Individual Test Item Specifications

8600040- Exploration of Production Technology

2015

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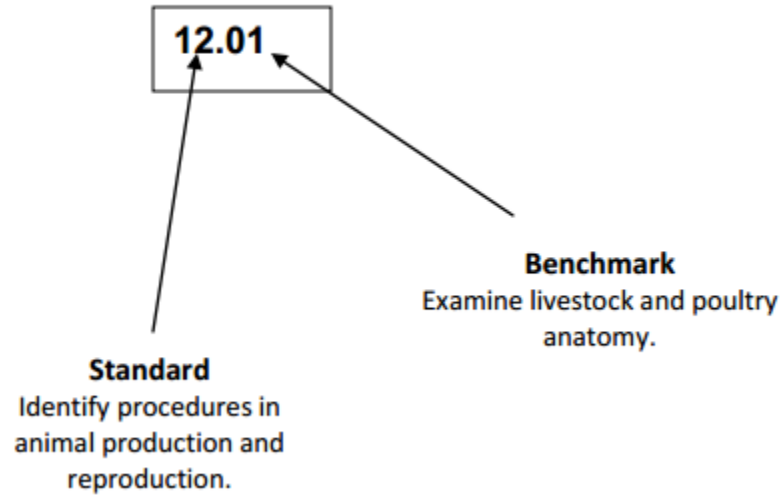
I. Guide to the Individual Benchmark Specifications

Content specific guidelines are given in the *Individual Benchmark Specifications* for each course. The *Specifications* contains specific information about the alignment of items with the Florida Standards. It identifies the manner in which each benchmark is assessed, provides content limits and stimulus attributes for each benchmark, and gives specific information about content, item types, and response attributes.

Benchmark Classification System

- Each Career and Technical Education course has its own set of course standards. The benchmarks are organized numerically, with two numbers separated by a decimal point. The first number is the standard number, and the second number is the benchmark number. You will see these numbers on the Item Specifications for each course.

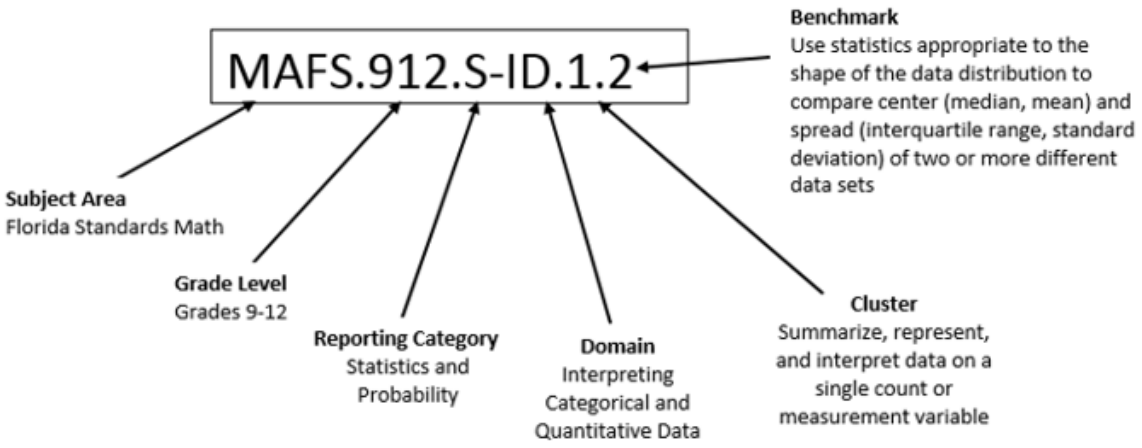
An example, from Agritechnology 1:



The image above describes the components of a Career and Technical Education Standard and Benchmark classification system.

Each MAFS benchmark is labeled with a system of letters and numbers.

- The four letters in the *first position* of the label identify the **Subject**.
- The number(s) in the *second position* represents the **Grade Level**.
- The letter(s) in the *third position* represents the **Category**.
- The number in the fourth position shows the **Domain**.
- The number in the *fifth position* identifies the **Cluster**.
- The number in the last position identifies the specific **Benchmark**.



The image above describes the components of a Florida Standard and Benchmark classification system.

Definitions of Benchmark Specifications

The *Individual Benchmark Specifications* provides standard-specific guidance for assessment item development for the Florida Department of Education Career and Technical Education item banks. For each benchmark assessed, the following information is provided.

Reporting Category	is a grouping of related benchmarks that can be used to summarize and report achievement.
Standard	refers to the standard statement presented in the Florida Standards.
Benchmark	refers to the benchmark statement presented in the Florida Standards. In some cases, two or more related benchmarks are grouped together because the assessment of one benchmark addresses another benchmark.
Item Types	are used to assess the benchmark or group of benchmark.
Cognitive Complexity	ideal level at which item should be assessed.
Benchmark Clarifications	explain how achievement of the benchmark will be demonstrated by students. In other words, the clarification statements explain what the student will do when responding to questions.
Content Limits	define the range of content knowledge and that should be assessed in the items for the benchmark.
Stimulus Attributes	define the types of stimulus materials that should be used in the items, including the appropriate use of graphic materials and item context or content.
Response Attributes	define the characteristics of the answers that a student must choose or provide.
Content Focus	addresses the broad key terms and concepts associated with the examples found in the standards, benchmarks, or benchmark clarifications.
Sample Items	are provided for each type of question assessed. The correct answer for all sample items is provided.

II. Individual Benchmark Specifications

Standard	6.0 Demonstrate an understanding of the role of society in the development and use of technology.
Benchmark	6.01Describe the development of technologies that has resulted from the demands, values, and interests of individuals, businesses, industries, and societies.
Item Types **(MC)-Multiple Choice** **(SA)-Short Answer** **(P)-Performance** **(ER)-Extended Response**	(MC)=X (SA)=X (P)= (ER)=
Cognitive Complexity Level	Low, Moderate
Benchmark Clarification	The student will understand how society impacts technology development.
Content Focus	Economy, values, global, community, needs, wants, culture, competition,
Content Limits	Items are limited to what influences technology development.
Stimulus Attributes	Worksheets, observations, hands on assignments, examples and non examples, simulations, role playing
Response Attributes	Documents, checklists, design briefs, project scope, feedback, performance rubrics, simulations, examples
Sample Item	Multiple Choice: The Space Race between the U.S. and Russia began in 1955 and ended with the U.S putting a man on the moon. This accomplishment led the U.S. and Russia to develop what technology together? a. 3D graphics b. International Space Station c. navigation systems d. satellites Correct answer: b

Standard	6.0 Demonstrate an understanding of the role of society in the development and use of technology.
Benchmark	6.02Describe changes in society and the creation of new needs and wants caused by the use of inventions and innovations.
Item Types **(MC)-Multiple Choice** **(SA)-Short Answer** **(P)-Performance** **(ER)-Extended Response**	(MC)=X (SA)=X (P)= (ER)=
Cognitive Complexity Level	Low
Benchmark Clarification	The student will understand how technology advances because of change.
Content Focus	Invention, innovation, changes, improvements, modernization, urbanization,
Content Limits	Items are limited to how innovations can be derived based on the needs and wants of society.
Stimulus Attributes	Worksheets, observations, hands on assignments, examples and non examples, simulations, role playing
Response Attributes	Documents, checklists, design briefs, project scope, feedback, performance rubrics, simulations, examples
Sample Item	Multiple Choice: Innovations have made our lives easier by updating technologies. What is one innovation we have that is common today that emerged from a previous technology? a. artificial intelligence b. digital camera c. fire d. household robots Correct answer: b

Standard	6.0 Demonstrate an understanding of the role of society in the development and use of technology.
Benchmark	6.03Describe social and cultural priorities and values that are reflected in technological devices.
Item Types **(MC)-Multiple Choice** **(SA)-Short Answer** **(P)-Performance** **(ER)-Extended Response**	(MC)=X (SA)=X (P)= (ER)=
Cognitive Complexity Level	Low
Benchmark Clarification	The student will understand how social and cultural values impact technological devices.
Content Focus	Social, cultural , values, acceptable, groundbreaking, ethical, morals,
Content Limits	Items are limited to how society and culture determine technology.
Stimulus Attributes	Worksheets, observations, hands on assignments, examples and non examples, simulations, role playing
Response Attributes	Documents, checklists, design briefs, project scope, feedback, performance rubrics, simulations, examples
Sample Item	Multiple Choice: What emerging technology could evoke controversial views based on cultures and values? a. alternative fuels b. cloning c. desalination plants d. high speed transportation Correct answer: b

Standard	8.0 Demonstrate an understanding of the attributes of design.
Benchmark	8.02Explain why there is no perfect design.
Item Types **(MC)-Multiple Choice** **(SA)-Short Answer** **(P)-Performance** **(ER)-Extended Response**	(MC)=X (SA)=X (P)= (ER)=
Cognitive Complexity Level	Low
Benchmark Clarification	The student will understand the design cycle.
Content Focus	Design cycle, factors, constraints, criteria, purpose, budget
Content Limits	Items are limited to the factors of design and why each design is unique.
Stimulus Attributes	Worksheets, observations, hands on assignments, examples and non examples, simulations, role playing
Response Attributes	Documents, checklists, design briefs, project scope, feedback, performance rubrics, simulations, examples
Sample Item	Multiple Choice: Sal is working for a very demanding advertising firm. They keep sending Sal's project back to him stating they are looking for the perfect design. Sal has explained there is no perfect design. What is NOT a factor that Sal used in his explanation? a. functional design and user experience b. materials, manufacturing methods and money c. packaging d. time Correct answer: d

Standard	8.0 Demonstrate an understanding of the attributes of design.
Benchmark	8.03Evaluate criteria and constraints that are requirements for a design.
Item Types **(MC)-Multiple Choice** **(SA)-Short Answer** **(P)-Performance** **(ER)-Extended Response**	(MC)=X (SA)=X (P)= (ER)=
Cognitive Complexity Level	Moderate
Benchmark Clarification	The student will understand how criteria and constraints are the basis for a design.
Content Focus	Requirements, criteria, constraints, restraints, standard, analysis, attempt, procedure
Content Limits	Items are limited to how to determine criteria and constraints of a design.
Stimulus Attributes	Worksheets, observations, hands on assignments, examples and non examples, simulations, role playing
Response Attributes	Documents, checklists, design briefs, project scope, feedback, performance rubrics, simulations, examples
Sample Item	Multiple Choice: Which factor is a criteria of a design? a. available resources b. limitations c. restrictions d. requirements Correct answer: a

Standard	10.0 Demonstrate an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.
Benchmark	10.01Use troubleshooting as a problem-solving method used to identify the cause of a malfunction in a technological system.
Item Types **(MC)-Multiple Choice** **(SA)-Short Answer** **(P)-Performance** **(ER)-Extended Response**	(MC)=X (SA)=X (P)= (ER)=
Cognitive Complexity Level	Low
Benchmark Clarification	The student will understand how to use troubleshooting as a tool to diagnose equipment problems.
Content Focus	Diagnose, troubleshoot, preventative maintenance, safety procedures, repair, tool usage
Content Limits	Items are limited to how to use problem solving skills to troubleshoot equipment.
Stimulus Attributes	Worksheets, observations, hands on assignments, examples and non examples, simulations, role playing
Response Attributes	Documents, checklists, design briefs, project scope, feedback, performance rubrics, simulations, examples
Sample Item	Multiple Choice: Your computer has lost the internet connection. After checking the cables, you find one unplugged. You have identified the problem and the probable cause. What is the next step in the troubleshooting process? a. document your actions b. establish a plan of action c. implement the solution d. test your theory Correct answer: c

Standard	10.0 Demonstrate an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.
Benchmark	10.02Describe invention as a process of turning ideas and imagination into devices and systems and innovation as the process of modifying an existing product or system to improve it.
Item Types **(MC)-Multiple Choice** **(SA)-Short Answer** **(P)-Performance** **(ER)-Extended Response**	(MC)=X (SA)=X (P)= (ER)=
Cognitive Complexity Level	Low
Benchmark Clarification	The student will understand the design process for creating an invention or innovation.
Content Focus	Design cycle, invention, innovation systems, imagination, creativity, problem solving
Content Limits	Items are limited to how to take an idea to a finished design.
Stimulus Attributes	Worksheets, observations, hands on assignments, examples and non examples, simulations, role playing
Response Attributes	Documents, checklists, design briefs, project scope, feedback, performance rubrics, simulations, examples
Sample Item	Multiple Choice: The first computer was the size of a room and consuming as much power as several hundred modern personal computers. Since then computers have continued to evolve to today's laptops and smartphones. What is one factor that contributed to these advances? a. business sense b. natural resources c. patience d. trial and error Correct answer: d

Standard	10.0 Demonstrate an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.
Benchmark	10.03Identify technological problems that are best solved through experimentation.
Item Types **(MC)-Multiple Choice** **(SA)-Short Answer** **(P)-Performance** **(ER)-Extended Response**	(MC)=X (SA)=X (P)= (ER)=
Cognitive Complexity Level	Low
Benchmark Clarification	The student will understand how trial and error helps solve problems.
Content Focus	Trial and error, problem solving, experimentation,
Content Limits	Items are limited to the benefit of trial and error in solving problems.
Stimulus Attributes	Worksheets, observations, hands on assignments, examples and non examples, simulations, role playing
Response Attributes	Documents, checklists, design briefs, project scope, feedback, performance rubrics, simulations, examples
Sample Item	Multiple Choice: You have been asked to design a device that will measure soda consumption at your school. Your first attempt failed to solve the problem. What would be your next step? a. envision the final design b. experiment with different variables c. redo the same design d. submit design Correct answer: b

Standard	11.0 Demonstrate the abilities to apply the design process.
Benchmark	11.02Specify criteria and constraints for the design.
Item Types **(MC)-Multiple Choice** **(SA)-Short Answer** **(P)-Performance** **(ER)-Extended Response**	(MC)=X (SA)=X (P)= (ER)=
Cognitive Complexity Level	Low
Benchmark Clarification	The student will understand what criteria and constraints are and how to create appropriate criteria and constraints.
Content Focus	Requirements, criteria, constraints, restraints, standard, analysis, attempt, procedure
Content Limits	Items are limited to how to define criteria and constraints for a design.
Stimulus Attributes	Worksheets, observations, hands on assignments, examples and non examples, simulations, role playing
Response Attributes	Documents, checklists, design briefs, project scope, feedback, performance rubrics, simulations, examples
Sample Item	Multiple Choice: You have been given a brochure to create for the intramurals department. You have determined when the project was due, the content and the audience? What other constraints should you know? a. how much do you get paid b. how many people read it c. the materials for the brochure d. the size of the brochure Correct answer: d

Standard	11.0 Demonstrate the abilities to apply the design process.
Benchmark	11.03Make two-dimensional and three-dimensional representations of the designed solution.
Item Types **(MC)-Multiple Choice** **(SA)-Short Answer** **(P)-Performance** **(ER)-Extended Response**	(MC)=X (SA)= (P)=X (ER)=
Cognitive Complexity Level	Moderate
Benchmark Clarification	The student will understand and create 2D and 3D models of a design.
Content Focus	2D, 3D, model, drawing, drafting, isometric, perspective, symbols, pictorial, orthographic
Content Limits	Items are limited to the difference between 2D and 3D drawings and be able to create them.
Stimulus Attributes	Worksheets, observations, hands on assignments, examples and non examples, simulations, role playing
Response Attributes	Documents, checklists, design briefs, project scope, feedback, performance rubrics, simulations, examples
Sample Item	Multiple Choice: What is NOT a type of three - dimensional drawings? a. isometric drawing b. oblique drawing c. orthographic drawing d. pictorial drawing Correct answer: d

Standard	11.0 Demonstrate the abilities to apply the design process.
Benchmark	11.04Test and evaluate the design in relation to pre-established requirements, such as criteria and constraints, and refine as needed.
Item Types **(MC)-Multiple Choice** **(SA)-Short Answer** **(P)-Performance** **(ER)-Extended Response**	(MC)=X (SA)= (P)=X (ER)=
Cognitive Complexity Level	Moderate
Benchmark Clarification	The student will understand how to review a design with pre existing criteria and constraints and adapt for the current project.
Content Focus	Requirements, criteria, constraints, test, results analysis, problem solve
Content Limits	Items are limited to review criteria and constraints and adapt and change for the current project.
Stimulus Attributes	Worksheets, observations, hands on assignments, examples and non examples, simulations, role playing
Response Attributes	Documents, checklists, design briefs, project scope, feedback, performance rubrics, simulations, examples
Sample Item	Multiple Choice: You have been given five materials and a set of measurements for a dragster. The goal of the project is to have the fastest time on the track. You have just completed creating the dragster and you were disqualified in the first test run. What should be your next step? a. change materials b. check the project's constraints c. determine how much time is left in the project d. start the project over Correct answer: b

Standard	12.0 Demonstrate the abilities to use and maintain technological products and systems.
Benchmark	12.02Use tools, materials, and machines safely to diagnose, adjust, and repair systems.
Item Types **(MC)-Multiple Choice** **(SA)-Short Answer** **(P)-Performance** **(ER)-Extended Response**	(MC)=X (SA)=X (P)= (ER)=
Cognitive Complexity Level	Low
Benchmark Clarification	The student will understand how to operate diagnose and fix equipment.
Content Focus	Diagnose, troubleshoot, preventative maintenance, safety procedures, repair, tool usage
Content Limits	Items are limited to how to use, troubleshoot and fix equipment.
Stimulus Attributes	Worksheets, observations, hands on assignments, examples and non examples, simulations, role playing
Response Attributes	Documents, checklists, design briefs, project scope, feedback, performance rubrics, simulations, examples
Sample Item	Multiple Choice: When using a word processing software the default font changes from Times New Roman to Wing Dings. Where would you change the default settings of the word processing program? a. control panel b. program files c. preferences d. spelling and grammar check Correct answer: c

Standard	19.0 Demonstrate an understanding of and be able to select and use manufacturing technologies.
Benchmark	19.01Classify manufactured goods as durable and nondurable.
Item Types **(MC)-Multiple Choice** **(SA)-Short Answer** **(P)-Performance** **(ER)-Extended Response**	(MC)=X (SA)=X (P)= (ER)=
Cognitive Complexity Level	Low
Benchmark Clarification	The student will understand and be able to determine the difference between durable and nondurable goods.
Content Focus	Durable goods, nondurable goods, consumption, time frame19.0 Demonstrate an understanding of and be able to select and use manufacturing technologies.
Content Limits	Items are limited to the difference between durable and nondurable goods.
Stimulus Attributes	Worksheets, observations, hands on assignments, examples and non examples, simulations, role playing
Response Attributes	Documents, checklists, design briefs, project scope, feedback, performance rubrics, simulations, examples
Sample Item	Multiple Choice: Your project is to create a kite to check the aerodynamics of shape and angles. You designed and built the kite from newspaper. After testing the kite, it fell apart. What should you have done to prevent it from falling apart? a. change the size of the kite b. create the kite from durable goods c. create the kite from non-durable goods d. fly it on a less windy day Correct answer: b

Standard	19.0 Demonstrate an understanding of and be able to select and use manufacturing technologies.
Benchmark	19.03Describe manufacturing technologies that are used to modify or alter manufactured products.
Item Types **(MC)-Multiple Choice** **(SA)-Short Answer** **(P)-Performance** **(ER)-Extended Response**	(MC)=X (SA)=X (P)= (ER)=
Cognitive Complexity Level	Low
Benchmark Clarification	The student will understand different manufacturing processes.
Content Focus	Manufacturing processes, modify, alter, molding, forging, casting, machining, additive technology, joining
Content Limits	Items are limited to different ways to make changes in the manufacturing process.
Stimulus Attributes	Worksheets, observations, hands on assignments, examples and non examples, simulations, role playing
Response Attributes	Documents, checklists, design briefs, project scope, feedback, performance rubrics, simulations, examples
Sample Item	Multiple Choice: An ice cube tray is what type of manufacturing process? a. combining b. forming c. joining d. machining Correct answer: b

Standard	21.0 Demonstrate proper and safe procedures while working with technological tools, apparatus, equipment, systems, and materials.
Benchmark	21.01Follow laboratory safety rules and procedures.
Item Types **(MC)-Multiple Choice** **(SA)-Short Answer** **(P)-Performance** **(ER)-Extended Response**	(MC)=X (SA)=X (P)= (ER)=
Cognitive Complexity Level	Low
Benchmark Clarification	The student will understand how to safely use the laboratory.
Content Focus	Safety, procedures, fire precautions, eye protection, flammable, clothes
Content Limits	Items are limited to how to use the laboratory rules safely.
Stimulus Attributes	Worksheets, observations, hands on assignments, examples and non examples, simulations, role playing
Response Attributes	Documents, checklists, design briefs, project scope, feedback, performance rubrics, simulations, examples
Sample Item	Multiple Choice: Whenever you work with corrosive chemicals or substances that can stain, what protective clothing should be worn? a. have a fire extinguisher next to the table b. open shoes or sandals c. read the MSDS thoroughly d. wear a lab apron or coat Correct answer: d

Standard	21.0 Demonstrate proper and safe procedures while working with technological tools, apparatus, equipment, systems, and materials.
Benchmark	21.02 Demonstrate good housekeeping at workstations within a total laboratory.
Item Types **(MC)-Multiple Choice** **(SA)-Short Answer** **(P)-Performance** **(ER)-Extended Response**	(MC)=X (SA)= (P)=X (ER)=
Cognitive Complexity Level	Moderate
Benchmark Clarification	The student will understand how to keep the laboratory clean.
Content Focus	Procedures, housekeeping, rules, chemicals, protective gear, sterilization, sanitize
Content Limits	Items are limited to the rules and procedures to keep the lab clean.
Stimulus Attributes	Worksheets, observations, hands on assignments, examples and non examples, simulations, role playing
Response Attributes	Documents, checklists, design briefs, project scope, feedback, performance rubrics, simulations, examples
Sample Item	Multiple Choice: When finished using goggles, what should you do with them? a. at the workstation b. in the sanitizer c. in your backpack d. in the closet Correct answer: b

Standard	21.0 Demonstrate proper and safe procedures while working with technological tools, apparatus, equipment, systems, and materials.
Benchmark	21.04 Identify tools, machines, materials and equipment and describe their functions.
Item Types **(MC)-Multiple Choice** **(SA)-Short Answer** **(P)-Performance** **(ER)-Extended Response**	(MC)=X (SA)=X (P)= (ER)=
Cognitive Complexity Level	Low
Benchmark Clarification	The student will understand tools, machines and materials and their uses.
Content Focus	Tools, machines, equipment
Content Limits	Items are limited to the functions of different tools,machines and materials
Stimulus Attributes	Worksheets, observations, hands on assignments, examples and non examples, simulations, role playing
Response Attributes	Documents, checklists, design briefs, project scope, feedback, performance rubrics, simulations, examples
Sample Item	Multiple Choice: What is a hand saw with short thin blade held by a bow-shaped frame used to cut irregular shapes in wood? a. coping saw b. crosscut saw c. hack saw d. rip saw Correct answer: a

Standard	21.0 Demonstrate proper and safe procedures while working with technological tools, apparatus, equipment, systems, and materials.
Benchmark	21.05 Select appropriate tools, machines, and equipment to accomplish a given task.
Item Types **(MC)-Multiple Choice** **(SA)-Short Answer** **(P)-Performance** **(ER)-Extended Response**	(MC)=X (SA)=X (P)= (ER)=
Cognitive Complexity Level	Low
Benchmark Clarification	The student will understand how to select the right tools for the project.
Content Focus	Tools, machines, equipment uses
Content Limits	Items are limited to the different uses of tools and how to choose the correct one for a project.
Stimulus Attributes	Worksheets, observations, hands on assignments, examples and non examples, simulations, role playing
Response Attributes	Documents, checklists, design briefs, project scope, feedback, performance rubrics, simulations, examples
Sample Item	Multiple Choice: You need to remove a screw that is in a board you need to cut. The screw has a two slots in the shape of a cross. What type of screwdriver should you use to remove the screws? a. flat blade b. phillips c. robinson d. socket Correct answer: b

Standard	21.0 Demonstrate proper and safe procedures while working with technological tools, apparatus, equipment, systems, and materials.
Benchmark	21.07Identify color-coding safety standards.
Item Types **(MC)-Multiple Choice** **(SA)-Short Answer** **(P)-Performance** **(ER)-Extended Response**	(MC)=X (SA)=X (P)= (ER)=
Cognitive Complexity Level	Low
Benchmark Clarification	The student will understand the industry color coding for safety.
Content Focus	Color codes, hazardous, protocols, precautions
Content Limits	Items are limited to the different colors mean in safety standards.
Stimulus Attributes	Worksheets, observations, hands on assignments, examples and non examples, simulations, role playing
Response Attributes	Documents, checklists, design briefs, project scope, feedback, performance rubrics, simulations, examples
Sample Item	Multiple Choice: There are four fire extinguishers in the classroom. They are red, blue, black and yellow. If there was an electrical fire in the classroom, what color fire extinguisher should you use? a. black b. blue c. red d. yellow Correct answer: b

Standard	21.0 Demonstrate proper and safe procedures while working with technological tools, apparatus, equipment, systems, and materials.
Benchmark	21.08 Explain fire prevention and safety precautions and practices for extinguishing fires.
Item Types **(MC)-Multiple Choice** **(SA)-Short Answer** **(P)-Performance** **(ER)-Extended Response**	(MC)=X (SA)=X (P)= (ER)=
Cognitive Complexity Level	Moderate
Benchmark Clarification	The student will understand fire safety protocols and practices.
Content Focus	Protocols, procedures, practices, sprinklers, smoke detectors, fire extinguishers, safety colors, flamable, combustible, class
Content Limits	Items are limited to how to prevent and put out fires.
Stimulus Attributes	Worksheets, observations, hands on assignments, examples and non examples, simulations, role playing
Response Attributes	Documents, checklists, design briefs, project scope, feedback, performance rubrics, simulations, examples
Sample Item	Multiple Choice: The plotter in Mr. Thompson's class caught on fire. After the fire department extinguished the fire, they looked for the a cause. Which of the following could be a cause for the fire? a. glass beakers sitting next to the plotter b. papers on the workstation c. power cord plugged into an extension cord plugged into a surge protector d. water on the floor Correct answer: c

Standard	21.0 Demonstrate proper and safe procedures while working with technological tools, apparatus, equipment, systems, and materials.
Benchmark	21.09 Identify harmful effects/potential dangers of familiar hazardous substances/devices to people and the environment.
Item Types **(MC)-Multiple Choice** **(SA)-Short Answer** **(P)-Performance** **(ER)-Extended Response**	(MC)=X (SA)=X (P)= (ER)=
Cognitive Complexity Level	Low
Benchmark Clarification	The student will understand what is hazardous and its effects on people and the environment.
Content Focus	Hazardous, symptoms, effects, dangers, environment, harmful,
Content Limits	Items are limited to how hazardous materials will affect people and the environment.
Stimulus Attributes	Worksheets, observations, hands on assignments, examples and non examples, simulations, role playing
Response Attributes	Documents, checklists, design briefs, project scope, feedback, performance rubrics, simulations, examples
Sample Item	Multiple Choice: Many of today's devices use rechargeable batteries. When disposing of a rechargeable battery, what is one component of the battery that causes an environmental concern? a. acid b. alkaline c. carbon d. zinc Correct answer: a

Standard	28.0 Identify evolving technologies of production systems.
Benchmark	28.01List evolving technologies of manufacturing and construction industries.
Item Types **(MC)-Multiple Choice** **(SA)-Short Answer** **(P)-Performance** **(ER)-Extended Response**	(MC)=X (SA)=X (P)= (ER)=
Cognitive Complexity Level	Low
Benchmark Clarification	The student will understand the emerging technologies in manufacturing and their impact.
Content Focus	Emerging technology, manufacturing, affects, economic, social, job creation or reduction, political, environmental, consumer
Content Limits	Items are limited to the different emerging technologies in manufacturing and how they will affect the process.
Stimulus Attributes	Worksheets, observations, hands on assignments, examples and non examples, simulations, role playing
Response Attributes	Documents, checklists, design briefs, project scope, feedback, performance rubrics, simulations, examples
Sample Item	Multiple Choice: What emerging technology in manufacturing allows rapid prototyping and for the production of custom parts? a. 3D printing b. biometrics c. nanotechnology d. plotter Correct answer: a

Standard	30.0 Express knowledge of factors that impact manufacturing technology and practices.
Benchmark	30.01 Explain economic factors that impact on manufacturing technology.
Item Types **(MC)-Multiple Choice** **(SA)-Short Answer** **(P)-Performance** **(ER)-Extended Response**	(MC)=X (SA)=X (P)= (ER)=
Cognitive Complexity Level	Low
Benchmark Clarification	The student will understand what factors in the economy impacts the manufacturing industry.
Content Focus	Economy, values, global, community, needs, wants, culture, competition, impact, recession,
Content Limits	Items are limited to how the economy impacts manufacturing technology.
Stimulus Attributes	Worksheets, observations, hands on assignments, examples and non examples, simulations, role playing
Response Attributes	Documents, checklists, design briefs, project scope, feedback, performance rubrics, simulations, examples
Sample Item	Multiple Choice: When the economy is in an upswing and doing well, traditionally manufacturing output increases. What is one factor that causes this increase? a. government gives more money to manufacturing companies b. money spent on developing technologies decreases c. more jobs producing the materials needed to make the product d. sales decrease Correct answer: c

Standard	30.0 Express knowledge of factors that impact manufacturing technology and practices.
Benchmark	30.05Define the terms "organized labor" and "collective bargaining."
Item Types **(MC)-Multiple Choice** **(SA)-Short Answer** **(P)-Performance** **(ER)-Extended Response**	(MC)=X (SA)=X (P)= (ER)=
Cognitive Complexity Level	Low
Benchmark Clarification	The student will understand the meaning of organized labor and collective bargaining
Content Focus	Organized labor, collective bargaining, labor unions, association, council, negotiation, agreement, regulate, working conditions
Content Limits	Items are limited to what organized labor and collective bargaining is.
Stimulus Attributes	Worksheets, observations, hands on assignments, examples and non examples, simulations, role playing
Response Attributes	Documents, checklists, design briefs, project scope, feedback, performance rubrics, simulations, examples
Sample Item	Multiple Choice: What is NOT a term of employment that a collective bargaining agreement would cover? a. benefits b. unit sales price c. wages d. work condition Correct answer: b