Writing Effective Multiple-Choice Questions for Educational Videos and CME Courses

One-best-answer multiple-choice questions consist of:
- ☐ A **stem**: i.e. a brief case vignette and a lead-in question
- ☐ Response **options**: one correct answer and three or four distractors.

Tips

Make it matter
- ☐ Focus on important concepts from the learning objectives (i.e. not trivial facts or esoteric cases)
- ☐ Ensure items map back to specific points taught in the video (i.e. test what you teach)
- ☐ Assess <u>understanding</u> and <u>application</u> of knowledge (not simply <u>recall</u> of facts!)*
    - Example lead-ins from a case vignette:
        - ☐ *What is the most likely diagnosis?*
        - ☐ *What additional finding is most likely to be present?*
        - ☐ *Which of the following is an example of X?*
        - ☐ *What is most likely to happen next?*
        - ☐ *What is the most appropriate next step in management?*
- ☐ Focus on areas in which clinical reasoning mistakes are often made
- ☐ Focus on tasks that the learner must be able to undertake at the next stage of training

Avoid common flaws that "tip off" the learner
- ☐ Ensure response options follow grammatically from the stem
- ☐ Ensure the correct option "looks like" the distractors (i.e. similar length and detail)
- ☐ Create distractors that are plausible and incorporate common errors
- ☐ Avoid absolute terms like "always" or "never"

Don't confuse the learner
- ☐ Pose a clear question in the stem. The learner should be able to arrive at an answer with the response options covered. (i.e. AVOID *"Which of the following statements is correct?"*)
- ☐ Keep stems and response options short and simple (i.e. only include relevant details)
- ☐ Avoid NEGATIVE lead-in questions (i.e. *"which of the following does NOT apply?"*)
- ☐ Avoid overlapping response options (i.e. *a) steroids, b) prednisone…*)
- ☐ Avoid *"none of the above" / "all of the above"*

Resources

National Board of Medical Examiners <http://www.nbme.org/publications/index.html#iwman>
- • Writing Multiple Choice Questions: An Introductory Tutorial
- • Constructing Written Test Questions for the Basic and Clinical Sciences, 3rd edition.

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*Bloom's Taxonomy provides a framework for developing educational objectives, instructional activities and assessments. When possible, seek to assess higher-order thinking (beyond basic recall) with multiple-choice questions that ask learners to demonstrate their ability to explain concepts (*understand*), to use information in new situations (*apply*), and to draw connections between ideas (*analyze*).
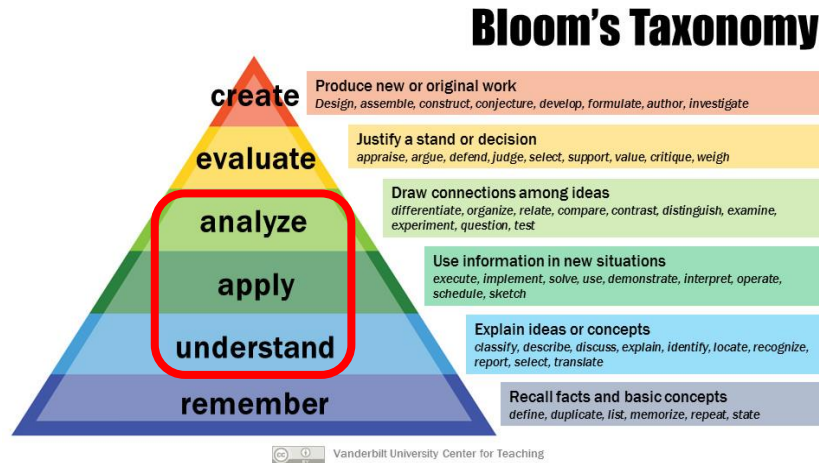
Bloom's Taxonomy

create — Produce new or original work
Design, assemble, construct, conjecture, develop, formulate, author, investigate

evaluate — Justify a stand or decision
appraise, argue, defend, judge, select, support, value, critique, weigh

analyze — Draw connections among ideas
differentiate, organize, relate, compare, contrast, distinguish, examine, experiment, question, test

apply — Use information in new situations
execute, implement, solve, use, demonstrate, interpret, operate, schedule, sketch

understand — Explain ideas or concepts
classify, describe, discuss, explain, identify, locate, recognize, report, select, translate

remember — Recall facts and basic concepts
define, duplicate, list, memorize, repeat, state

Vanderbilt University Center for Teaching

Image obtained from: https://www.flickr.com/photos/vandycft/29428436431

Blueprint Development

As a healthcare provider and educator assisting in the development of an examination, you may be asked to write items to assess test-taker knowledge of a particular domain.

What do you want the test-taker to know or demonstrate? The topic of the item usually results from the **blueprint**, which is the outline of the major topics to be covered on the examination. For instance, if an examination is developed to assess knowledge of the cardiovascular system, the blueprint might have two dimensions: 1) disease-based (e.g., hypertension, ischemic heart disease, systolic heart failure), and 2) task-based (e.g., assessment of basic science principles, history, diagnosis, prognosis). The blueprint would likely include items along both dimensions, and might call for six items on hypertension, four on systolic heart failure, two on diastolic heart failure, ten on ischemic heart disease, and so on. Along the task dimension there might be a similar distribution of topics.

Content area	Basic science	History	Diagnosis	Prognosis
Hypertension				
Ischemic heart disease				
Systolic heart failure				
Diastolic heart failure				

A clear and comprehensive blueprint or other set of test specifications should always be available so that item writers can stay focused on the important topics and write sufficient numbers of items for each topic.