

Manufacturing Technology

Exam Information	Description
Exam number 620 Items 52 National Career Cluster Advanced Manufacturing Certification available Yes	The Manufacturing Technology industry certification exam assesses knowledge and skill in how manufacturers use technology to transform raw materials into finished products. Learners demonstrate their understanding of the history of manufacturing, social impacts, types of manufacturing production, design processes, properties of materials, manufacturing processes, safe use of tools and equipment, free enterprise, marketing principles, and career exploration.

Exam Blueprint and Performance Skills

Standard	Percentage of exam score
1. Safety Practices*	21%
2. Effects of Technology*	11%
3. Manufacturing Technologies*	40%
4. Free Enterprise & Marketing*	18%
5. Mass Production System*	16%
6. Career Opportunities*	4%

*Includes performance skill evaluation

Standard 1 - Safety Practices (21% of exam score)

Candidates will follow safety practices

Objective 1 Identify potential safety hazards and follow general laboratory safety practices.

1. Assess workplace conditions with regard to safety and health.
2. Identify potential safety issues and align with relevant safety standards to ensure a safe workplace/jobsite.
3. Locate and understand the use of shop safety equipment.
4. Select appropriate personal protective equipment.

Objective 2 Use safe work practices.

1. Use personal protective equipment according to manufacturer rules and regulations.
2. Follow correct procedures when using any hand or power tools.

Objective 3 Complete a basic safety test without errors (100%) before using any tools or shop equipment.

Optional: Standard performance evaluations on the final page of this document

Standard 2 - Effects of Technology (11%)

Candidates will develop an understanding of the cultural, social, economic, and political effects of technology, the effects of technology on the environment, the role of society in the development and use of technology, and the influence of technology in history

Objective 1 In order to be aware of the history of technology, candidates should learn that

1. Many inventions and innovations have evolved by using slow and methodical processes of tests and refinements.
2. The specialization of function has been at the heart of many technological improvements.
3. The design and construction of structures for service or convenience have evolved from the development of techniques for measurement, controlling systems, and the understanding of spatial relationships.
4. In the past, an invention or innovation was not usually developed with the knowledge of science.

Objective 2 In order to realize the impact of society on technology, candidates should learn that:

1. Throughout history, new technologies have resulted from the demands, values, and interests of individuals, businesses, industries, and societies.
2. The use of inventions and innovations has led to changes in society and the creation of new needs and wants.
3. Social and cultural priorities and values are reflected in technological devices.

4. Meeting societal expectations is the driving force behind the acceptance and use of products and systems.

Objective 3 In order to understand the effects of technology on the environment, candidates should learn that:

1. The management of waste produced by technological systems is an important societal issue.
2. Technologies can be used to repair damage caused by natural disasters and to break down waste from the use of various products and systems.
3. Decisions to develop and use technologies often put environmental and economic interests in direct competition with one another.

Optional: Standard performance evaluations on the final page of this document

Standard 3 - Manufacturing Technologies (40%)

Candidates will develop an understanding of and be able to select and use appropriate manufacturing technologies.

Objective 1 In order to better understand manufacturing technologies, candidates should learn that:

1. Materials must first be located before they can be extracted from the earth through such processes as harvesting, drilling, and mining.
2. Materials have different qualities and may be classified as natural, synthetic, or mixed.
3. Manufacturing systems are mechanical processes that change the form of materials through the process of separating, forming, combining, and conditioning.
4. Chemical technologies are used to modify or alter chemical substances and provide a means for humans to alter or modify materials and produce chemical products.

Objective 2 In order to select and use manufacturing technologies, candidates should learn that:

1. The manufacturing process includes the designing, development, making, and servicing of products and systems.
2. Manufacturing systems may be classified into types, such as customized production, batch production, and continuous production.
3. Manufactured goods may be classified as durable and non-durable. Durable goods are designed to operate for a long period of time, while non-durable goods are designed to operate for a short period of time.
4. The interchangeability of parts is an inherent requirement of an effective manufacturing process.
5. Servicing keeps products in good condition.

Objective 3 Demonstrate basic technical drawing and reading skills.

Objective 4 Take measurements using basic equipment used in manufacturing.

1. Steel rule

2. Digital or analog caliper
3. Micrometer

Optional: Standard performance evaluations on the final page of this document

Standard 4 - Free Enterprise & Marketing (8%)

Candidates will define free enterprise and marketing as it relates to manufacturing

Objective 1 In order to define free enterprise and marketing, candidates should learn that:

1. The basic concepts of entrepreneurship.
2. The process of obtaining capital and managing finances.
3. Marketing a product involves conducting research on its potential, establishing a product's identity, advertising it, selling it, and distributing it.

Optional: Standard performance evaluations on the final page of this document

Standard 5 - Mass Production System (16%)

Candidates will design and operate a mass production system that creates a product of value

Objective 1 In order to better understand a production system, candidates will:

1. Assume an individual production role within a continuous system.
2. Understand the importance of labor efficiency and be able to identify ways to improve a mass production system.
3. Include evidence of planning that ensures the product, system, or service meets established criteria.

Optional: Standard performance evaluations on the final page of this document

Standard 6 - Career Opportunities (4%)

Candidates will investigate the educational pathways and career opportunities in the manufacturing industry

Objective 1 Identify occupations related to the manufacturing industry

Objective 2 Identify different types of occupational training.

Optional: Standard performance evaluations on the final page of this document

Performance Skills Evaluation

Exam name: Manufacturing Technology

Candidate Name: _____

Performance assessments may be completed and evaluated any time before the certification is issued. The following performance skills can be used in connection with the associated standards and exam. The evaluator will function as the subject matter expert to determine if the candidate meets the skills requirements with a Yes/No for passing.

Standard 1 – Safety Practices Follow safety practices	Pass:
Standard 2 – Cultural Effects of Technology Develop an understanding of the cultural, social, economic, and political effects of technology, the effects of technology on the environment, the role of society in the development and use of technology, and the influence of technology on history.	Pass:
Standard 3 – Manufacturing Technologies Develop an understanding of and be able to select and use appropriate manufacturing technologies.	Pass:
Standard 4 – Free Enterprise Marketing Define free enterprise and marketing as it relates to manufacturing.	Pass:
Standard 5 – Mass Production Operation System Design and operate to a mass production system that creates a product of value.	Pass:
Standard 6 – Career Opportunities Investigate the educational pathways and career opportunities in the manufacturing industry.	Pass:

Evaluator Name:

Date:
