

## Designing Multiple Choice Questions

This resource page was compiled for the Faculty of Engineering, Architecture and Science. For more teaching and learning resources, visit the LTO's website:

<http://www.ryerson.ca/lt/resources/>

When determining the best option for test design, consider the pros and cons of using multiple choice questions.

### Strengths of Multiple-Choice Items

1. Versatility in measuring all levels of cognitive skills.
2. Permit a wide sampling of content and objectives.
3. Provide highly reliable test scores.
4. Can be machine-scored quickly and accurately.
5. Reduced guessing factor compared with true-false items.

### Limitations of Multiple-Choice Items

1. Difficult and time-consuming to construct.
2. Depend on student's reading skills and instructor's writing ability.
3. Ease of writing low-level knowledge items leads instructors to neglect writing items to test higher-level thinking.
4. May encourage guessing.

Excerpted from "How to Write Better Tests," University of Indiana

[http://www.indiana.edu/~best/write\\_better\\_tests.shtml](http://www.indiana.edu/~best/write_better_tests.shtml)

### *Getting Started*

1. **Write questions throughout the term.** Multiple-choice question exams are challenging and time-consuming to create. You will find it easier if you write a few questions each week, perhaps after a lecture when the course material is still fresh in your mind.
2. **Instruct students to select the "best answer" rather than the "correct answer".** By doing this, you acknowledge the fact that the distracters may have an element of truth to them and discourage arguments from students who may argue that their answer is correct as well.
3. **Use familiar language.** The question should use the same terminology that was used in the course. Avoid using unfamiliar expressions or foreign language terms, unless measuring knowledge of such language is one of the goals of the question. Students are likely to dismiss distracters with unfamiliar terms as incorrect.
4. **Avoid giving verbal association clues from the stem in the key.** If the key uses words that are very similar to words found in the stem, students are more likely to pick it as the correct answer.
5. **Avoid trick questions.** Questions should be designed so that students who know the material can find the correct answer. Questions designed to lead students to an incorrect answer, through misleading phrasing or by emphasizing an otherwise unimportant detail of the solution, violate this principle.

6. **Avoid negative wording.** Students often fail to observe negative wording and it can confuse them. As a result, students who are familiar with the material often make mistakes on negatively worded questions. In general, avoid having any negatives in the stem or the options. In the rare cases where you use negatives be sure to emphasize the key words by putting them in UPPER CASE, and **bolding** or underlining them.

Excerpted from “Designing Multiple-choice Questions,” University of Waterloo  
[http://cte.uwaterloo.ca/teaching\\_resources/tips/designing\\_multiple\\_choice\\_questions.html](http://cte.uwaterloo.ca/teaching_resources/tips/designing_multiple_choice_questions.html)

## Parts of a Multiple Choice Question

A traditional multiple choice question (or item) is one in which a student chooses one answer from a number of choices supplied. A multiple choice question consists of

1. A **stem** - the text of the question
2. **Options** - the choices provided after the stem
3. The **key** - the correct answer in the list of options
4. **Distracters:** the incorrect answers in the list of options

Excerpted from “Designing effective objective test questions: an introductory workshop,”  
Computer Assisted Assessment Centre  
<http://www.caacentre.ac.uk/dldocs/otghdout.pdf>

## Writing Stems

1. **Express the full problem in the stem.** When creating the item, ask yourself if the students would be able to answer the question without looking at the options. This makes the purpose of the question clear.
2. **Put all relevant material in the stem.** Do not repeat in each of the alternatives information that can be included in the stem. This makes options easier to read and understand, and makes it easier for students to answer the question quickly.
3. **Eliminate excessive wording and irrelevant information from the stem.** Irrelevant information in the stem confuses students and leads them to waste time

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## Writing Answers

1. **Avoid lifting phrases directly from text or lecture.** This becomes a simple recall activity for the student. Use new language as frequently as possible.
2. **Write the correct answer before writing the distracters.** This makes sure you pay enough attention to formulating the one clearly correct answer.
3. **Answer options should be about the same length and parallel in grammatical structure.** Too much detail or different grammatical structure can give the answer away.
4. **Limit the number of answer options.** Research shows that three-choice items are about as effective as four-choice items. Four choice items are the most popular, and never give more than five alternatives.

5. **Distracters must be incorrect, but plausible.** If you can, include among the distracters options that contain common errors. Students will then be motivated to listen to your explanations of why those options are incorrect.
6. **To make distracters more plausible, use words that should be familiar to students.** If a recognizable key word appears in the correct answer, it should appear in some or all of the distracters as well. Don't let a verbal clue decrease the accuracy of your exam.
7. **Help students see crucial words in the question.** For example: "Which of the following is NOT an explicit norm?" Likewise, when you ask a similarly-worded question about two different things, always highlight the difference between the questions.
8. If it is too easy to eliminate one or two options, then the question loses much of its measurement value. If you must come up with one more distracter, **consider either offering a true statement that does not answer the question and/or a jargon-ridden option that is meaningless to someone who understands the concept.**
9. **Use Rarely:**
  - **Extreme words** like "all," "always" and "never" (generally a wrong answer).
  - **Vague words** or phrases like "usually," "typically" and "may be" (generally a correct answer).
  - **"All of the above"** - eliminating one distracter immediately eliminates this, too.
  - **"None of the above"** - use only when the correct answer can be absolutely correct, such as in math, grammar, historical dates, geography, etc. Do not use with negatively-stated stems, as the resulting double-negative is confusing. Studies do show that using "None of the above" does make a question more difficult, and is a better choice when the alternative is a weak distracter.

Excerpted from "Writing Multiple-Choice Questions that Demand Critical Thinking," University of Oregon

<http://tep.uoregon.edu/resources/assessment/multiplechoicequestions/mc4critthink.html>

### **Suggestions for Writing MCQs Which Measure Higher Objectives**

1. Present practical or real-world situations to the students. These problems may use short paragraphs describing a problem in a practical situation. Items can be written which call for the application of principles to the solution of these practical problems, or the evaluation of several alternative procedures.
2. Present the student with a diagram of equipment and ask for application, analysis, or evaluations, e.g., "What happens at point A if .?," "How is A related to B?"
3. Present actual quotations taken from newspapers or other published sources or contrived quotations that could have come from such sources. Ask for the interpretation or evaluation of these quotations.
4. Use pictorial materials that require students to apply principles and concepts.
5. Use charts, tables or figures that require interpretation.

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