

Workflow for Developing Practice Questions Using ChatGPT

1. Acquire Learning Objectives:

Learning objectives, provided by faculty, lecturers, or institutions, are often found at the beginning of lectures or in course syllabi. The quality of learning objectives directly impacts the effectiveness of practice questions developed with ChatGPT. Learning objectives that are *deliberately written, clear, and action-oriented*, using *specific and measurable verbs* (e.g., define, compare, interpret, apply) and reflect the desired level of cognitive engagement will yield the most beneficial results.

2. Develop Practice Questions, Answers, and Explanations:

Use the following bold text as your ChatGPT input. *Replace all the red, highlighted text* with your own learning objective and any additional information if needed. Further instructions regarding the use of additional information in the prompt are listed below the prompt.

*ChatGPT prompt begins now:

Requirements:

1. **Question should test the learning objective provided below while accommodating any additional information provided after the learning objective.**
2. **Maintain clarity and conciseness; always phrase the question with the most enhanced clarity for medical students.**
3. **Avoid unnecessary jargon and use standard language with a well-constructed question stem.**
4. **Single-best answer question format; only one answer is most appropriate/correct in the context of the question.**
5. **Utilize distractor answers for incorrect answer choices (answers designed to be plausible, reflecting common misconceptions or errors in reasoning, challenging students to differentiate the correct answer).**
6. **In less than 1000 total characters (including spaces), provide a detailed explanation for all answers; including an explanation as to why incorrect answers are not correct and why the correct answer is correct.**
7. **Include a separate explanation section for each of the answer choices.**
8. **Answers should be short and not overly descriptive (1-5 words).**
9. **Questions should be at the level of a medical student's knowledge.**

Quality Question Example:

A 68-year-old male presents to the emergency department with severe dyspnea, peripheral edema, and abdominal distention. On examination, he appears diaphoretic and is tachypneic

with crackles heard bilaterally on auscultation. His blood pressure is 80/50 mmHg, heart rate is 110 bpm, and oxygen saturation is 88% on room air. Which pharmacotherapy should be initiated immediately?

- A) Metoprolol
- B) Digoxin
- C) Furosemide
- D) Morphine

Explanation:

C) Correct. In the setting of cardiogenic shock with symptoms of volume overload and elevated filling pressures, the initial pharmacotherapy of choice is a loop diuretic such as furosemide to reduce fluid overload and alleviate symptoms of congestion.

A) Incorrect. Metoprolol, a beta-blocker, may be beneficial in stable heart failure patients with reduced ejection fraction but is not the first-line therapy for cardiogenic shock with volume overload.

B) Incorrect. Digoxin may be used for rate control in atrial fibrillation or as an adjunctive therapy in heart failure, but it is not indicated as the initial treatment for acute cardiogenic shock.

D) Incorrect. Morphine sulfate may be used for pain relief and to reduce anxiety in acute coronary syndromes but is not indicated as the initial therapy for cardiogenic shock with volume overload.

Using the Requirements above, and in same format as the Quality Question Example above, generate a different practice question for the following learning objective: **insert selected learning objective here**

optional area to add additional information

*End of ChatGPT prompt

The *optional area to add additional information* should be *deleted or replaced* at the discretion of the question writer. Reasons for utilizing this option include:

- To phrase the question in a specific way or target specific content.
- To clarify complex or nuanced material not easily interpreted by ChatGPT's training data or general language patterns.
- To paste lecture content for use in the vignette or answer choices.
- To provide a specific patient vignette or question format (e.g., NBME-style).
- To clarify the level of learner(s) (e.g., Step 1 vs Step 2 preparation).
- To specify a desired correct answer or to add certain distractor answers.
- To add information from credible online sources or third-party resources.

Example 1 of text to include in the *optional area to add additional information*:

“Question should be NBME style of a child who presented initially in clinic with nasal congestion and pressure associated with the common cold, physician started him on a medication that he took regularly which improved his symptoms. After stopping the drug, the patient's symptoms came back and got worse. Final question should be asked: what is the most likely MOA of drug that patient was prescribed?

The answer should be ‘alpha receptor agonist’

Distractor answers should include Antihistamine, Anticholinergic, Beta receptor agonist”

Example 2 of text to include in the optional area to add additional information:

“Make the question start with patient vignette that is clearly stable angina as described by symptoms. State that he was on a beta blocker (metoprolol) + HRL CCB (verapamil). He was having side effects and was switched to a medication that impairs myocardial relaxation and reduces myocardial oxygen demand. Ask what is the side effect he felt with combo drugs and what single drug was he started on?

The correct answer should be as follows: Side effect: bradycardia, new drug: Ranolazine.

Other distractor answers should be combinations of other side effects and drugs to treat stable angina”

Note: If the learning objective is extensive or if the initial input fails to sufficiently assess the desired content, supplemental context or information may be necessary to generate an accurate and appropriate question.

3. Develop an Easy-to-Read Document for Questions to be Collected/Reviewed:

Once all desired practice questions have been generated, copy and paste them—along with their corresponding answers and explanations—into a single document. Number each question to make faculty review easier. It may be helpful to include the relevant lecture and/or learning objective above each question, depending on your preference.

4. Review of Questions by Faculty:

It is essential to involve a knowledgeable faculty member in the review process. Their expertise is critical to ensure that the questions, answers, distractors, and explanations are all accurate and appropriately aligned with current literature and learning objectives.

5. Create Microsoft Forms Quiz:

After approval from the designated faculty, create a survey to display practice questions in Microsoft Forms:

- 1) Enter Microsoft Forms.
- 2) Select “New Quiz” in the top left corner.
- 3) Add an appropriate title and description.

Example Title:

Circulatory Block Exam 3 Practice Questions

Example Description (helpful if distributing practice questions to students):

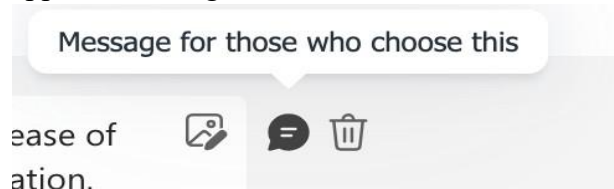
You may use these practice questions as many times as you wish. Select “Recap Questions” after completion of the last question to view explanations of correct and incorrect answers. The questions are not guaranteed to be reflective of questions that will be asked on an exam, as these questions were AI-generated and reviewed by select faculty members. It is possible that there are errors or inaccuracies. If you encounter these, reach out to **[insert proper contact information here]**.

- 4) Quick start with “Choice”.
- 5) Click on the settings icon at the top of the screen and select settings as shown below in both text and image formats. These settings ensure that students can complete the survey multiple times and view explanations after completing the questions. Settings may be altered at the discretion of the question writer.
 - a. Option for quiz: Turn on “Practice mode” and ensure “Show results automatically” is turned on
 - b. Who can fill out this form: Select “Anyone can respond”
 - c. Options for responses: Ensure “Accept responses” and “Allow respondents to save their responses” are the only boxes selected
 - d. Response receipts: Select “Allow receipt of responses after submission”

The image shows a settings interface for a survey or quiz. It is divided into four main sections:

- Option for quiz:** Contains two toggle switches. "Practice mode" is turned on (blue). Below it, text says "Respondents can practice at their own pace and see correct answers for each question before submitting. [Try a demo](#)". "Show results automatically" is also turned on (blue). Below it, text says "Responders will see their results and correct answers immediately after submitting the quiz."
- Who can fill out this form:** Contains three radio button options. The first, "Anyone can respond", is selected (blue circle). Below it, text says "Anonymous response, doesn't require sign-in". The other two options are "Only people in University of Nebraska Medical Center can respond" and "Specific people in University of Nebraska Medical Center can respond".
- Options for responses:** Contains a list of checkboxes. "Accept responses" is checked (blue). Other unchecked options include "Start date", "End date", "Set time duration" (with an info icon), "Shuffle questions", "Disable question number for respondents", "Show progress bar" (with an info icon), "Hide Submit another response", "Customize thank you message", "Allow respondents to save their responses" (checked, blue), and "Allow respondents to edit their responses".
- Response receipts:** Contains a list of checkboxes. "Allow receipt of responses after submission" is checked (blue). Other unchecked options include "Get email notification of each response" and "Get smart notification emails to track" (with an info icon).

- 6) Paste a question in the text box labeled “question”. At the discretion of the question writer, include the associated lecture and/or learning objective in the same text box for reference. Utilize the image icon () within the text box to include images or other media.
- 7) Add all answer choices in the text boxes labeled “Option 1, Option 2, etc.” Utilize the image icon () within the text boxes to include images or other media.
- 8) As you hover over each answer choice, a message bubble, along with other icons will appear to the right of the text box:



Click the message bubbles for each answer choice and add the *entire* explanation, for *every* answer choice, to each “message for those who choose this” text box. This way, when students finish the survey and review their answers, they will be able to see why *every* answer is correct or incorrect via this text box.

- 9) Select the grey checkmark icon next to the designated correct answer (). The grey checkmark will turn green once selected (). Grey “x” icons will automatically appear next to the other incorrect choices ()
- 10) Repeat Steps 6-9 for all questions. Each new question should be also be “Choice”.
- 11) Distribute practice questions.