

A Guide to Preparing Multiple Choice Items

Introduction

The most commonly used type of test item in admissions, certification, and licensure examinations is the multiple choice item. The purpose of this guide is to assist test developers and representatives of professional associations in becoming more skilled in writing multiple choice test items. Preparing multiple choice items may appear on the surface to be a relatively simple task, given familiarity with the subject matter. However, experienced test authors find that this task actually requires a great deal of skill, patience, and creativity.

In the sections that follow, general knowledge is used as the content of the examples, in order to facilitate understanding of the principles by professionals from diverse content areas. The skills needed for writing quality items are similar regardless of content discipline.

Like any other skill, multiple choice item writing requires a significant amount of painstaking practice with appropriate feedback. It is essential that you try out your multiple choice items on others. This process will help you to uncover ambiguities in wording and unintended violations of item writing principles. Feedback from others will greatly enhance your item writing quality and productivity.

Parts of the Multiple Choice Item

All multiple choice items consist of two basic parts: the stem and the responses. The **stem** is the introductory statement or question that elicits the correct answer. The **responses** are suggested answers which complete the statement or answer the question asked in the stem, only one of which is the correct answer. In the examples that follow, four responses (i.e., 1 correct response and 3 incorrect responses) are presented. *The certified archivist examination uses items with four responses.*

STEM Who is the scientist most closely associated with the discovery of polio vaccine?

RESPONSES: a. Jonas Salk
 b. Louis Pasteur
 c. Edward Jenner
 d. Robert Koch

In the example above, of the four responses, the three incorrect responses are called **distracters**, and the correct response is called the **answer**. One of the key elements in multiple choice item writing is to be able to write high-quality distracters that effectively discriminate those who have mastered the material being assessed from those who have not.

Item stems can be written in the form of an incomplete statement, as well as in question form. Thus, the item above could be modified as follows:

The polio vaccine was discovered by:
a. Jonas Salk.
b. Louis Pasteur.
c. Edward Jenner.
d. Robert Koch.

Note that the responses for this item are followed by a period, as the response serves to complete a sentence.

It is wise to draft an item first as a direct question; then revise it to an incomplete sentence if this offers a smoother, less repetitive wording.

Correct- vs. Best-Answer Items

It is important for test item writers to keep in mind the distinction between items in which only one response is correct, and items in which more than one response may be technically correct but in which only one response is clearly the best answer.

Correct-Answer Item

The capital of Kentucky is:

- a. Frankfort.
- b. Lexington.
- c. Louisville.
- d. Ashland.

Best-Answer Item

The *major* goal of raising the legal drinking age is to:

- a. reduce driving fatalities and injuries.
- b. reduce liquor consumption.
- c. discourage the habit of drinking by adolescents.
- d. reduce roadside litter.

In writing best-answer stems, care must be taken to word the stem in such a way so as to make it clear that only *one* response is preferred. In the example above, the word “major” achieves this objective.

Writing Multiple Choice Items

The following principles are essential in developing high-quality multiple choice items that neither penalize nor confuse the examinee, nor reward the examinee by inadvertently providing clues that make the correct answer obvious. As you acquire experience writing items, you should refer to these principles frequently. Apply these principles when evaluating the items written by others.

Writing Stems

1. Present a single, definite statement to be completed or answered by only one of the several given choices. The stem should be clear enough to provide the examinee with sufficient information to anticipate the type of answer before looking at the question:

Poor

Polysaccharides:

- a. are made up of thousands of smaller units called monosaccharides.
- b. are *not* found in the aloe vera leaf.
- c. are created during photosynthesis.
- d. can be described by the chemical formula: CHHOH.

Better

Polysaccharides of the plant cell wall are synthesized mainly in:

- a. the endoplasmic reticulum.
- b. the cytosol.
- c. the Golgi complex.
- d. amyloplasts.

In the first example, the stem offers no sense of what the question is asking. The better example clarifies the question and offers a set of homogeneous responses.

2. Use clear, straightforward language in the stem. Items constructed with complex wording may become a test of reading comprehension rather than an assessment of skills and knowledge.

3. Avoid unnecessary and irrelevant material.

Poor

Ed Locke, professor of management at the University of Maryland and author of many books on goal setting, states that the most effective performance goals are:

Better

According to Ed Locke's goal setting theory, the most effective performance goals are:

4. Put as much of the question in the stem as possible, rather than repeating words in each of the responses.

Poor

The process whereby amniotic fluid is removed from a pregnant woman to test for possible defects:

- a. is known as amniocentesis.
- b. is known as cesarean section.
- c. is known as embryonic analysis.
- d. is known as fetal catheterization.

Better

The process whereby amniotic fluid is removed from a pregnant woman to test for possible birth defects is known as:

- a. amniocentesis.
- b. cesarean section.
- c. embryonic analysis.
- d. fetal catheterization.

5. Avoid negatively stated stems, i.e., ones that require the examinee to select an incorrect response rather than a correct response. Negatives include in the stem words such as "except," "not," "least," or "false." Although easier to write, they tend to confuse the examinee and to make the items less effective in assessing subject matter knowledge. If negatives must be used, italicize, capitalize, underscore, or otherwise highlight them.

Poor

Which of the following authors is **not** a major American novelist?

- a. George Orwell
- b. Saul Bellow
- c. John Steinbeck
- d. Ernest Hemingway

Better

Which of the following authors is a major British novelist?

- a. George Orwell
- b. Saul Bellow
- c. John Steinbeck
- d. Ernest Hemingway

6. Do not use the form "what would you do" or "what do you believe". In items of this kind, the examinee can defend the response selection as being correct, because each person has a unique frame of reference.

Writing Responses

7. When writing new test items, always put the correct answer as the first response so that reviewers can easily identify the correct answer.

8. The correct answer must clearly stand out as the one that experts in the field would recognize as the best response. When there is doubt or controversy about the correct response, not only is the examinee confused, but the item may be challenged as being inappropriate.

Poor

Better

The primary cause of the Vietnam War was: Which of the following factors most likely sustained the military campaign of the Vietnamese insurgents in the Vietnam war?

- a. Vietnamese nationalism.
- b. French imperialism.
- c. Chinese expansionism.
- d. American imperialism.

- a. Nationalism
- b. Chinese expansionism
- c. Soviet militarism
- d. American expansionism

9. Do not create distracters which are so close to the correct response that they confuse examinees who really know the answer to the question. Make sure that distracters differ from the correct response in a substantial way, not simply with some minor nuance of phrasing or emphasis.

10. Correct statements that do not answer the question are often strong distracters.

11. All responses must be grammatically consistent with the stem; and all responses must be parallel. Lack of parallelism and grammatical inconsistency can make it possible for examinees to choose the intended answer even when they do not have the skill or knowledge that an item is intended to measure.

Poor

Better

An American city noted for its production of automobiles is:

- a. Detroit.
- b. Ohio.
- c. Indiana.
- d. Philadelphia.

An American city noted for its production of automobiles is:

- a. Detroit.
- b. Cincinnati.
- c. Indianapolis.
- d. Philadelphia.

Poor

Better

Serious communicable diseases that can cause developmental disability to the offspring of a pregnant mother are:

- a. rubella and chickenpox.
- b. cancer.
- c. rheumatism and arthritis.
- d. sinus infection.

A serious communicable diseases that can cause developmental disability to the offspring of a pregnant mother is:

- a. rubella.
- b. cancer.
- c. rheumatism.
- d. sinus infection.

12. Use only plausible and attractive alternatives as distracters. Avoid using distracters that are absurd, humorous, or obviously wrong.

Poor

The person who developed the psychoanalytic theory of human behavior is:

- a. Sigmund Freud.
- b. Yogi Berra.
- c. Jimmy Carter.
- d. Burt Reynolds.

Better

The person who developed the psychoanalytic theory of human behavior is:

- a. Sigmund Freud.
- b. B. F. Skinner.
- c. Carl Rogers.
- d. John Watson.

13. Responses should not overlap or include each other so that the examinee could select more than one of the responses and still be technically correct.

Poor

The right to vote in the United States is granted to individuals at what age?

- a. 18
- b. 16
- c. 17
- d. 19

Better

The right to vote in the United States is granted to individuals beginning at what age?

- a. 18
- b. 16
- c. 17
- d. 19

Note that in the example on the left, both a. and d. could be considered correct.

14. Do not include the response “**all of the above**” or “**none of the above**”. These items are flawed because it is logically difficult to claim that one of the other responses in the item is either correct or incorrect. When “none of the above” is the correct answer, it still cannot be determined whether the examinee knows what the correct answer is ---- only that he or she recognizes wrong answers.

15. Items should not be worded so that correct responses might be out of date at the time of testing.

16. Avoid providing the examinee with clues that will make it easy to determine the correct answer.

- a. Do not make the correct answer much longer, shorter, or more technical than the distracters. If this is not possible, try to have two relatively short and two relatively long distracters, or two relatively technical and two relatively non-technical.
- b. Do not put the same key words or descriptive words in the stem and in the correct answer, but not in the distracters.
- c. Do not make the correct answer clear and concise, and the distracters vague and ambiguous.

Refining Multiple Choice Items

17. Items should be written to assess knowledge of meaningful facts and concepts, not trivial information.

Poor

The assassination of President John F. Kennedy occurred on what date?

- a. November 22, 1963
- b. December 4, 1961
- c. February 18, 1961
- d. October 2, 1963

Better

President John F. Kennedy was assassinated:

- a. before the passage of the major civil rights legislation of the 1960s.
- b. before the Bay of Pigs invasion of Cuba.
- c. after the Tet Offensive of the Vietnam war.
- d. before the construction of the Berlin Wall.

Note how the item on the right assesses the sequence of historical events rather than a single date.

18. The stem should be specific enough to pose only one question or problem; and each distracter should be related to that question or problem. It is very confusing for the examinee to read an ambiguous stem for which several distracters could be construed as being correct.

Poor

Alcoholic beverage consumption is believed to be:

- a. a tradition in western cultures.
- b. a vice by those with certain religious beliefs.
- c. a means to achieve desirable states of relaxation.
- d. a major cause of family conflict and disorganization.

Better

Data on per capita alcoholic beverage consumption in the US during the last 10 years suggest what statistical trend?

- a. Increased consumption by females
- b. Decreased consumption by adolescents
- c. Abstinence among all age groups
- d. Abstinence among those over age 65

19. Avoid the use of gender pronouns such as he, she, his, her, etc. Reword the stem and/or responses to eliminate gender and construct neutral items,

Information Sets

In certain situations, it is useful to base a group of items on one information set. An information set can present a context or relate questions to commonly encountered situations. If this is done, make sure that the information presented in one item does not result in giving away the correct answer to a related item.

QUESTIONS 1 THROUGH 3 REFER TO THE FOLLOWING INFORMATION:

On a biology examination, the following scores were obtained by students:

90
88
85

76
72

1. What is the average or mean score for this group of students?
 - a. 82.2
 - b. 85.0
 - c. 79.5
 - d. 84.8
2. If the average score is 82.2, what is the median score?
 - a. 85
 - b. 88
 - c. 76
 - d. 90

NOTE: Item 2 is poor because it provides the answer to Item 1.

3. What is the range of the scores?
 - a. 18 points
 - b. 90 points
 - c. 72 points
 - d. 04 points

Assessing Higher-Level Cognitive Skills

Items that test higher-level cognitive skills, such as the application of knowledge and problem solving, are often difficult to write; but they are needed to assess important components of examinee competence.

Knowledge

Compared to boys, how much earlier or later is the average start of puberty for girls?

- a. 2 years earlier for girls
- b. 3 years later for girls
- c. 1 year earlier for girls
- d. 2 years later for girls

Application of Knowledge

A chaperone at a 7th grade dance would generally observe which of the following conditions?

- a. Girls are taller than boys.
- b. Boys are taller than girls.
- c. Girls and boys are of approximately equal height.
- d. Most of the boys have completed puberty.

Problem Solving

If a school principal wanted to arrange for a dance where the boys and girls would be of approximately equal height, this could best be achieved by inviting:

- a. 7th grade girls and 8th grade boys.
- b. 7th grade boys and 9th grade girls.
- c. 9th grade boys and 9th grade girls.
- d. 8th grade girls and 7th grade boys.

Job-Related Situations

For certification and licensing tests, items which assess an examinee's response to a job-related situation are required. These items are difficult to develop because it is often hard to write distracters that result in an item that is neither too easy nor too difficult. One method for writing good job-related situation items is to first write a question asking the best way a professional would respond to a given situation. Then prepare a list of responses with a wide range of acceptance among experienced professionals in the appropriate occupational group. Finally, present the question and list of responses to several professionals from the occupational group. Have them select what they believe is the best answer and three reasonable distracters. While this is a time-consuming practice, it is essential for writing items of this kind. It is also important that the stem in these items provide only essential information. Superfluous detail should be avoided.