



**CERTIFIED MANUFACTURING
ASSOCIATE
BODY OF KNOWLEDGE**



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MANUFACTURING ASSOCIATE

BODY OF KNOWLEDGE 2020

Topics	Competency
1. Shop Essentials (Applied Mathematics)	
1.1 Mathematics	Understand & Apply
1.1.1 Perform calculations involving addition	
1.1.2 Perform calculations involving subtraction	
1.1.3 Perform calculations involving multiplication	
1.1.4 Perform calculations involving division	
1.2 System of Measurement	Understand & Apply
1.2.1 Perform calculations involving common English units	
1.2.1 Perform calculations involving metric units	
1.2.2 Perform conversions between the two systems	
1.3 Fractions and Decimals	Understand & Apply
1.3.1 Perform calculations involving fractions	
1.3.2 Perform calculations involving decimals	
1.3.3 Perform conversions between the two types	
2. Safety	
2.1 Safely assembling components	Remember & Understand
2.1.1 Describe best practices for safely assembling components	
2.1.2 Describe proper ergonomics and use of personal protective equipment	
2.2 Intro to OSHA	Remember & Understand
2.2.1 A basic awareness of standards, rights, and responsibilities for workplace safety and keeping the workplace legally compliant	
2.3 OSHA Regulations (PPE)	Remember & Understand
2.3.1 Regulations for personal protective equipment (PPE)	
2.3.2 Impact on day-to-day operations in the workplace	

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2.4 OSHA Regulations (Lockout/Tagout)	Remember & Understand
2.4.1 Describe OSHA regulations regarding lockout/tagout procedures	
2.4.2 Describe OSHA regulations regarding energy isolation	
2.4.3 Describe the impact on day-to-day operations in the workplace	
2.5 OSHA Regulations (Hazardous Materials)	Remember & Understand
2.5.1 Describe OSHA regulations regarding hazardous materials	
2.5.2 Describe Safety Data Sheets (SDS) and how they impact day-to-day operations in the workplace	
2.6 Fires and Safety	Remember & Understand
2.6.1 Describe OSHA regulations regarding fire safety and how they impact day-to-day operations in the workplace	
2.7 Bloodborne Pathogens	Remember & Understand Understand & Apply
2.7.1 Describe OSHA regulations regarding bloodborne pathogens and how they impact day-to-day operations in the workplace	
2.8 Hand and Power Tools	Remember & Understand
2.8.1 Describe the safe use of hand and power tools used on the job	
3. Quality	
3.1 Quality Overview	Remember & Understand
3.1.1 Describe the importance of quality throughout different departments of an organization	
3.1.2 Describe the use of different quality management systems and tools in manufacturing processes and products	
4. Lean	
4.1 5S Principles (Sort, Set in Order, Sweep, Standardize, Sustain)	Remember & Understand
4.1.1 Restate terms associated with 5S principles	
4.1.2 Restate examples for each term specific to the person's working environment	

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4.2 Lean Manufacturing Overview	Remember & Understand
4.2.1 Understand the principles and terminology of lean	
4.2.2 Describe the seven forms of waste, value-added, push and pull systems, and the importance of continuous improvement	
5. Inspection	
5.1 Inspection Instruments and Gages	Remember & Understand
5.1.1 Describe the use and care of common inspection instruments and gages used in the shop	
5.2 Part Tolerancing	Remember & Understand
5.2.1 Describe common methods used for part tolerancing	
5.2.2 Describe the impact that tolerances have on part production and quality	
5.3 Assembly Print	Remember & Understand
5.3.1 Read an assembly print with an exploded view describe how key assemblies of the component are joined	
5.4 Troubleshooting	Remember & Understand
5.4.1 Understand various methods and tools used to troubleshoot problems	
5.4.2 Describe tools that are used to collect and interpret data including check sheets, fishbone diagrams, and Pareto charts	
5.4.3 Understand the 5 Why technique, brainstorming, documentation, and troubleshooting teams which are common methods of gathering troubleshooting data	
6. Fasteners	
6.1 Identify common assembly and late-stage processes that take place in industrial facilities	Remember & Understand
6.2 Assembling Components	Remember & Understand
6.2.1 Describe best practices for safely assembling components, including proper ergonomics and use of personal protective equipment	

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6.3 Tools for threaded fasteners	Remember & Understand
6.3.1 Identify different types of tools used with threaded fasteners	
6.3.2 Identify the advantages and disadvantages of the different types of tools	
6.3.3 Identify factors that go into selecting a tool for a threaded fastener application	
7. CNC	
7.1 CNC machine tools and controls	Remember & Understand
7.1.1 Describe common components of CNC machine tools and controls	
8. Robotics	
8.1 Industrial robots	Remember & Understand
8.1.1 Describe the basics of industrial robotics, including types, applications, and programming methods and safety protocols.	
8.1.2 Identify different ways to prevent robot accidents	
8.1.3 Describe the different kinds of safeguarding systems that protect employees from injury when working with robots	
9. Additive Manufacturing	
9.1 Overview of AM	Remember & Understand
9.1.1 Identify the basic steps, methods, processes, and materials	
9.1.2 Identify the advantages and disadvantages of AM	
9.1.3 Identify uses of AM	