

## Creating Multiple Choice Tests

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Take a couple of minutes to make up a couple of multiple-choice questions about the things around you.

You may have found that this is not as easy as it looks. Some questions are trivial:

My car is a:

- Cadillac
- Minivan
- Yugo
- Humvee
- Peterbilt truck

Anybody has a shot at getting this question right, even if he's never seen your car. Other questions are nit-picky:

My car is a:

- 1992 Hyundai with a green pin stripe
- 1991 Hyundai with a green pin stripe
- 1993 Hyundai with a blue pin stripe
- 1992 Hyundai with a black pin stripe

Even the driver of this car might have a problem! Avoiding the two extremes is not easy. For another example, look at these two questions:

Professor Dutch is:

- Less than 5 feet 3 inches tall
- Between 5 feet 3 inches and 5 feet 9 inches tall
- Between 5 feet 9 inches and 6 feet 3 inches tall
- More than 6 feet 3 inches tall

Professor Dutch is:

- Less than 5 feet tall
- Between 5 feet and 5 feet 6 inches tall
- Between 5 feet 6 inches and 6 feet tall
- Between 6 feet and 6 feet 6 inches tall
- More than 6 feet 6 inches tall

In the case of the first question, even somebody who knows nothing about me would probably guess the correct answer. On the other hand, somebody who knows me very well might have trouble with the second question (I am 5 feet 11 inches tall).

## Strategies for Taking Multiple-Choice Tests

The point of this little exercise is that good multiple-choice questions are not easy to write and that *you can anticipate a lot of multiple-choice questions by putting yourself in the professor's shoes*. A professor who doesn't want a lot of complaints about unfair tests soon learns that :

- *Answers must be unambiguous.* If there are close judgment calls involved, there will be lots of arguments.
- *Questions must be briefly stated.* Too long, or too many qualifiers, and the exam takes too long. Also, students complain about not being able to understand the question.
- *Answers must be brief.* An answer that is conspicuously longer than all the others is probably carefully engineered to avoid objections.

**Sneaky tip:** an answer with a glaring typo is often a wrong answer. The tester may have proofread the correct answers carefully, but not the incorrect ones.

### Where Will the Questions Come From?

With those points in mind, what are some good sources of brief questions with unambiguous, brief answers?

- *Terminology*, the old standby. You can always get a useful question out of defining terms
- *Lists* are an excellent source of multiple-choice questions
- *Easily-confused items.* Is Colorado or Wyoming the one on top? Is Vermont or New Hampshire on the left? Was Teddy or Franklin Roosevelt the one who charged up San Juan Hill? Did Madison come before or after Monroe?
- *"Everybody knows" questions.* A personal favorite of mine. Are you really bothering to unlearn your misconceptions? If something violates conventional wisdom, or popular misconception, or what you think you already know, it could easily turn up on an exam. (Count on it in my courses!)

Some Examples:

- Only Catholics opposed the idea that the Earth goes around the Sun. (I show the *Cosmos* video on the life of Kepler in several courses. Carl Sagan quotes Martin Luther as referring to Copernicus as a "fool". On quizzes, I ask "This religious reformer was a harsh critic of Copernicus." I will even go so far as to add "'The Pope' is not a correct answer." 20 or 30 percent of the class will *still* answer "the Pope." A few, bless 'em, will answer "Martin Luther King.")
- Water in wells comes from "underground rivers."
- Most geologists are employed in looking for gold, oil, or diamonds.
- Geologists frequently dig to get at the rocks.
- Carbon dioxide is the main Greenhouse Effect gas on Earth (Nope. Water vapor accounts for 90% of Earth's Greenhouse Effect.)
- The Greenhouse Effect is bad (Wrong again. Without a natural Greenhouse Effect the Earth would be frozen. A little Greenhouse Effect is a good thing.)

### A couple of suggestions for taking the test

- **Stick with your first impression.** This point gets a lot of debate, but unless you have serious reason to change, your first impression is likely to be correct. Second guessers start reading things into the questions that aren't there.
- **Avoid the "Philadelphia Lawyer" syndrome.** Read the questions in plain English and don't look for hidden meanings. *Do look* for legitimate subtle differences between similar answers, but if one answer seems to leap out, go with it. If none of the answers are perfect, go with the "least worst."
- **Answer questions *in the context of the course* unless you are told otherwise.** If you learned density as grams per cubic centimeter in one course and weight in relation to water in another, don't pass up a correct answer because of the definition you learned in another course.
- **Use the exam.** Some instructors spend a lot of effort screening exams to eliminate questions that offer clues to other questions. Others don't. I think if a student can correlate information between questions, he or she deserves to benefit from it.
- **Weed out the wrong answers.** An answer you never heard of before is quite likely a made-up answer and therefore not correct. Warning! If you never heard of the answer because you didn't study or come to class, this does not apply!

- **Come to class.** The real hard-core absentees are those who don't come to the class after a midterm to get their scores. Almost always the exams I have left over after handing them back are the lowest scores.

Bright students often cheat themselves out of points on multiple-choice tests by violating the first three points above. The ability to simplify things to essentials and not become bogged down in extraneous details is a critical intellectual skill, and being able to take multiple-choice tests well is a consequence of that skill. Besides, bright students almost always make up far more points in correct answers than they lose by being over-attentive to details.

### **Do a Post-Mortem**

After you get the test back, look it over for patterns.

**Did you miss a lot of "all of the above" or "none of the above" questions?** Chances are you're not reading the answers all the way through. Don't pick the first answer that looks right; make sure it's the *best* answer.

**Did you miss a lot of questions because of not knowing the terms?** Easy. Work on learning the terminology better.

**Did you miss a lot of fill-in-the-blank questions?** Read the question through and put the answer in the blank for each answer. Is the sentence true? Does it make sense?

**Did you miss questions involving formulas?** Make sure you can apply or at least calculate any formulas that might be on the test.

**Did you miss "everybody knows" questions?** *Never* gloss over things you think you already know. There are always new details, and sometimes what you think you know isn't so.