

Test Item Developer's Guide

The CET tests use multiple-choice items to evaluate the attainment of all types of learning objectives, from the simplest recall of knowledge through comprehension, application, analysis, synthesis, and evaluation. We strive to assess the candidate's

- knowledge and understanding of instructional methods for adult learners (the Instructional Technology test),
- knowledge and understanding of environmental issues and regulations (the technical specialty area tests), and
- ability to problem-solve in training and in the specialty areas.

This requires that we carefully develop the test items and the design of the entire credentialing examination.

You, the item writer, are critical to this process. Without many *good* test items, it is impossible to have a reliable examination. To provide good items, you must be familiar with, and use, the Test Need-to-Know Outline(s) for the specialty area(s), for which you intend to write items. This will allow you to prepare each question stem and its correct answer accurately, clearly, and succinctly, as well as devise plausible (but incorrect) options to serve as distracters.

ITEM CONTENT

The Test Need-to-Know Outlines define the content that each test is designed to cover. It also provides the relative emphasis of each topic within the entire outline. To write your item, select a topic from the outline and consider what an instructor in this area *should* know. Ideas for items may come from many different sources. Your own experience will suggest problems and situations which can form the basis for items.

You may recall functions, roles, concepts, and abilities that are essential components of the knowledge needed to do a particular job. Items should be written to determine whether candidates know what should be done. Sources of inspiration may include situations in which a less-than-competent person could cause harm, or where an improper sequence or lack of knowledge could lead to an undesirable outcome.

Reading materials, both texts and references, can also suggest topics for items, but it is important to keep in mind that the best items rarely measure rote memory. We want to evaluate an examinee's ability to apply principles and demonstrate insights and understanding. Sentences

taken directly from printed materials rarely make good test items; at a minimum, they should be re-phrased.

Remember, easy questions are needed, too. Don't feel that every item you write is directed toward a highly experienced expert. Try to vary the relative level of difficulty, even within a single topic area.

A series of questions based on a single scenario is also a good approach for item writing. Your challenge is to develop a scenario, then write a number of separate items which will probe the examinee's ability to apply necessary knowledge to solve a problem in the situation. You may use pictures or graphics in setting up your scenario.

ITEM STRUCTURE

Each multiple-choice item is composed of a stem followed by four OPTIONS, one correct option and three distracters. The stem of a multiple-choice item may be presented in question form or as an incomplete statement. Here are examples of each type:

STEM: Where can the proper shipping name of a hazardous waste be found?

- | | |
|----------------|---|
| Correct Option | *1. In the DOT Hazardous Materials Table. |
| Distracter | 2. On material safety data sheets. |
| Distracter | 3. In a chemical dictionary. |
| Distracter | 4. By knowing the manufacturing process. |

Or

STEM: The proper shipping name of a hazardous waste can be found

- | | |
|----------------|---|
| Correct Option | *1. in the DOT Hazardous Materials Table. |
| Distracter | 2. on material safety data sheets. |
| Distracter | 3. in a chemical dictionary. |
| Distracter | 4. by knowing the manufacturing process. |

A Good Item Stem:

- Presents a problem situation clearly. Knowledgeable candidates should be able to look at the stem and produce the desired response before referring to the

option.

- Is stated positively rather than negatively. When an item requires the examinee to know what NOT to do in a situation, the negative term (**NOT, EXCEPT, LEAST, CONTRAINDICATED**) should be capitalized and presented in bold face or underlined to call attention to it.
- Avoids pronouns (it, he, she, and you) to avoid confusion about the referent.
- Is presented as simply as possible, including only information that is necessary to understand the problem.
- Includes all words that would have to be repeated in each option.
- Specifies the authority or standard upon which the correct option is based.
- Poses a problem for which the correct answer is not likely to change over time.
- Focuses on important learning objectives and avoids testing trivia.

Good Options:

- Use correct options that are unquestionably correct and distracters that are unquestionably wrong.
- Contain four options that are grammatically related to the stem. If the stem asks a question, each of the four options provides a plausible answer to the question. If the stem is an incomplete statement, each option serves to complete the statement. Punctuation is appropriate to the grammatical structure of the item.
- Have similar structure, content, and length. This will naturally follow if the stem has clearly defined a question or problem.
- Distracters include any key words that appear in the stem and in the correct option.
- The correct answer includes no incorrect information which might force examinees to choose between ignoring the incorrect information and selecting some other option.
- Avoid "None of the above" and "All of the above," except when the content of the item demands such synthesis skills.

USING THE ITEM DESIGN FORM

- To ensure proper credit for each new item you submit, please type or print your name, e-mail, and date on each form, and on added pages to the form, if needed.
- Type or print each item on a copy of the Item Design Form. Make as many copies of this form as you need.
- Submit the forms by mail to:

CET BOC
P.O. Box 10321
Phoenix, AZ 85064-0321

- Submit the forms by fax to: 602-956-6399
- Submit on-line at:
<http://cet-certification.org/Forms/ItemForm.htm>

Coding or "tagging" Items

- You must code or "tag" each item you write, to link it specifically to a single section of the Need-to-Know Outline for which it is written. On the attached form, this code is written in the boxes "Need-to-Know Outline" and "Need-to-Know Paragraph, subparagraph, etc." In the first box, write in the initials for the Need-to-Know Outline (ER, IT, MTHMW, or OSH), for which you are writing the item. In the second box, write in:
 - a roman numeral to identify the NTK paragraph.
 - a capital letter to identify the NTK subparagraph to which the item relates. (Note: In a very few cases, there are no subcategories under a roman numeral. Only in this case is the roman numeral used without a letter.)

Example

The tag for an item submitted for the following ***bolded/italicized*** section from the IT Need-to-Know Outline...

II. Assess individual, group or organizational needs (15%)

- A. Develop and/or apply organizational assessment tools.
 1. Analyze and interpret data effectively.
 2. Prepare concise and meaningful data analysis summary reports for management.
- B. ***Assess organizational and client needs.***
 1. Analyze problems.
 2. ***Distinguish between training and other needs.***
 3. Select and implement training needs assessment methodologies.
 4. Match training program to goals and objectives of the organization/client by prioritizing needs, conducting cost/benefit analysis, and preparing and presenting recommendations."

would be properly coded as "IT II.B.2."

- a number, where these are used to further break down a subparagraph in the NTK.
- An item can have **only one code**, even if the question could possibly be linked to more than one NTK paragraph or subparagraph. Choose the one that seems to be the best fit for the item.
- In writing items, the correct option is **always** Option 1, and an asterisk **must** be placed to the left of the number to visibly confirm that it is the correct option.
- Write a brief explanation, if needed, for the correct response and for the type of mistake represented in each of the distracters.
- If you create a scenario on which two or more items are based, give the scenario a distinct, descriptive name and write it on a separate sheet. Then, refer to the scenario by name in the space provided on the Item Design Form.

Reference Citations

- All items submitted must have a single reference to a specific, authoritative, and publicly available citation for the source of the correct answer to the questions stem.
- An acceptable reference citation must include the following elements:
 - if the reference is a federal regulation, national standard, etc., it should be as specific as needed to precisely and quickly identify an exact, single source for the correct answer.
 - only items that are **very** general in nature may use a general reference, e.g. "29 CFR 1910.120."
 - when the correct answer is found buried within the regulation or standard, the reference must be to the specific section, paragraph, and perhaps subparagraph of the regulation or standard, e.g. "29 CFR 1910.120(q)(2)."
 - if the reference is a publication or guide, include the chapter or other identifying information which provides a single, exact source for the correct answer. As with regulations and standards, very general questions may require only a general reference to the publication or guide.
 - secondary sources, such as organizational policies, institutional operating procedures, proprietary training guides or materials, etc., generally **should not** be used. Instead, use the primary source which provides the basis for the organization's document.
 - only in the case of a very general stem and correct answer (e.g., "What U.S. government organization is responsible for worker safety?") is a simple reference to an agency or office

(OSHA, NIOSH, NFPA, IAFF, etc.) an appropriate source.

- a single source, only, may be used for any given correct answer, even if several possible and authoritative references exist. Choose the one that best fits the situation.

Test Item Design Form

Date: January 25, 2006

Name: John J. Trainer, CET

e-Mail address: jjt@mycompany.com

Need-to-Know Outline

MTHWM

Need-to-Know Paragraph, subparagraph, etc.

III.J.1.

Stem

Where can the proper shipping name of a hazardous waste be found?

Example of a Correctly Completed Form

Refer to Scenario: 06

Correct Option

Option *1. Explain:	In the DOT Hazardous Materials Table.
Option 2. Explain:	On Materials Safety Data sheets.
Option 3. Explain:	In a chemical dictionary.
Option 4. Explain:	On DOT Form F 5800.

Reference Notes: DOT 49 CFR 172.101 lists in the Hazardous Materials Table the name that most accurately describes the waste to be shipped.

Test Item Design Form

Date: _____

Name: _____

e-Mail address: _____

Need-to-Know Outline

Need-to-Know Paragraph, subparagraph, etc.

Stem

Refer to Scenario:

**Correct
Option**

Option *1. Explain:	
Option 2. Explain:	
Option 3. Explain:	
Option 4. Explain	

Reference Notes: