

A guide to using Bloom's Taxonomy for writing Learning Objectives (LO), and Critical Thinking Questions (CTQ)

Developed by Briju Thankachan Ph.D.
Office of Faculty Learning, Development and Scholarship

Learning objectives ask for a specific behavior that demonstrate learning.



X = fact, concept, principle, rule, procedure OR disease, signs & symptoms, diagnosis, treatment, drugs etc....

Bloom's Taxonomy	KNOWLEDGE <i>Recall information.</i>	COMPREHENSION <i>Interpret information in your own words.</i>	APPLICATION <i>Use knowledge in a familiar or new situation.</i>	ANALYSIS <i>Break down knowledge into parts and show relationships among parts.</i>	SYNTHESIS <i>Bring together part of knowledge to form a whole and build relationships for new situations.</i>	EVALUATION <i>Make judgements on basis of given criteria.</i>
Action Verbs for Learning Objectives (LO)	<ul style="list-style-type: none"> list name define label find locate match state identify 	<ul style="list-style-type: none"> describe explain illustrate interpret restate report discuss outline 	<ul style="list-style-type: none"> use demonstrate apply solve employ 	<ul style="list-style-type: none"> analyze compare contrast differentiate discriminate distinguish classify examine separate categorize 	<ul style="list-style-type: none"> synthesize organize assemble arrange construct create plan design prepare setup invent compose formulate manage write 	<ul style="list-style-type: none"> evaluate judge predict rate assess choose select decide value verify recommend appraise
Learning Objectives Example: At the end of this module, students will be able to:	<ul style="list-style-type: none"> List the steps in CPR procedure. Define CPR. Identify C-A-B 	<ul style="list-style-type: none"> Describe rescue breathing. Explain AED. 	<ul style="list-style-type: none"> Demonstrate CPR. Use automated external defibrillator (AED). 	<ul style="list-style-type: none"> Compare child CPR and adult CPR. Distinguish between chest compressions and rescue breathing. 	<ul style="list-style-type: none"> Plan a CPR for adults, children and infants. 	<ul style="list-style-type: none"> Evaluate a CPR procedure. Decide when to use AED. Recommend a CPR procedure.
Critical Thinking Questions (CTQ)/ Discussion Questions for Learning Activities (You can use CTQ/DQ in reading guides and in class activities)	<ul style="list-style-type: none"> Can you list X? Can you name X? Can you provide a definition for X? Where is X? Can you select X? Which is true or false, X or Y? When did X happen? How many X? What are the steps in X procedure? 	<ul style="list-style-type: none"> Can you describe X in your own words? How do you describe X? Can you explain X in your own words? Can you interpret X in your own words? What is the main idea of X? Can you restate X in your own words? Can you report major ideas in X? Can you discuss major points in X? Can you outline major points in X? What is the theme of X? 	<ul style="list-style-type: none"> How would you use X? Can you demonstrate X? How would you solve X? How does disease X work in the body? How do you prevent disease X? How do you screen disease X? How do you treat disease X? Can you group by characteristics such as X and Y? 	<ul style="list-style-type: none"> How do you analyze X? How do you compare X and Y? How is X related to Y? What are the parts of X? How do you discriminate X? How do you distinguish between X and Y? How do you categorize X? How do you classify X? If X happened, what might the ending have been? Which events could have happened after X? What do you see as other possible outcomes of X? Can you explain what must have happened when X interacted with Y? What are some of the problems of X? What facts would you select to show X? 	<ul style="list-style-type: none"> How do you synthesize X? How do you organize X? How do you assemble X? How do you construct X? How do you create X? How do you plan for X? How do you design X? How do you prepare X? How do you setup X? How do you compose X? How do you formulate X? How do you manage X? How do you write X? If you had access to all resources how would you plan/design/construct/prepare/setup/arrange X? If you had access only to limited resources how would you plan/design/construct/prepare/setup/arrange X? 	<ul style="list-style-type: none"> How would you evaluate X? How would you predict X? How would you rate X? How would you assess X? How would you select X? How would you decide X? How would you verify X? How would you justify X? How would you prove X? What would be the outcome if X? What inference can you make about X? What conclusions can you draw about X?

Essential Parts of a Learning Objective

1. Action Verb - observable action by the learner is the most critical part of the objective.

Example: Describe Coronavirus, List the symptoms of COVID-19

2. Content Reference - describes the content addressed by the objective.

Example: List the symptoms of COVID-19

Optional Parts of a Learning Objective

3. Conditions of Performance - 'tools' or 'information' learners will be given to perform their learning. Often use this at the beginning of the objective.

Example: Based on the assigned reading, compare Corona virus and influenza virus.

4. Level of achievement - standards or criteria or the minimum acceptable performance (How well? How much? How accurate? How complete? In what time?)

Example: Demonstrate wearing a mask, with at least 90 percent accuracy in the steps listed in the procedure.

Reference: Morrison, Ross, Kalman & Kemp (2013) Designing effective instruction (Seventh Edition). NJ, Wiley Publishing.

Bloom's Taxonomy

Testing Knowledge: Check List for Writing effective Multiple-Choice questions (MCQ)

Developed by Briju Thankachan Ph.D.
Office of Faculty Learning, Development and Scholarship

The main purpose of a Bloom's Taxonomy higher level application question is - **the learner will recall (facts, concepts, principles/rules, procedure) and then apply in a significant life situation or context/scenario.**


Three Elements of a higher-level Multiple-Choice Question:

STEM (Significant life situation or Context/Scenario)
Lead in Question
Answer Options

The following check list will guide you to evaluate a question in MCQ format.

STEM (Significant life situation or Context/Scenario)		Good Example		Your Evaluation	
		Yes	No	Yes	No
1.	Does this STEM align with a measurable learning objective ?	X			
2.	Does this STEM have a significant life situation (high frequency/high impact) or Context/Scenario?	X			
3.	Does this STEM have unnecessary or irrelevant information?		X		
4.	Does this STEM have explanatory information (teaching) ?		X		
5.	Does this STEM have an Imprecise terminology (e.g., "For a long time", "frequently", "rarely", "seldom", "occasionally", "sometimes", "few", and "many")		X		
6.	Does this STEM have more than 150 words ?		X		
CLINICAL SCENARIO (Only for Medical Education)					
	Demographics (age/sex, site of care)	X			
	Reason for presentation	X			
	Findings from the health history	X			
	Vital signs	X			
	Findings from the physical examination	X			
	Diagnostic test results (optional)	X			
LEAD IN QUESTION					
7.	Is this negatively phrased (does it have EXCEPT or NOT)?		X		
8.	Is this asking for a single best answer?	X			
9.	Does the lead question depend on the STEM?	X			
10.	Can a knowledgeable examinee provide correct answer without looking at the answer options (Cover up test)?	X			
11.	Does this apply "bury the verb" and/or 'multi-logic thinking', to prompt the learner for evaluation and discrimination? (e.g., changing the verb 'describe' to 'description'. 'best description', 'most likely')	X			
ANSWER OPTIONS					
12.	Is the "Correct answer" being the longest or most comprehensive?		X		
13.	Are the distractors (incorrect answer options) in the same category (e.g., diagnoses, tests, treatments)?	X			
14.	Are there any "K-type" options, where one or more options may be correct (e.g., X; Y; Z; X & Y; X, Y, & Z)?		X		
15.	Is the numeric data consistent?	X			
16.	Does the answer options have implausible and unlikely option?		X		
17.	Does the answer options have "always", "never", "none" "all of the above", "none of the above"?		X		

POOR EXAMPLE



Measurable learning objective ?

Unnecessary or irrelevant information


Learning Objective: Understand CPR

You find a 38-year-old ~~Asian~~ male unconscious ~~at a hiking trail in the Great Smoky Mountain National Park~~ and does not appear to be breathing. ~~You have called 911. After a few attempts to deliver a rescue breath (manually push oxygen in and out of a victim's lungs)~~ by you, the patient is still in a difficult position to ventilate properly.

Imprecise Terminology

Teaching

GOOD EXAMPLE



Learning Objective: Evaluate rescue breathing

A 38-year-old man is unconscious and does not appear to be breathing. On your first attempt to deliver a rescue breath, the patient is in a difficult position to ventilate properly.

What is the next best step?

A. Use Automated External Defibrillator (AED)
B. Repeat the head tilt/chin lift maneuver and breath*
C. Use abdominal thrusts and breath again
D. Use Heimlich maneuver and breath again

References

Collins, J. (2006). Writing Multiple-Choice Questions for Continuing Medical Education Activities and Self-Assessment Modules. RadioGraphics, 26(2), 543-551.
Morrison, Ross, Kalman & Kemp (2013) Designing effective instruction (Seventh Edition). NJ, Wiley Publishing.
National Board of Osteopathic Medical Examiners (NBOME) - Item Writing 101: Multiple Choice Items with Realistic Clinical Scenarios.

How to cite this document: Thankachan, B., (2020) Testing Knowledge: Check List for Writing effective Multiple-Choice questions (MCQ)
Acknowledgement: I would like to thank Dr. Paul G Koles and the HCOM Faculty for their useful and constructive recommendations on this checklist.