

**WORKSHEET**

**Creating and Editing Multiple Choice Questions (MCQ) for use on Mastery Exercises**

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|  |  | **Review**  |
| **STEP 1: Choose/Identify the learning objective for the MCQ** | Learning Objective:Identify the one testable “nugget”: |  |
| **STEP 2:** **Consider the most appropriate level of learning** **[See NOTE 1 below]** | What level of learning do you want to test?[ ] Remembering[ ] Understanding – Cognitive Integration [Y] [N][ ] Application – Cognitive Integration [Y] [N] |  |
| **STEP 3:** **Write/review the Stem (See NOTE 2 below)** | 1st sentenceBody (Scenario) | * If a scenario is presented, is the scenario directly pertinent to the question posed or can the question stand alone?
* For questions with a scenario, is the suggested format followed? First sentence: “A (age)-year old (woman, man, boy, girl, infant) presents to the (location: ER, clinic) with (chief complaint) for the past (duration). (Followed by additional relevant history, then physical, then investigations).
* Is the question free of names (e.g. Joe, Kate)?
* Is the word “complaining” replaced with “reporting” or simply “presents with?”
* Wherever possible, is the question written in the suggested third person format with references to “you” avoided entirely? Are phrases such as, “Which one of the following would you do?” replaced with, “Which one of the following is the best management option/next step/should be recommended at this time?”
* Does the question refrain from telling the reader what role he/she is playing? E.g. You are a third-year medical student/resident on your urology rotation?” or, “You are working….”
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| **STEP 4: Write/review the lead in (See NOTE 3 below)** | [ ] Which of the following (WOOF): *\*See below for examples*[ ] Other | * Is the question positively worded (i.e. not an “except” or “least likely” question)?
* Is there a question that ends in a “?”
* Is the lead-in presented in the WOOF format (Which one of the following is….?)
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| **STEP 5:**  **Write/review the correct answer and 3 distractors (See NOTE 4 below).** | Correct Answer:Distractor 1:Distractor 2:Distractor 3: | **Correct Option:*** Is the correct answer the most correct option presented?
* Are the common pitfalls that cue to the correct answer avoided?

**Pitfalls to be avoided – The correct answer**:* Is the longest and/or most specific option
* Contains words that are repeated in the stem
* Fits better grammatically with lead-in question than the distractors
* Contains the highest frequency of elements from the other options (convergence)

**Distractors:*** Are distractors clearly a less favorable option than the correct answer?
* Are the distractors plausible such that they would be attractive to students who don’t know the content? (see suggestions on next page)

**Check for Common Pitfalls**[ ] Have I avoided turning the MCQ into a True False question? [ ] Or used response options such as None of the above, or All of the above?[ ] Have I avoided using “never” or “always” in the response options?[ ] Have I avoided wordy response options? [ ] Have I avoided making any responses options visibly longer or shorter than the rest?  |
| **STEP 6:** **If the MCQ has been used in the past you can use the item statistics to review the MCQ.** | **Acceptable:**[ ] Difficulty Index (target 0.1-0.9)[ ] Discrimination Index (target ≥ 0.2)[ ] Point Biserial (target ≥ 0.2)[ ] % student choose each answer (correct answer chosen by majority, distractors chosen less often than correct answer and by at least 2% of students) | **Is the question to easy or too hard based on item statistics?**This may require a revisit of the level of learning that the question is targeting, content in the stem, choice of distractors, and/or the presence of a common pitfall |

**NOTES**

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| **NOTE 1: Description of Different Types of Questions** |
| **Remembering Questions:** Questions that target this level of knowledge require simply, that the student be able to recall information. Answering “Remembering” questions correctly can be accomplished with memorization of facts and does not require an understanding of the material. These questions typically do not have a clinical scenario as a stem. **Understanding Questions:** Rather than a simple recall of facts, “Understanding” questions require a deeper comprehension of the concepts but do not ask students to apply their knowledge to a specific clinical case example. As such, there is no clinical decision making task. Similar to “Remembering” questions, and unlike “Applying” questions, “Understanding” questions typically do not have a clinical scenario as a stem. “Understanding” questions may ask students to identify examples of a given term or concept or interpret the meaning of an idea or concept.**Applying Questions:** These questions demand that a student understands the information and can apply it to a clinical context. A typical question would present a patient scenario and ask the student to elicit factors on history that would be important, predict physical examination or test results, determine the most likely diagnosis, suggest management (drug and non-drug), or recommend a monitoring plan. The question presented at the beginning of this primer is an example of an MCQ that would fall under this category. |
| **NOTE 2: Terminology** |
| The main body of the question is the **Stem**. The task is called the **Lead-In** question. The response options are the **Distractors** (wrong answers) and the **Key** (the right answer). See example below:A 56–year-old man presents to the clinic reporting retrosternal chest pain for STEMthe last 2 weeks that is described as a heavy sensation. The pain occurs only with climbing stairs or running for the bus and is associated with shortness ofbreath and palpitations. His past medical history is significant for hypertension and high cholesterol and he is on hydrochlorothiazide and atorvastatin. His physical examination is unremarkable.Which one of the following is the best next step? Lead-InA) electrocardiogram B) chest X-rayC) coronary angiogram Response OptionsKeyDistractorsD) echocardiogram |

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| **NOTE 3: Examples for a WOOF Statement (Step 4):** |
| * what’s the best next step?
* is the most appropriate management at this time?
* is the most likely diagnosis?
* are you likely to find on further history?
* are you likely to find on physical examination?
* abnormalities are you likely to find on (bloodwork/investigation)
* professionals should be consulted next?
* ethical principles is most important to consider in this case?
* patient factors should be explored on history?
* factors will influence the management decision the most?
* risks should the patient be warned about?
* strategies has been proven to … (e.g. reduce hospitalizations in frail elderly?)
 | * best describes the patient safety incident demonstrated by this scenario?
* individuals should be asked to make the decision regarding the treatment?
* strategies should be recommended to this patient?
* is the purpose of screening for – in this patient?
* is the best strategy for to discuss goals of care?
* additional screening tests should be offered?
* should be recommended to reduce the patient’s risk of …?
* possible complications should be included in the consent discussion?
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| **NOTE 4: Suggestions for choosing plausible distractors (Step 5)** |
| **Diagnosis Questions:**Consider a broad differential diagnosis and choose those options that:* More closely resemble the correct diagnosis because they are within the same system (e.g. all renal diseases as opposed to diseases from various body systems)
* Could be correct *if* there were slight modifications to the patient presentation (e.g. different characterization of pain, different risk factors, etc.)
* Contain medical content that tend to be experienced as complex by students (e.g. vasculitis)
 | **Management Questions:*** Often management items require the student to take “2-steps” to answer the question, first identify a diagnosis and then determine management.
	+ If the diagnosis is provided, remove it and expect the students to determine the diagnosis with the given clinical scenario as a first step to answering the management question. E.g. Remove phrases such as, “You are concerned that the patient could be experiencing an acute myocardial infarction”
	+ Use the management options for the illnesses that act as the differential diagnoses for the presentation as the distractors.
* When asking about “best next step,” consider including options that are reasonable management strategies but not “next” or “best” in the treatment algorithm.
* Construct questions for which the correct answer is, “Do nothing.” Students tend to shy away from this as an option.
* Choose the wording carefully to make the distractor more appealing by making the content more specific or using language that appears more acceptable. E.g. Replace “No further testing,” with, “Offer reassurance”.
* Add or remove information into the stem that would make a distractor more attractive, but still clearly incorrect. Make sure not to “trick” the student by removing features that are essential to reaching the correct answer or adding in features that would make a distractor an additionally correct option.
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