></ul>

**Energy, Environment, and Utilities Pathways & Occupations Table**

<b>Pathways</b>	<b>Occupations</b>
<ul style="list-style-type: none"><li>• Energy and Power Technology</li><li>• Environmental Resources</li><li>• Telecommunications</li></ul>	<ul style="list-style-type: none"><li>• Air Quality Technician</li><li>• Climatologist</li><li>• Control system maintenance and repair</li><li>• Electrical power distribution</li><li>• Electrician</li><li>• Electronic consumer products service</li><li>• Electronics assembly</li><li>• Energy Auditor</li><li>• Energy Engineer</li><li>• Energy, environment and resource manager/technician</li><li>• Environmental Biologist/Scientist</li><li>• Hybrid microelectronics</li><li>• Hydroelectric plant operations</li><li>• Industrial electronics</li><li>• Marine power plant maintenance and repair</li><li>• Solar Occupations</li><li>• Telecommunications Technicians</li><li>• Water treatment</li></ul>

**Engineering and Architecture Pathways & Occupations Table**

<b>Engineering and</b>	<b>Engineering and Architecture Occupations</b>
<ul style="list-style-type: none"><li>• Architectural Design</li><li>• Engineering Technology</li><li>• Engineering Design</li><li>• Environmental Engineering</li></ul>	<ul style="list-style-type: none"><li>• Air Pollution Control Engineer</li><li>• Architect</li><li>• City Planner</li><li>• Drafting occupations</li><li>• Engineering occupations</li><li>• Environmental Specialist</li><li>• Field Engineer</li><li>• Manufacturing Design Engineer</li><li>• Mechanical/Electrical Drafting</li><li>• Robotics</li><li>• Structural Designer</li><li>• Surveying</li></ul>

**Fashion and Interior Design Pathways & Occupations Table**

<b>Pathways</b>	<b>Occupations</b>
<ul style="list-style-type: none"> <li>• Fashion Design, and Merchandising</li> <li>• Interior Design, Furnishings, and Maintenance</li> <li>• Personal Services</li> </ul>	<ul style="list-style-type: none"> <li>• Barber*</li> <li>• Clothing, alteration and repair</li> <li>• Cosmetologist*</li> <li>• Esthetician*</li> <li>• Fabric maintenance services</li> <li>• Fashion Buyer</li> <li>• Fashion design</li> <li>• Fashion manufacturing (factory and custom)</li> <li>• Fashion merchandising</li> <li>• Interior Buyer</li> <li>• Interior design</li> <li>• Kitchen and Bath Specialist</li> <li>• Makeup Artist</li> <li>• Jewelry design, fabrication, and repair</li> <li>• Manicurist*</li> <li>• Merchandising Manager</li> <li>• Pattern Maker</li> <li>• Set Decorator</li> <li>• Textile design</li> <li>• Textile production and fabrication</li> <li>• Upholstering</li> </ul>

*\*Note: Occupations marked with an asterisk (\*) require an additional state license outside the purview of the Commission.*

**Health Science and Medical Technology Pathways & Occupations Table**

<b>Pathways</b>	<b>Occupations</b>
<ul style="list-style-type: none"> <li>• Biotechnology</li> <li>• Patient Care</li> <li>• Healthcare Administrative Services</li> <li>• Healthcare Operational Support Services</li> <li>• Public and Community Health</li> <li>• Mental and Behavioral Health</li> </ul>	<ul style="list-style-type: none"> <li>• Athletic trainer</li> <li>• Biomedical equipment technician</li> <li>• Biomedical Engineer</li> <li>• Biomedical Research and Development Specialist</li> <li>• Central Service Technician</li> <li>• Clinical Data Specialist</li> <li>• Clinical Lab Technologist/scientist</li> <li>• Clinical Simulator Technician</li> <li>• Community Health Professional</li> <li>• Diagnostic Technician</li> <li>• Dental Assistant</li> <li>• Dental Hygienist</li> <li>• Dental Lab Technician</li> <li>• Forensic Pathologist</li> <li>• Geneticist</li> <li>• Geriatric Technician</li> </ul>

<b>Pathways</b>	<b>Occupations</b>
	<ul style="list-style-type: none"> <li>• Health Care Administrator</li> <li>• Health Education Specialist</li> <li>• Health Information Management</li> <li>• Technician/Technologist</li> <li>• Massage Therapist</li> <li>• Materials Manager</li> <li>• Medical/Clinical Assistant</li> <li>• Mental health professional</li> <li>• Medical Sonographer</li> <li>• Nutritionist/Dietician</li> <li>• Outreach Coordinator</li> <li>• Phlebotomist</li> <li>• Physician's Assistant</li> <li>• Physical Therapy Technician/Technologist</li> <li>• Prosthetic Technician/Technologist</li> <li>• Psychiatric Technician/Psychologist</li> <li>• Public health professional</li> <li>• Nurse (RN/LVN/NP)</li> <li>• Radiological Technician</li> <li>• Rehabilitation Technologist/Therapist</li> <li>• Respiratory Technologist/Therapist</li> <li>• Sports Medicine Specialist</li> <li>• Ultrasound Technician</li> </ul>

**Hospitality, Tourism, and Recreation Pathways & Occupations Table**

<b>Pathways</b>	<b>Occupations</b>
<ul style="list-style-type: none"> <li>• Food Science, Dietetics, and Nutrition</li> <li>• Food Service and Hospitality</li> <li>• Hospitality, Tourism, and Recreation</li> </ul>	<ul style="list-style-type: none"> <li>• Amusement and theme park occupations</li> <li>• Customer service representative related to amusement, theme parks, hotel and lodging, and restaurant and food service establishments</li> <li>• Dietetics and nutrition service</li> <li>• Event and conference planning</li> <li>• Executive Chef</li> <li>• Food and beverage production and preparation</li> <li>• Food and beverage services</li> <li>• Food scientist</li> <li>• Hotel and lodging occupations</li> <li>• Recreation and sports entertainment</li> <li>• Registered Dietitian</li> <li>• Restaurant Management</li> </ul>

**Information and Communication Technology Pathways & Occupations Table**

<b>Pathways</b>	<b>Occupations</b>
<ul style="list-style-type: none"><li>• Information Support and Services Networking</li><li>• Software and Systems Development</li><li>• Games and Simulation</li></ul>	<ul style="list-style-type: none"><li>• Big Data Administration</li><li>• Computer and Information Systems</li><li>• Computer Programming</li><li>• Computer Sciences</li><li>• Computer User Support</li><li>• E-Business/E-Commerce</li><li>• Game Production</li><li>• Information Management</li><li>• Information Security</li><li>• Information Systems and Operations</li><li>• Multimedia Production</li><li>• Networking Engineer</li><li>• Network Installation and Operation</li><li>• Network Support and Maintenance</li><li>• Robotics</li><li>• Social and New Media Production and Management</li><li>• Software and Applications Developer</li><li>• Web and Mobile Application Production</li></ul>

**Manufacturing and Product Development Pathways & Occupations Table**

Pathways	Occupations
<ul style="list-style-type: none"> <li>• Graphic Production Technologies</li> <li>• Machining and Forming Technologies</li> <li>• Welding and Materials Joining</li> <li>• Product Innovation and Design</li> </ul>	<ul style="list-style-type: none"> <li>• Animator</li> <li>• CAD/CAM Specialist/Designer</li> <li>• Commercial Photographer</li> <li>• Commercial/Industrial Designer</li> <li>• Computer-assisted manufacturing</li> <li>• Computer Numerical Control (CNC) Operations</li> <li>• Cutter</li> <li>• Digital/Graphic Artist</li> <li>• Drafting occupations</li> <li>• Electronics assembly</li> <li>• Electronic publishing</li> <li>• Fitter</li> <li>• Industrial ceramics manufacturing</li> <li>• Machine tool operation and machine shop</li> <li>• Manufacturing Engineer</li> <li>• Metal fabrication</li> <li>• Material/Supply Management</li> <li>• Model Maker</li> <li>• Plastics and composites manufacturing occupations</li> <li>• Printing and graphics occupations</li> <li>• Product development, testing and demonstration</li> <li>• Production process/management</li> <li>• Quality Assurance</li> <li>• Robotics</li> <li>• Technical illustration</li> <li>• Tool and die making</li> <li>• Waterfront manufacturing</li> <li>• Welder</li> <li>• Welding Inspection</li> <li>• Welding Engineer</li> </ul>

### **Marketing, Sales, and Services Pathways & Occupations Table**

<b>Pathways</b>	<b>Occupations</b>
<ul style="list-style-type: none"> <li>• Marketing</li> <li>• Professional Sales</li> <li>• Entrepreneurship/Self-Employment</li> </ul>	<ul style="list-style-type: none"> <li>• Advertising Representative/Manager</li> <li>• Business Computer Specialist</li> <li>• Business Owner</li> <li>• Fashion Buyer</li> <li>• Floristry</li> <li>• Insurance Agent/Broker</li> <li>• International trade</li> <li>• Marketing</li> <li>• Market Research Analyst</li> <li>• Office Occupations</li> <li>• Public Relations Specialist</li> <li>• Real estate</li> <li>• Retail occupations</li> <li>• Small business ownership and/or management</li> <li>• Small Business Repair and Maintenance</li> <li>• Travel Agent</li> <li>• Various Professional Sales Occupations</li> </ul>

### **Public Services Pathways & Occupations Table**

<b>Pathways</b>	<b>Occupations</b>
<ul style="list-style-type: none"> <li>• Public Safety</li> <li>• Emergency Response</li> <li>• Legal Practices</li> </ul>	<ul style="list-style-type: none"> <li>• Court reporting</li> <li>• Cyber Security</li> <li>• Emergency Medical Technician</li> <li>• Emergency Response Dispatcher</li> <li>• Fire control and safety</li> <li>• Fire fighting</li> <li>• Forester</li> <li>• Investigator/Law Librarian</li> <li>• Law enforcement occupations</li> <li>• Legal occupations (deletion of word to expand options)</li> <li>• Loss Prevention Specialist</li> <li>• Paralegal</li> <li>• Protective and security services</li> <li>• Wildland fire services</li> </ul>

**Transportation Pathways & Occupations Table**

<b>Pathways</b>	<b>Occupations</b>
<ul style="list-style-type: none"> <li>• Operations</li> <li>• Structural Repair and Refinishing</li> <li>• Systems Diagnostics and Service</li> </ul>	<ul style="list-style-type: none"> <li>• Airframe and power plant mechanics</li> <li>• Automobile detailing</li> <li>• Automotive body repair and refinishing</li> <li>• Automotive brake installation and repair</li> <li>• Automotive electrical systems service and repair</li> <li>• Automotive heating and air-conditioning service</li> <li>• Automotive mechanics/technician</li> <li>• Automotive parts counterperson</li> <li>• Automotive suspension and steering repair</li> <li>• Automotive transmission and transaxle service and repair</li> <li>• Avionics</li> <li>• Bicycle repair</li> <li>• Claims Adjuster</li> <li>• Container Crane Operator</li> <li>• Diesel equipment mechanics</li> <li>• Dispatcher</li> <li>• Distribution Manager</li> <li>• Electric motor repair</li> <li>• Engine performance technician</li> <li>• Heavy equipment maintenance and repair</li> <li>• Industrial maintenance</li> <li>• Inspectors and Planners</li> <li>• Investigator/Inspector</li> <li>• Marine power plant maintenance and repair</li> <li>• Motorcycle service and repair</li> <li>• Production, Planning, and Expediting Specialist</li> <li>• Railroad operations</li> <li>• Small engine service and repair</li> <li>• Transportation occupations, travel services</li> <li>• Truck and bus driving</li> <li>• Warehousing</li> </ul>