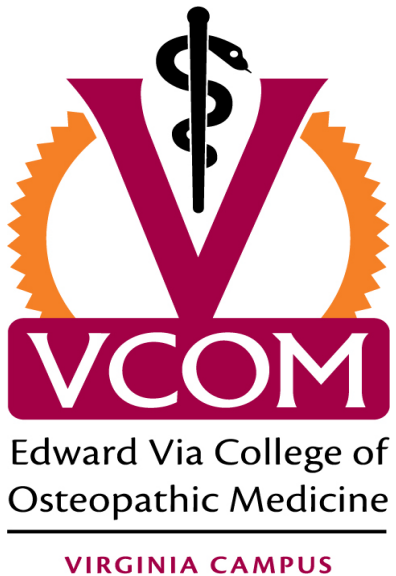


Conference on Higher Education Pedagogy 2023

Best Practices in Writing Multiple Choice Questions

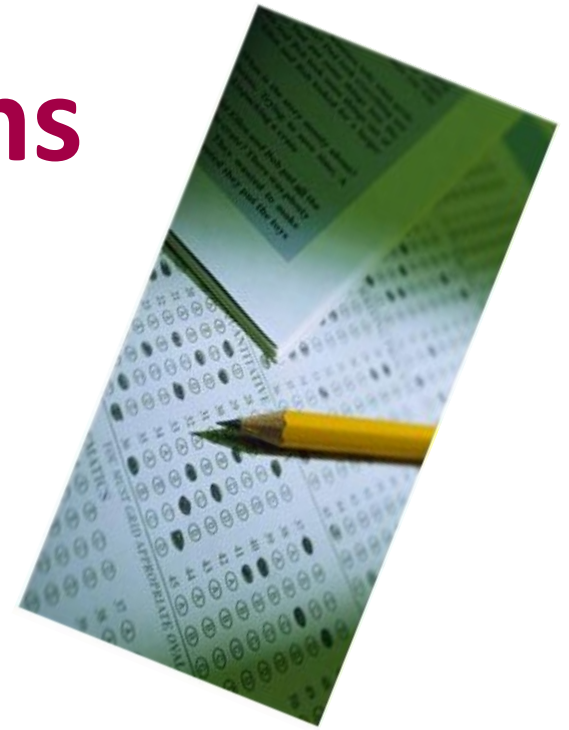
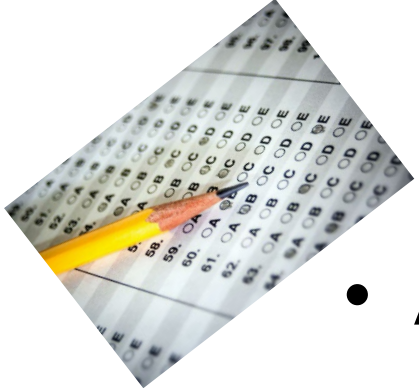


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High Stakes & Licensure Exams within Health Fields

- All utilize multiple choice formats
- All have strict writing/format criteria based on best practices





Constructing Written Test
Questions for the Basic
and Clinical Sciences



National Board of Medical Examiners
3750 Market Street
Philadelphia, PA 19104



Free download +
dissemination from
the National Board
of Medical Examiners

Reference for this presentation

Goal of a Multiple Choice Item



Students with superior subject knowledge are more likely to choose the correct alternative and students with less adequate subject knowledge are more likely to choose a wrong alternative.

Item Analysis Used to Measure Discrimination

Item 1: 50% of the class answered correctly, including 50% of those who earned an A and 50% of those who earned a D or F.

Item 2: 50% of the class answered correctly. Of those who earned an A, 88% answered correctly, while only 38% of those who earned a D or F answered correctly.



Components of an Multiple Choice Item

stem

A 65-year-old man has difficulty rising from a seated position and straightening his trunk, but he has no difficulty flexing his leg. Which of the following muscles is most likely to have been injured?

answer set

- A. Gluteus maximus
 - B. Gluteus minimus
 - C. Hamstrings
 - D. Iliopsoas
 - E. Obturator internus
-

The Stem

A 65-year-old man has difficulty rising from a seated position and straightening his trunk, but he has no difficulty flexing his leg. Which of the following muscles is most likely to have been injured?

- May contain a lead-in prior to the question
 - Most important part of the item
 - Requires the most effort to write correctly
-

“Cover the Options”

Rule for Writing Stems

Each stem should contain sufficient information such that knowledgeable students should be able to give the correct answer without looking at the answer set.

Does this stem contain sufficient information?

stem

A 65-year-old man has difficulty rising from a seated position and straightening his trunk, but he has no difficulty flexing his leg. Which of the following muscles is most likely to have been injured?

answer set






Example of a Stem that Lacks Sufficient Information



Basophils _____.

- A. are only derived from lymphoid tissue located in Peyer's patches.
 - B. are the most common leukocyte in circulating blood.
 - C. have granules containing vasoconstricting mediators
 - D. have nuclei that typically contain 4-6 lobes.
 - E. participate in allergic reactions by binding to IgE molecules.
-

More Examples of Stems that Lack Sufficient Information

-  Which of the following is TRUE regarding basophils?
 -  Which of the following is FALSE regarding basophils?
 -  All of the following are true of basophils EXCEPT:
-

Questions should be asked in the positive versus the negative.

 Which of the following is NOT a risk factor for type II diabetes?

however

✓ What is the least likely site of metastasis?

✓ Which antidepressant would be contraindicated?

Phrasing in the Question

- avoid the use of imprecise phrases
ex. associated with, often, usually, frequently, etc.
 - get in the habit of using phrases such as “most likely” and “best”
-

Miscellaneous Rules for Stems

- Should be ≤ 5 lines in length
- Should contain only relevant information
- Should not have irrelevant difficulty
- Grammar and syntax should not eliminate potential answers



Avoid Pseudo Cases

...they contain irrelevant information

A 37-year-old man was admitted to the hospital with the chief complaint of abdominal cramping and bloody diarrhea. These symptoms have been present for over a month. Upon further workup a diagnosis was made of ulcerative colitis. What type of epithelium lines the colon?

Components of an Exam Question

stem

A 65-year-old man has difficulty rising from a seated position and straightening his trunk, but he has no difficulty flexing his leg. Which of the following muscles is most likely to have been injured?

answer set

A. Gluteus maximus

B. Gluteus minimus

C. Hamstrings

D. Iliopsoas

E. Obturator internus

distractors

All choices in the answer set should be ...

- Plausible answers
- Homogenous in content
- Similar in terms of construction and length
- Arranged in alphabetical or numerical order

A. Gluteus maximus
B. Gluteus minimus
C. Hamstrings
D. Iliopsoas
E. Obturator internus



Additional Rules for Choices

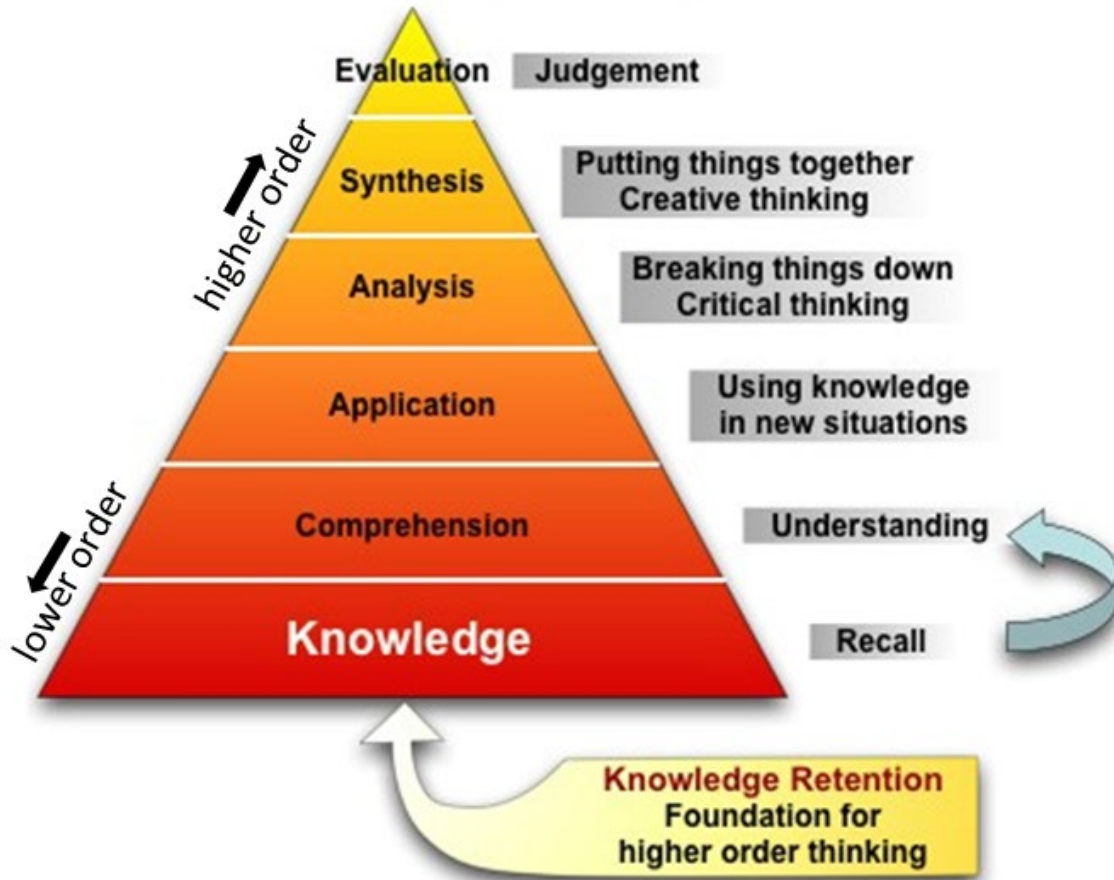
- Do not use “all of the above” or “none of the above.”
 - Avoid use of distractors that are opposites unless you use 2 sets of opposites
 - Do not use more choices than there are choices to use/ do not make up words in choices.
-

General Rules for Stems & Answer Sets

- Avoid abbreviations
- Most items should consist of long stems with short answer sets



Can multiple choice items require higher order thought?



answer:

YES

Higher Order Multiple Choice Items

Do not focus on making the questions harder – focus instead on making the learner use more thought processes.



Lower Order Item #1

Which leukocyte is a major contributor to pus?

- A. basophil
 - B. eosinophil
 - C. lymphocyte
 - D. monocyte
 - E. neutrophil
-

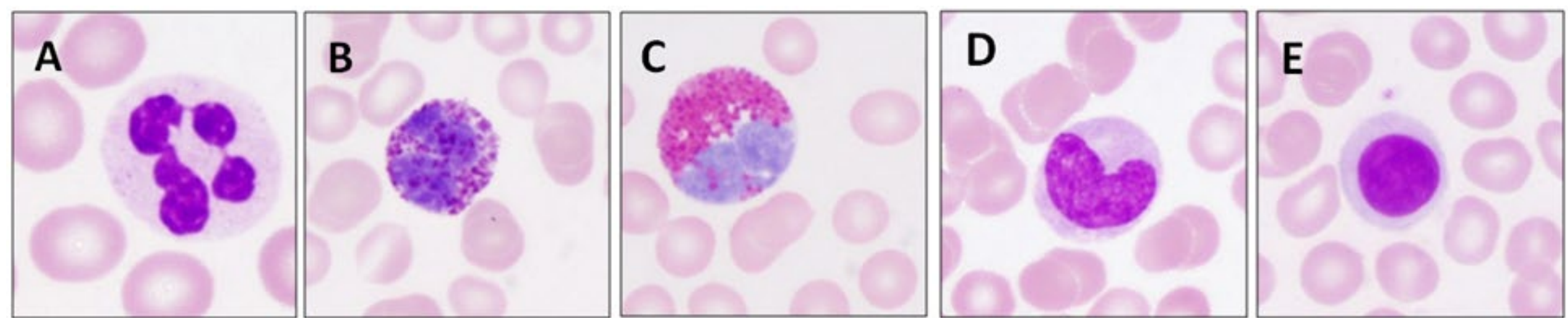
... adding another thought process

A 37 year old male presents with a perianal abscess. Upon lancing, a thick, yellow exudate is drained. What leukocyte was the largest contributor to this exudate?

- A. basophils
 - B. eosinophils
 - C. lymphocytes
 - D. monocytes
 - E. neutrophils
-

... adding yet another thought process

A 37 year old male presents with a perianal abscess. Upon lancing, a thick, yellow exudate is drained. Which leukocyte was the largest contributor to this exudate?



Lower Order Item #2

Which muscle or muscle group is the major extensor of the thigh?

- A. gluteus maximus
 - B. gluteus minimus
 - C. hamstrings
 - D. iliopsoas
 - E. obturator internus
-

... adding another thought process

A 65-year-old man has difficulty rising from a seated position and straightening his trunk, but he has no difficulty flexing his leg. Which of the following muscles is most likely to have been injured?

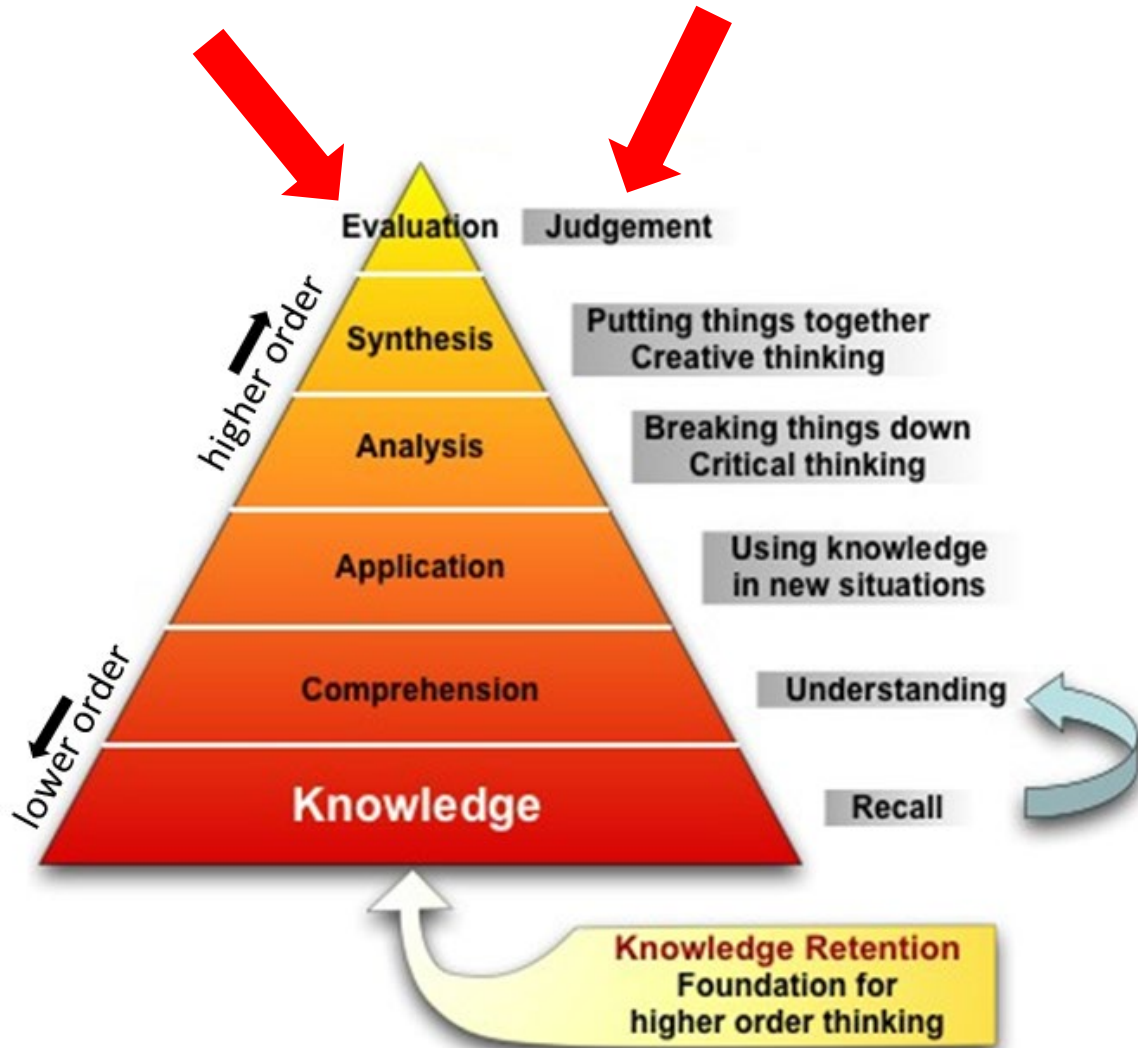
- A. gluteus maximus
 - B. gluteus minimus
 - C. hamstrings
 - D. iliopsoas
 - E. obturator internus
-

... adding yet another thought process

A 65-year-old man has difficulty rising from a seated position and straightening his trunk, but he has no difficulty flexing his leg. Which of the following nerves is most likely to have been injured?

- A. femoral nerve
 - B. inferior gluteal nerve
 - C. obturator nerve
 - D. sciatic nerve
 - E. superior gluteal nerve
-

Highest order items require evaluation and judgment.



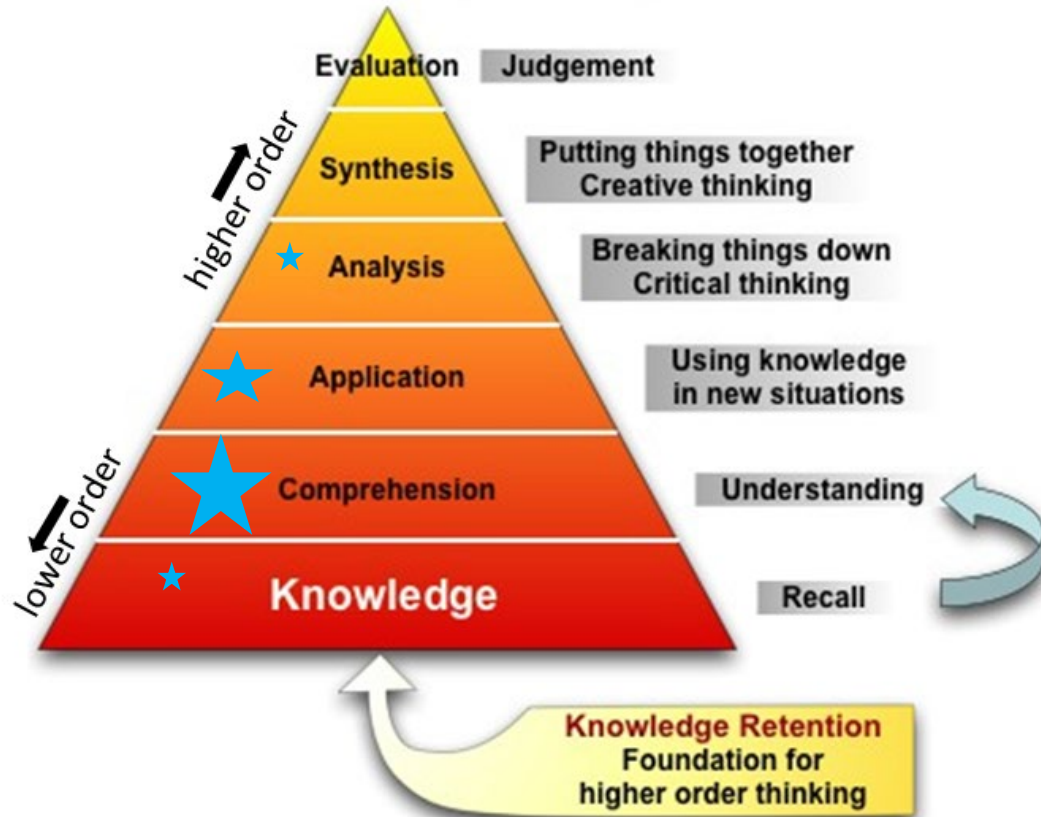
- Multiple answer choices could be correct, but one answer clearly the most correct
- Students must use judgment of which is the most correct answer
- Requires the use of “best” or “most likely” in the stem

Example of a Question Requiring Evaluation and Judgment

Three of the four children in a family have erythropoietic protoporphyria, a rare autosomal dominant disorder. Neither parent has the disorder nor is there a history of this disease within their lineage that can be traced for five generations. Which of the following best explains the finding of this disorder within the children?

- A. A gonadal mutation in one of the parents. ← potentially correct answer
 - B. Allelic heterogeneity for the disorder.
 - C. *De novo* mutations in each of the children. ← potentially correct answer
 - D. Reduced penetrance for this disorder. ← potentially correct answer
 - E. Variable expressivity of the disorder.
-

A Warning on Exam Composition



- Most of your items will test comprehension & application, & occasionally higher levels.
- Exams should be composed with defined proportions of item levels.

