

# MANUFACTURING & PRODUCT DESIGN INDUSTRY SECTOR

From cars to contact lenses, lipstick to bicycles this industry sector creates some of the best products and highest paying skilled jobs in the workforce. While some manufacturing jobs are declining, high-tech manufacturing is hard at work creating products to solve many of today's most challenging problems. Because robots and automation take care of the repetitive work, today's manufacturing employees have more challenging and interesting job assignments.



No matter which one gets you fired up, you can turn your skill and creativity into a great career by following the Manufacturing and Product Development pathway. Once you've learned the core knowledge and skills on this pathway, you'll have the chance to follow one of four different branches: Machine Tools, Welding, Graphic Communications and Graphic Design.

## CAREER PATHWAYS

### IS THIS INDUSTRY A GOOD MATCH FOR YOU?

#### Are you?

- Curious about how things work
- At ease in the mechanical world
- Creative
- Good at math

#### Do you?

- Like to work with your hands
- Follow assembly instructions
- Enjoy computer/technical magazines
- Grasp how complicated equipment works

### EDUCATION LEVEL & RELATED OCCUPATIONS

#### High School Diploma

Network Installer  
Special Effects Animator  
Welder

#### Certificate and/or Associate Degree

Production Manager  
Special Effects Editor  
Composite Fabricator

#### Bachelors+ Degree

Manufacturing Engineer  
Quality Control Inspector  
Industrial & Technology Multimedia AuthorM

FOR MORE INFORMATION ON THE MANUFACTURING & PRODUCT DESIGN INDUSTRY SECTOR, GO TO THE CALIFORNIA CAREERZONE.



## GRAPHIC PRODUCTION TECHNOLOGIES

The Graphic Production Technologies pathway provides students with an understanding of printing and manufacturing processes and systems common to careers in the graphic arts and printing technology industries. Representative topics include the principles of design composition, graphic design and layout, typography, image generation and file preparation, photography, digital imaging, prepress preparation, printing and screen printing technologies, binding and finishing processes, multimedia blending, and business and entrepreneurship principles.

### Sample occupations associated with this pathway:

- Animator
- Commercial Photographer
- Digital/Graphic Artist
- Printing Press Operator
- Production Assistant

## MACHINING AND FORMING TECHNOLOGIES

The Machine and Forming Technologies pathway provides students with an understanding of manufacturing processes and systems common hand and machine tools; reading to careers in

machine tool and materials forming industries. Representative topics include trade vocabulary; shop math; basic material identification; proper use of precision measuring tools within .001" and the interpretation of machined and formed-part prints; the cutting, shaping, fastening, and finishing of machined parts; fixtures: forging, molding (casting), cold forming, and shearing processes.

### Sample occupations associated with this pathway:

- CAD/CAM Specialist
- CNC Machinist
- Manufacturing Engineer
- Materials/Supply Management Specialist
- Quality Assurance Technician

## WELDING AND MATERIALS JOINING

The Welding and Materials Joining pathway provides students with an understanding of manufacturing processes and systems common to careers in welding and related industries. The following pathway standards are based on, but not limited to, well established American Welding Society (AWS) EG2.0 Guidelines for the Entry Level Welder. Representative topics include the interpretation and layout of welded and assembled-part prints, cutting, mechanical bonding, joining,

cohesive bonding, adhesive bonding, and mechanical fastening.

### Sample occupations associated with this pathway:

- Metal Fabricator
- Sales
- Welders, Cutters, and Fitters
- Welding Inspector/Welding Engineer

## PRODUCT INNOVATION AND DESIGN

The Product Innovation and Design pathway provides students with an understanding of the design and manufacturing technologies common to careers in the fields of product design and manufacturing. Representative topics include the product design and development process, the principles of design, computer aided design, fabrication and manufacturing processes, sustainability, and the principles of business, entrepreneurship, and global design.

### Sample occupations associated with this pathway:

- Commercial/Industrial Designer
- CAD Designer
- Model Maker
- Product Developer