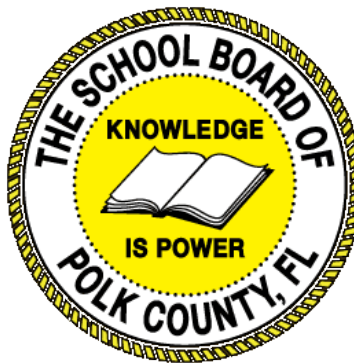


Individual Test Item Specifications

8401030- Technical Design 3

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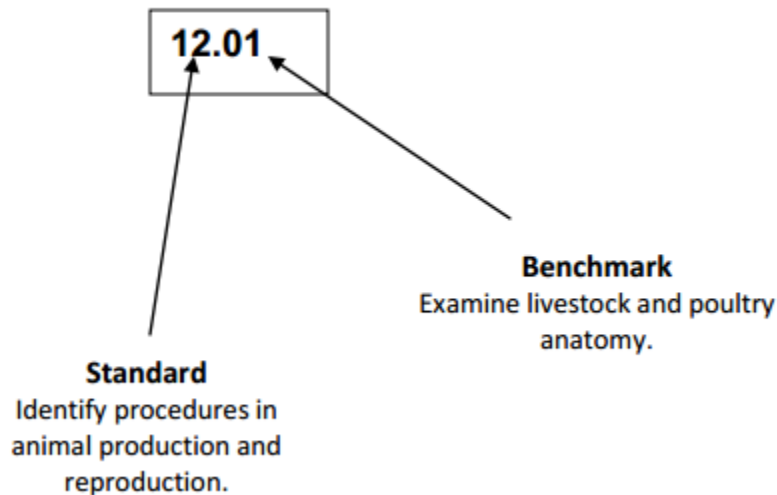
I. Guide to the Individual Benchmark Specifications

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.

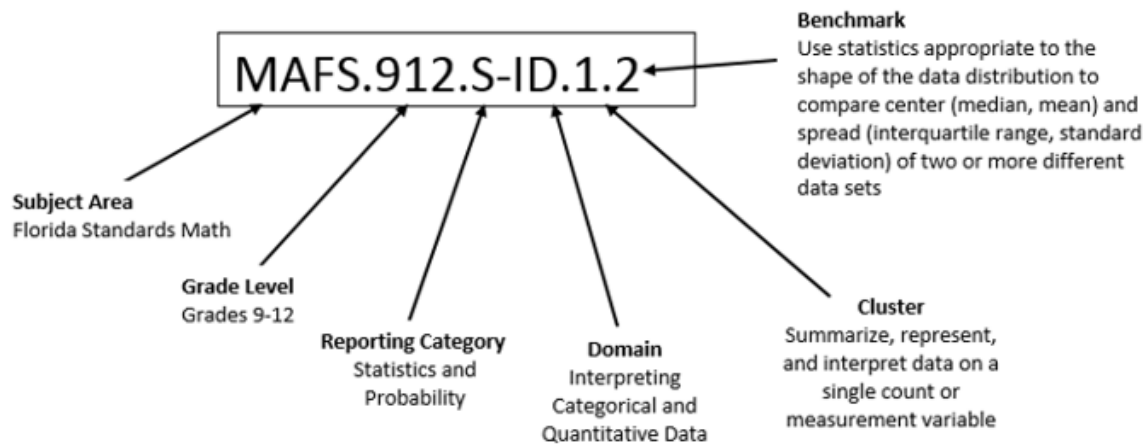
An example, from Agritechnology 1:



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	defines the content measured by each test item. 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	43.0 Demonstrate an understanding of the cultural, social, economic, and political effects of technology–The student will be able to:
Benchmark	43.01 Discuss changes caused by the use of technology ranging from gradual to rapid and from subtle to obvious.
Item Types (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=43.0 Demonstrate an understanding of the cultural, social, economic, and political effects of technology–The student will be able to: (SA)=X (P)= (ER)=
Cognitive Complexity Level	Moderate
Benchmark Clarification	The student will understand the evolution of technology.
Content Focus	Inventions, innovations, changes, advancement, breakthrough, emerging
Content Limits	Items will be limited to how technology has changed.
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 technology is obsolete since the invention of the smartphone? a. cordless phones b. open source c. payphone d. wifi Correct answer: c

Standard	44.0 Demonstrate the abilities to use and maintain technological products and systems–The student will be able to:
Benchmark	44.01 Document processes and procedures and communicate them to different audiences using appropriate oral and written 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 how to communicate with different audiences.
Content Focus	audience, oral, written, verbal, goal, outcomes, rationale, interpersonal, memos, briefs, summary
Content Limits	Items will be limited to how to communicate both verbally and written with different types of clients.
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: Why is oral communication considered more effective than written communication? a. can be archived b. decreases the risk of miscommunication c. it is verifiable d. more consistent Correct answer: b

Standard	44.0 Demonstrate the abilities to use and maintain technological products and systems–The student will be able to:
Benchmark	44.02 Diagnose a system that is malfunctioning and use tools, materials, machines, and knowledge to repair it.
Item Types (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)= (P)=X (ER)=
Cognitive Complexity Level	44.0 Demonstrate the abilities to use and maintain technological products and systems–The student will be able to:
Benchmark Clarification	The student will understand how to troubleshoot and repair equipment.
Content Focus	Diagnose, troubleshoot, malfunctioning, equipment, repairs,
Content Limits	Items will be limited to how to diagnose and fix machines and 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: Sally is having problems with her laptop. She needs to determine if the problem is related to hardware or software. Which of the following is one of the most important questions to ask? a. How big is the hard drive? b. Have you recently installed any new hardware or software? c. Is there a conflict with the modem? d. Is there power? Correct answer: b

Standard	44.0 Demonstrate the abilities to use and maintain technological products and systems–The student will be able to:
Benchmark	44.03 Troubleshoot, analyze, and maintain systems to ensure safe and proper function and precision.
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 equipment maintenance and operation of equipment.
Content Focus	Troubleshoot, analyze, maintenance,
Content Limits	Items will be limited to how to maintain and operate 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 is running slow, you decide that rearranging the files that are stored on a disk in order to enable faster retrieval of the data. What command should you run? a. activate BIOS b. back up and restore c. defragment of the hard drive d. run virus protection Correct answer: c

Standard	44.0 Demonstrate the abilities to use and maintain technological products and systems–The student will be able to:
Benchmark	44.05 Use computers and calculators to access, retrieve, organize process, maintain, interpret, and evaluate data and information in order to communicate.
Item Types (MC)-Multiple Choice (SA)-Short Answer (P)-Performance (ER)-Extended Response	(MC)=X (SA)= (P)=X (ER)=
Cognitive Complexity Level	Low
Benchmark Clarification	The student will understand how to manipulate data and information.
Content Focus	Data, qualitative, quantitative, database, data analysis, range, mean, median, mode, frequency
Content Limits	Items will be limited to how to find, use and evaluate data to communicate.
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 a database and a spreadsheet? a. database stores data in cells and a spreadsheet stores data in tables b. database stores data in tables and a spreadsheet stores data in cells c. database data are stored in records and spreadsheet data has data relationships d. database data has data relationships and spreadsheet data is stored in records Correct answer: b

Standard	45.0 Demonstrate the abilities to assess the impact of products and systems–The student will be able to:
Benchmark	45.01 Collect information and evaluate its quality.
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 collect data and test for validity.
Content Focus	Reliability, validity, factor analysis, face validity, criterion validity, source, methods of collection
Content Limits	Items will be limited to how to find data and determine its accuracy.
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 team was given the results to a market analysis on a new project. The analysis shows a low interest level. The analysis was done by the marketing department. What is one clarifying question that your team should ask to determine the validity of the results? a. How much the project has cost to date? b. How much did the analysis cost? c. Who was responsible for the research? d. Who was surveyed for the analysis? Correct answer: d

Standard	45.0 Demonstrate the abilities to assess the impact of products and systems–The student will be able to:
Benchmark	45.03 Apply assessment techniques, such as trend analysis and experimentation to make decisions about the future development of technology.
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 use tools to determine the visibility of a project.
Content Focus	Trend analysis, experiment, market research, analysis, viability,
Content Limits	Items will be limited to how to use industry tools such as trend analysis to determine the marketability of an invention or innovation in 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 is a technical analysis of financial position over time called? a. audit b. financial statement c. market analysis d. market trends Correct answer: b

Standard	47.0 Demonstrate and present a research and design project–The student will be able to:
Benchmark	47.01 Identify and research a design problem related to one of the following technologies (medical, GIS, agriculture, energy & power, information & communication, transportation, manufacturing, and construction).
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 design factors for different fields.
Content Focus	Medical, GIS, agriculture, energy & power, information & communication, transportation, manufacturing, construction
Content Limits	Items will be limited to how to determine what industry a design is used for.
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: Making maps that contain more data and analysis features could be an emerging technology in which field? a. agriculture b. GIS c. manufacturing d. medical Correct answer: b

Standard	47.0 Demonstrate and present a research and design project–The student will be able to:
Benchmark	47.02 Identify criteria and constraints.
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 criteria and constraints of design.
Content Focus	Criteria, constraints, budget, goals, factors, problem solving, restrictions, parameters
Content Limits	Items will be limited to how to determine criteria and constraints in 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: What is a customer's budget for completing a project called? a. constraint b. criteria c. interval d. scope Correct answer: a

Standard	48.0 Demonstrate an understanding of career opportunities and requirements in the field of drafting/illustrative design technology–The student will be able to:
Benchmark	48.01 Discuss individual interests related to a career in drafting/illustrative design technology.
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 careers in drafting and illustration technology.
Content Focus	Drafting, illustration, job skills, soft skills, interests, characteristics
Content Limits	Items will be limited to the responsibilities and job functions in drafting and illustration 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: What is NOT a characteristic of an illustrator? a. detail oriented b. independent c. originality d. physical strength Correct answer: d

Standard	48.0 Demonstrate an understanding of career opportunities and requirements in the field of drafting/illustrative design technology–The student will be able to:
Benchmark	48.02 Explore career opportunities related to a career in drafting/illustrative design 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 the methods of finding career opportunities in drafting/illustrative design technology.
Content Focus	Job hunt, career, opportunities, job readiness, qualifications, resume
Content Limits	Items will be limited to how to research career opportunities in drafting/illustrative design 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: Sending resumes online is a common practice. What file extension format is used to send your resume online correctly? a. .aiff b. .mov c. .psd d. .txt Correct answer: d

Standard	48.0 Demonstrate an understanding of career opportunities and requirements in the field of drafting/illustrative design technology–The student will be able to:
Benchmark	48.04 Conduct a job search.
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 steps to conduct a job search.
Content Focus	Social media, job boards, resume, plan, distribution, campaign,
Content Limits	Items will be limited to how to administer a job search.
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 looking for a job, what is an event that is organized for employers to meet with job seekers called? a. career fair b. guidance counselor c. interview d. temporary agency Correct answer: a

Standard	48.0 Demonstrate an understanding of career opportunities and requirements in the field of drafting/illustrative design technology–The student will be able to:
Benchmark	48.05 Complete a job application form correctly.
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 fill out a job application.
Content Focus	Job application, resume, references,48.0 Demonstrate an understanding of career opportunities and requirements in the field of drafting/illustrative design technology–The student will be able to:
Content Limits	Items will be limited to how to complete a job application.
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 completing a job application, what question is illegal? a. address b. family references c. previous salary d. religion Correct answer: d

Standard	48.0 Demonstrate an understanding of career opportunities and requirements in the field of drafting/illustrative design technology–The student will be able to:
Benchmark	48.06 Demonstrate competence in job interview 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 effective interview performance.
Content Focus	Interview, question, work ethic, supervisory style, dress code, resume,
Content Limits	Items will be limited to how to effectively interview for a job.
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: In a job interview when you are asked, "Tell me about yourself." What should you answer? a. Give examples of your qualifications b. Give examples of your strongest personal qualities and achievements. c. Restate your objective d. Talk about your interests and hobbies. Correct answer: b

Standard	49.0 Demonstrate familiarity with techniques associated with digital photo realism– The student will be able to:
Benchmark	49.01 Describe digital photo realism and its role in technical 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 photo realism is and how it is used in technical design.
Content Focus	Photo realism, genre, painting photograph, camera, pop art, abstract, expressionism, minimalism
Content Limits	Items will be limited to how to use photorealism in technical 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: What is primarily an American movement in painting that replicates what the camera captures? a. abstract expressionism b. minimalist art c. photorealism d. pop art Correct answer: c

Standard	49.0 Demonstrate familiarity with techniques associated with digital photo realism– The student will be able to:
Benchmark	49.02 Describe techniques that infuse photorealism into 3D drawings (e.g., beveling, gamma corrections, photometric lighting, depth of field, chromatic aberration, specular maps, texturing, and asymmetry).
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 photorealism is used in 3d drawings.
Content Focus	Beveling, gamma corrections, photometric lighting, depth of field, chromatic aberration, specular maps, texturing, and asymmetry
Content Limits	Items will be limited to how different 3D techniques enhance photo realism in technical drawing.
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: In 3D drawing what texture mapping method allows parts of an object to have an effect, possibly in the form of a shape. a. asymmetry map b. diffuse map c. opacity map d. specular effect Correct answer: d

Standard	51.0 Prepare and present a design portfolio–The student will be able to:
Benchmark	51.01 Select appropriate items for showcasing in a design portfolio.
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 appropriate items for a portfolio based on the job interview.
Content Focus	Portfolio, job requirements, types of drawings, styles,
Content Limits	Items will be limited to the best items to include in a portfolio.
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 applying for a job with a construction company as a draftsman and designer. What type of items should not be included in your portfolio? a. blueprints b. graphic designs c. oil paintings d. photographs Correct answer: c

Standard	51.0 Prepare and present a design portfolio–The student will be able to:
Benchmark	51.02 Modify/adjust a design portfolio to accommodate additional exemplars.
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 modify a portfolio for a job interview.
Content Focus	Portfolio, job requirements, types of drawings, styles,
Content Limits	Items will be limited to how to change items in a portfolio based on the job requirements.
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 called back for a second interview. During the first interview, you were asked several questions about marketing campaigns. What should you add to your portfolio for the second interview? a. brochures b. resumes c. watercolors d. sketches Correct answer: a