



Practical Tips

for · designing & implementing · multiple-choice tests

Before the Test

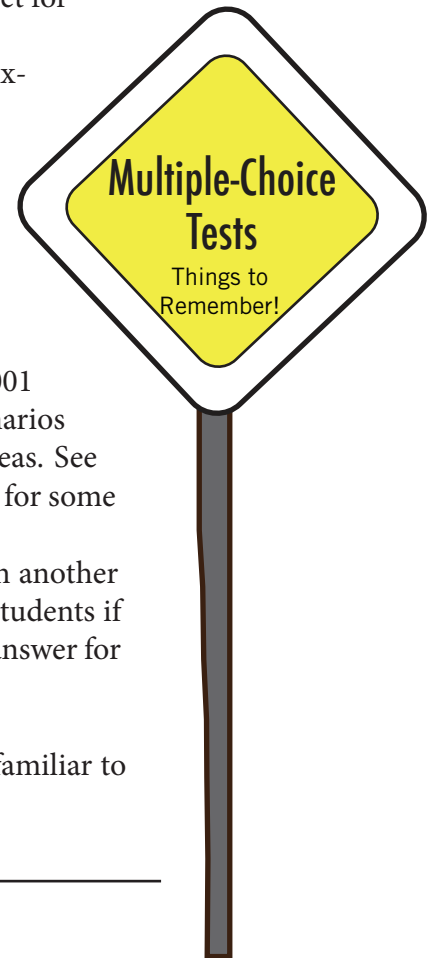
- Provide students with samples of your style of multiple choice questions, either posted on-line or reviewed in class as a learning task.
- For first-year classes post tips for students on how to write multiple choice tests. There are several university and course websites that can serve as models (search “multiple choice test writing tips”).

Content

- Things to consider before you begin writing include...
 - ✓ how you will make your questions consistent with the learning goals you set for your students
 - ✓ how you will make your questions consistent with the level to which you expect your students to master the material
 - ✓ what differences in test grades should reflect
- Base questions on important content and skills (i.e. intended learning outcomes). Write questions without consulting the lecture notes too closely (check for accuracy at the proofreading stage).
- Present a single, definite question to be completed or answered by only one of the options.
- Include questions that test as many levels of Bloom’s Taxonomy (revised in 2001 by Anderson & Krathwohl) as possible. For higher level questions, use scenarios and ask students to predict an outcome or apply knowledge from several areas. See Diagram 1: *Example Multiple-Choice Stems to Test Different Levels of Thinking*, for some examples of how to do this.
- Make sure that the questions are independent (do not give away the answer in another question). Be aware that it can also be problematic or perceived as unfair by students if you make the answer for a question completely dependent upon knowing the answer for an earlier question.
- Avoid trick items.
- Keep vocabulary simple. Even wrong answers should contain words that are familiar to the students.

Stems

- Make stems clear and concise, with only the relevant information.
- Avoid negatives. If you must use a negative term use caps, boldface.
- Phrase the stem as a question rather than an incomplete statement.





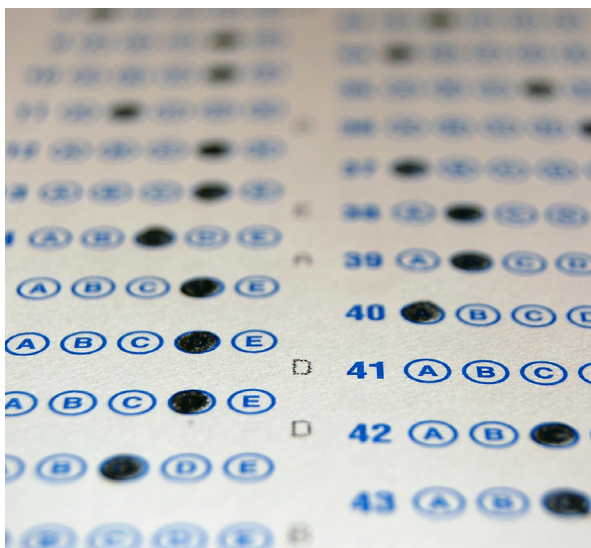
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Choices

- The correct answer should be the best, checked by one or more colleagues.
- The distracters should represent errors commonly made by the students being tested.
- Use only plausible and attractive alternatives as incorrect response choices.
- All choices should be as brief as possible (move words that are repeated in each option to the stem).
- Rarely use “all of the above” and “none of the above”.
- Do not give away the right answer.
 - ✓ Alternatives that include terms such as “always” and “never” are rarely right answers.
 - ✓ Alternatives that are longer or more elaborate than others are frequently right answers.
 - ✓ Watch for grammar and syntax clues that might give away the right answer (e.g. “an” vs “a”).
 - ✓ Two opposite choices might signal that one is correct.
 - ✓ Avoid similar wording in both the key and stem.

Format and Style



- Avoid double negatives.
- Keep all choices in a question approximately the same length.
- Consider using 4 rather than 5 choices, allows for more questions per test. (Look at your past test statistics.)
- Keep the number of choices consistent throughout the test and course.
- Create at least two versions of the test to avoid copying. Programs are available to do this automatically – they scramble the questions and/or answer choices (e.g. TestGen Pearson) and create a new answer key.
- Instruct students to choose the BEST answer.
- Proofread the test several times and make sure that you read all of the versions that you are having photocopied.
- Have someone else proofread the final versions.

During the Test

- Avoid interpreting questions; rather, ask students to indicate on the cover of the test paper questions that are ambiguous with a brief explanation of why.
- Avoid making corrections during the test. (Not all students hear the correction properly and not all test sites will announce correction at the same time, if at all (e.g. Accessibility Services).
- If you have multiple rooms writing the test at the same time, make sure all rooms have the same amount of time. This may require allotting a few minutes of extra time for your test to deal with locked exam room doors, missing tests, late invigilators, etc.



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After the Test

- Scan student response forms as quickly as possible after the test. It can take a few days to properly evaluate the results.
- Carefully go over the statistics for each question, including:

✓ proportion of students who selected the correct answer -- this should generally be in the range of 30% to 80%,

✓ proportion of students who selected each distracter -- this will give you information about how well the distracters were written and how many distracters you should include in future tests, thereby improving future question and test design.

Also, if most students picked a specific distracter, the distracter might actually be the correct answer or there might be two correct answers for the question.



✓ **point-biserial correlation** – this provides a measure of how well a specific question discriminates between the students who did well on the test over all and those who did not. If a question is a good discriminator, you would expect a greater proportion of the students performing better on the test as a whole to answer correctly in comparison with students who have a lower over all test score. Values range from -1 to 1. How to interpret the point-biserial correlation:

- ◆ 0.3 or greater: indicates a question that is a good discriminator (note the higher the better, 0.4 and above is very good)
- ◆ less than 0.3: could indicate a question that might be problematic. Investigate whether the question was too easy, had the answer bubbled into the key incorrectly, has more than one answer, or has no answer.

NOTE that the statistics are more meaningful when there are more students who wrote the test. The point-biserial correlation values have little meaning when class sizes are below approximately 50 students. Not all multiple choice scanning software packages generate the point-biserial correlation automatically. You may need to select it as an option when determining your statistical output.

- Carefully consider student concerns before posting the marks.
- Provide the results as soon as possible.
- If you have results in an Excel spreadsheet, you can use the VLOOKUP function in Excel to “automatically” upload marks onto Portal.
- Make the grading of the test transparent to the students. (Post class averages, explain why questions were deleted or two answers were allowed, etc.)

Diagram 1: Example Multiple Choice Stems to Test Different Levels of Thinking



References

- Anderson, L. & Krathwohl, D. A. (2001). *Taxonomy for Learning, Teaching and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives*. New York: Longman.
- Bloom, B. S. (1956). *Taxonomy of Educational Objectives, Handbook I: The Cognitive Domain*. New York: David McKay Co Inc.

