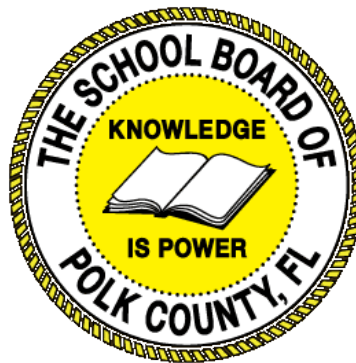


Individual Test Item Specifications

8401020- Technical Design 2

2015



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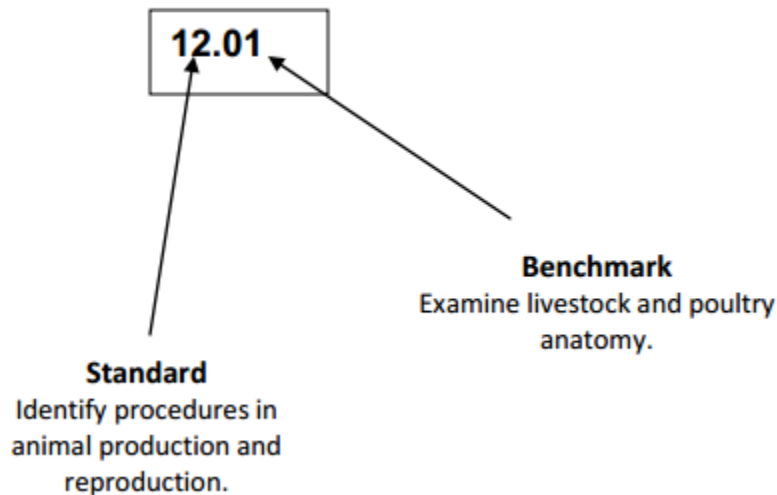
I. Guide to the Individual Benchmark Specifications

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.

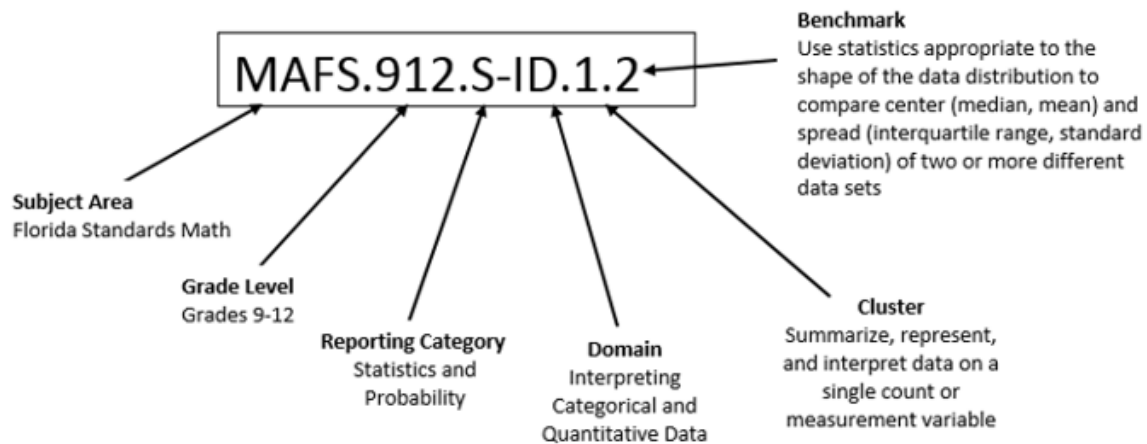
An example, from Agritechnology 1:



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	30.0 Demonstrate an understanding of the various approaches used in problem solving–The student will be able to:
Benchmark	30.01 Employ research and development processes to assess the functional, economic, and ethical viability of a product or prototype.
Item Types (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)=X (P)= (ER)=
Cognitive Complexity Level	Medium
Benchmark Clarification	The student will understand the steps necessary to determine the viability of a product.
Content Focus	Concept development, product development, want, need, purpose, audience,
Content Limits	Items are limited to how to determine if a product would be successful.
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 method of determining economic viability of a product? a. cost-benefit analysis b. cost-effectiveness analysis c. efficiency analysis d. weighted scale Correct answer: d

Standard	30.0 Demonstrate an understanding of the various approaches used in problem solving–The student will be able to:
Benchmark	30.02 Research a problem and determine the most appropriate problem solving method to employ.
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 problem solving methods and how to choose the best one for the project.
Content Focus	Problem solving, outcome, abstraction, analog, brainstorming, hypothesis, divide and conquer, lateral thinking, trial and error
Content Limits	Items are limited to how to apply different problem solving strategies based on the need of the 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: What is the approach to problem solving that uses methods that do not seem logical at first? a. divide and conquer b. hypothesis c. lateral thinking d. trial and error Correct answer: c

Standard	30.0 Demonstrate an understanding of the various approaches used in problem solving–The student will be able to:
Benchmark	30.03 Determine whether the solution to a specific problem is technology based.
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 the best method for solving problems and whether or not it is technology based.
Content Focus	Problem solving, outcome, abstraction, analog, brainstorming, hypothesis, divide and conquer, lateral thinking, trial and error
Content Limits	Items are limited to how to determine what method is best for solving the 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 are consulting with a machine shop to determine why the total output of products has decreased in the past three months. Where should you start looking for answers? a. check the maintenance schedule b. interview employees c. production logs d. survey customers Correct answer: c

Standard	30.0 Demonstrate an understanding of the various approaches used in problem solving–The student will be able to:
Benchmark	30.04 Utilize a multidisciplinary approach to solving technological problems.
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 different methods from different areas when solving technological problems.
Content Focus	Multidisciplinary, background knowledge, redefine problems, boundaries, complex situations
Content Limits	Items are limited to how to use different types of background knowledge to solve technological 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 are having difficulty in coming up with a design for a medical device. You have spoken to the technical designers in your field but you are still stalled on an idea. Who would be a good person to ask for help? a. aeronautical engineer b. banker c. drafter d. EMT Correct answer: d

Standard	31.0 Demonstrate abilities to apply the design process–The student will be able to:
Benchmark	31.01 Determine whether an illustrative design problem is worthy of being resolved or addressed.
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 to determine if solving a design problem should be attempted.
Content Focus	Design process, viable, vector, creative brief, expectations, creative thinking, Logo, branding, web, fashion, album, apparel, book covers, and advertising.
Content Limits	Items are limited to how to determine if solving a design problem is viable.
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 the primary difference between graphic design and illustration? a. graphic design uses structure and illustration uses drawing b. graphic design uses drawing and illustration uses structure c. graphic design is creating technical blueprints and illustration is coding and detail-oriented work d. graphic design is coding and detail-oriented work and illustration is creating technical blueprints Correct answer: a

Standard	31.0 Demonstrate abilities to apply the design process–The student will be able to:
Benchmark	31.02 Identify the criteria and constraints associated with an illustrative design problem and select the most appropriate solution based on these factors.
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 concept of criteria and constraints and select the best design using these factors.
Content Focus	Criteria, constraints, efficiency, relationship, tradeoffs, goals, requirements, materials, cost, safety, reliability, performance, maintenance, ease of use, aesthetics, policies, Life Cycle Analysis
Content Limits	Items are limited to how to select the best design based on the project's criteria and constraints.
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 client wants a casual look to the t-shirt design you are working on. They want it to have an illusive fairy tale quality. What would be an appropriate method to accomplish the client's requirements? a. computerized graphic design b. illustration c. manga style d. portrait photography Correct answer: b

Standard	31.0 Demonstrate abilities to apply the design process–The student will be able to:
Benchmark	31.03 Evaluate the quality, efficiency, and productivity of an existing or proposed design and refine the design accordingly.
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 the factors to determine the validity of a design and make any needed changes.
Content Focus	Quality, efficiency, productivity, design, purpose, sustainability, budget,
Content Limits	Items are limited to how to make changes to a design based on analyzing if the design is valid.
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 measure of efficiency in technical design? a. collaboration b. portfolio size c. project workflow d. sales Correct answer: a

Standard	31.0 Demonstrate abilities to apply the design process–The student will be able to:
Benchmark	31.04 Evaluate an existing design using conceptual, physical, and mathematical models and note aspects for improvement.
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 scientific knowledge and mathematical applications to evaluate designs and suggest improvements.
Content Focus	Scientific knowledge, mathematical applications, conceptual models, physical models, mathematical models, design considerations,
Content Limits	Items are limited to how to use conceptual, physical, and mathematical models to evaluate design and make changes.
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 one purpose of a conceptual model in design? a. enhance the chance for success b. enhance the understanding of the concept c. to determine the scale d. to determine the logic of the concept Correct answer: b

Standard	33.0 Create a reverse engineered drawing (as built) from a solid object–The student will be able to:
Benchmark	33.01 Identify and apply advanced measuring tools and techniques.
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 different types of measuring tools and the best method to use them.
Content Focus	Rulers, scales, calipers, and micrometers, customary, metric, GPS,
Content Limits	Items are limited to how to use advanced measuring tools.
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 measurement tool is used to check the variation in tolerance during the inspection process? a. dial caliper gages b. dial indicators c. digital indicators d. height gages Correct answer: a

Standard	35.0 Demonstrate proficiency in using presentation software–The student will be able to:
Benchmark	35.01 Describe presentation software and the ways in which it may be used.
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 different ways presentation software can be used.
Content Focus	Presentation, prezi, powerpoint, movie, direct, remote,
Content Limits	Items are limited to how to use presentation software in different ways.
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: Most presentation software has the ability to remotely present the presentation by sending a link to your audience. What is this feature called? a. broadcast slide show b. publish slide show c. share slideshow d. simulcast slideshow Correct answer: a