

Objective assessment



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Department for Education Innovation

100
1908 - 2008



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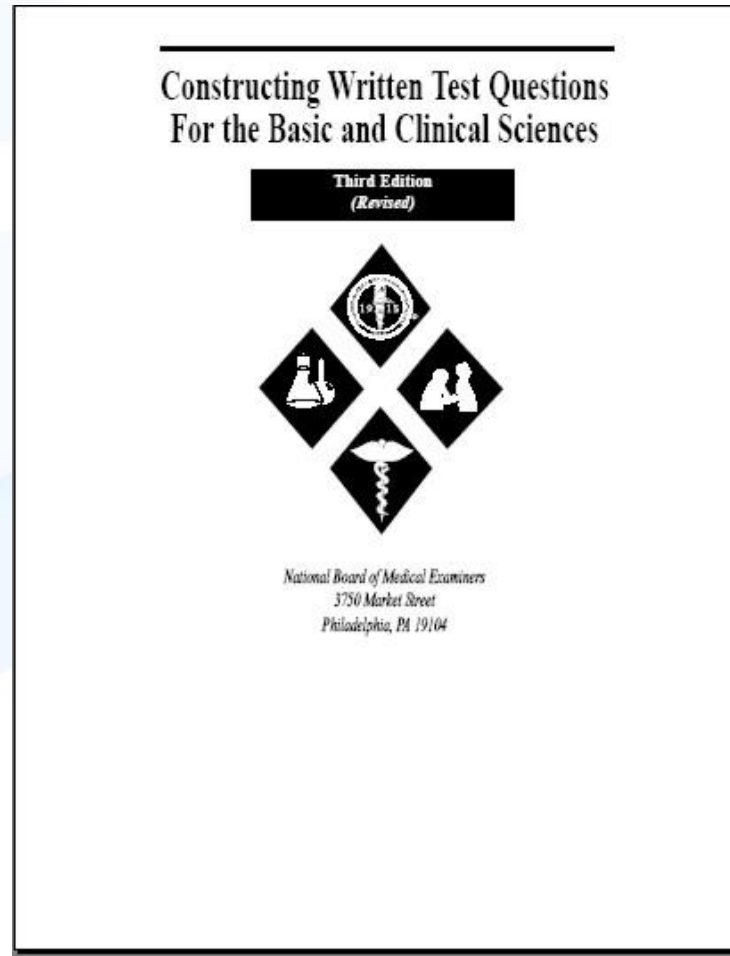
Outcomes for this session

After this session you should be able to:

- discuss the principles of objective assessment
- motivate the use of multiple choice questions
- identify weaknesses in MCQ practice
- write valid MCQ items
- know when not to use MCQs
- interpret statistical data

National Board of Medical Examiners (USA)

- <http://www.nbme.org/>





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NBME Subject Examinations

The NBME provides subject examinations in the basic and clinical sciences for the purpose of assessing the educational achievement of individuals in specific subject areas. These examinations are provided to medical schools and other institutions with a legitimate interest in the education of physicians or other health professionals.

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Transition to Web-Based Examinations

The NBME is transitioning its Subject Examinations to a web-based format, however paper subject examinations will continue to be available.

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What's New?



USMLE

[Availability of USMLE 2011 Bulletin of Information / Application Materials](#)

- [Delay in USMLE Step 2 CK Score Reporting](#)
- [Change in Minimum Passing Requirements for Step 2 CK](#)
- [Expanded Testing Capacity at Philadelphia CSEC Center Beginning in July 2010](#)

Date Updated: August 30, 2010

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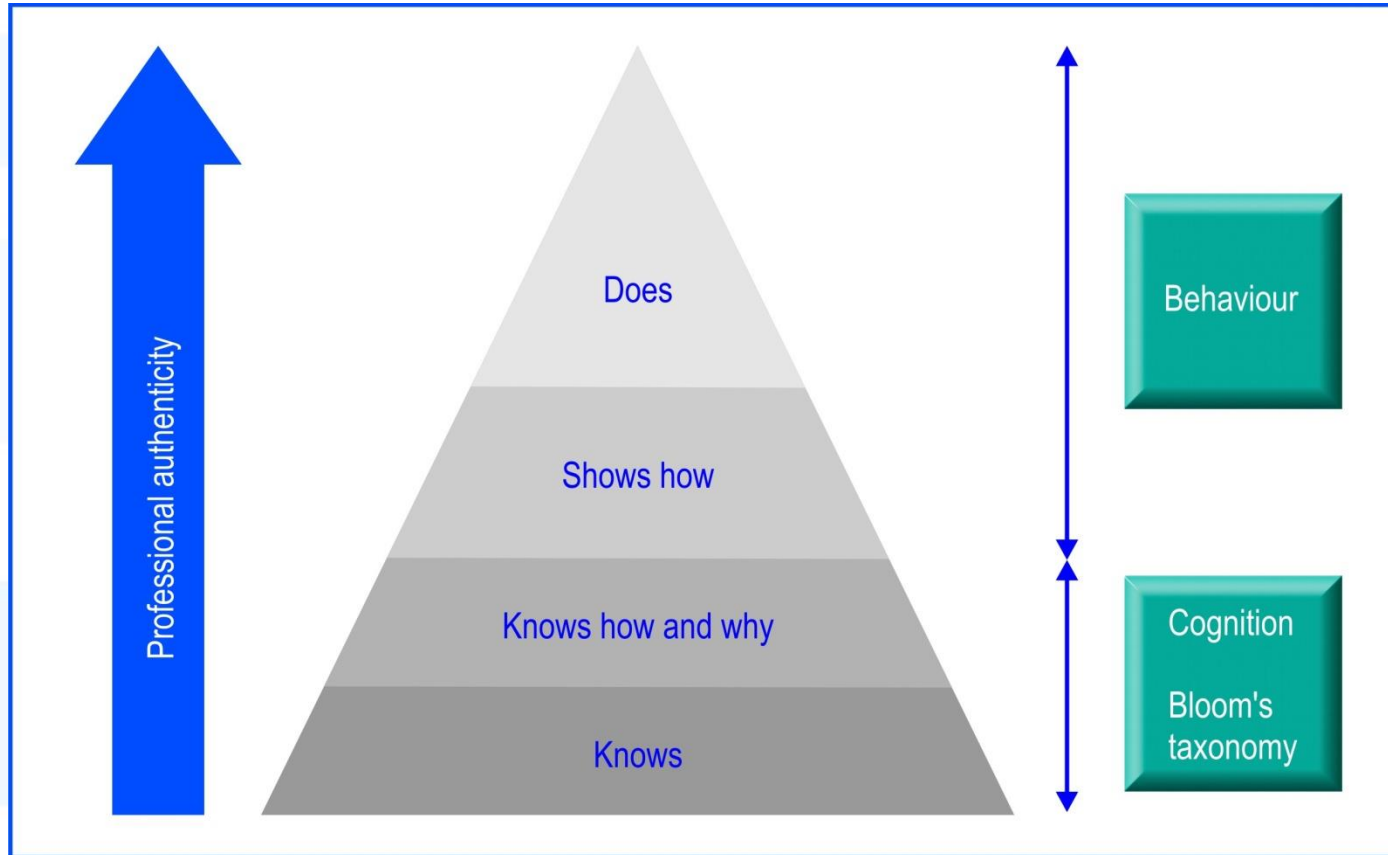
General guidelines



Keep the following in mind:

- Subject
- Learning outcomes
- Target group
- Item writing techniques

Miller's pyramid



Bloom's taxonomy

Learning Outcome	Verbs for measuring outcomes in test questions
Knowledge	Define, describe, identify, label, list, match, name, outline, reproduce, select, state
Comprehension	Convert, defend, distinguish, estimate, explain, extend, generalize, give examples, infer, paraphrase, predict, rewrite, summarize
Application	Change, compute, demonstrate, discover, manipulate, modify, operate, predict, prepare, produce, relate, show, solve, use
Analysis	Break down, diagram, differentiate, discriminate, distinguish, identify, illustrate, infer, outline, point out, relate, select, separate, subdivide
Synthesis	Categorize, combine, compile, compose, create, devise, design, explain, generate, modify, organize, plan, rearrange, reconstruct, relate, reorganize, revise, rewrite, summarize, tell, write
Evaluation	Appraise, compare, conclude, contrast, criticize, describe, discriminate, explain, justify, interpret, relate, summarize, support

Types of items

- **Choice items**

- Multiple choice items
- Multiple response items
- Matching and extended matching items
- True and false items
- Hot spot items

- **Supply items**

- Filling in missing words/phrases/numbers

Terminology

- **Stem**
 - Question
 - Problem
 - Statement
- **Options**
 - Distracter (wrong answers)
 - Key (correct answer)

The item must measure one important goal

Pretoria:

- A. has the largest residential university in South Africa.
- B. was named after Hendrik Potgieter.
- C. is the oldest village in Gauteng.
- D. has a larger population than Durban.

What is the executive capital of South Africa?

- A. Cape Town
- B. Durban
- C. Bloemfontein
- D. Pretoria

Avoid negative statements in the stem

Which procedure is **NOT** recommended for the victim of an accident?

- A. Do not leave the victim alone.
- B. Do not move the victim.
- C. Notify the police.
- D. Do not talk to the victim.

$P = \{2;3;5;7;11;13;17\}$

Which one of the following sets is **NOT** a subset of p ?

- A. $\{3;7;11\}$
- B. $\{0\}$
- C. $\{\text{prime numbers smaller than } 19\}$
- D. $\{11;17;5;2\}$

There should be only one correct or clearly best answer

In which of the following cases do hail storms cause the most damage?

- A. Livestock
- B. Windows
- C. Crops

The greatest economic loss caused by hail storms to the country as a whole is a result of damage to

- A. livestock.
- B. windows.
- C. crops.

Make sure that options follow grammatically from the stem

The financial institutions which lends money principally to bona fide farmers against a first bond is the

- A. national finances corporation
- B. Land and agricultural bank
- C. Department of Agricultural Credit and Property Ownership
- D. an agricultural managing body
- E. an agricultural corporation

All options should be of similar length



Reasons for structure failure:

- A. Bad design.
- B. Inferior materials.
- C. A mismatch between the power exerted on a particular node and the strength of the applicable composite material utilised for the product in question.
- D. Budget constraints.

All options should be homogeneous

The battle of Hastings took place in

- A. Sussex.
- B. 1066.
- C. Hastings.
- D. early May.
- E. good weather.

Students should not be able to derive the correct answer from the wording of the question

Name the principle according to which the goal of a better community is pursued by socialising the means of production.

- A. Anarchism
- B. Capitalism
- C. Colonialism
- D. Patriotism
- E. Socialism

Avoid items where options overlap

The average height of an American male is

- A. less than 5 foot 3 inches.
- B. less than 5 foot 5 inches.
- C. more than 5 foot 7 inches.
- D. more than 5 foot 9 inches.

Avoid using absolute, frequency and vague terms



Regular testing will help students to study more effectively because it

- A. encourages everyone to work harder.
- B. makes the student aware of his/her progress.
- C. gives everyone the feeling of success.
- D. prevents any one from neglecting homework.

Avoid using “all of the above” and “none of the above”



When the temperature drops, tyre pressure tends to:

- A. decrease.
- B. increase.
- C. stay the same.
- D. none of the above.

Place numerical options in numeric order

What is the optimum monthly transaction balance for a person earning R3000 per month? The interest rate is 18% per annum and the transaction cost is fixed at R10.

- A. R1000
- B. R289
- C. R1 500
- D. R329

- A. R289
- B. R329
- C. R1000
- D. R1500

The stem of the item must include as much as possible of the wording

The meaning of the word “coup d’état” may be described as:

- A. change resulting from a royal decree.
- B. change resulting from an unfair election.
- C. change resulting from a mutual agreement.
- D. change resulting from a violent state reform.
- E. change resulting from a hierarchical restructuring.

The meaning of the word “coup d’état” may be described as change resulting from:

- A. a royal decree.
- B. an unfair election.
- C. a mutual agreement.
- D. a violent state reform.
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Recap

- Each item should focus on an important concept
- Each item should assess application of knowledge – not recall of an isolated fact
- Stem of the item must pose a clear question
- All distracters should be homogeneous
- Avoid technical flaws

Item analysis

- Level of Difficulty
- Discrimination index
- Effectivity of distracters

Level of difficulty

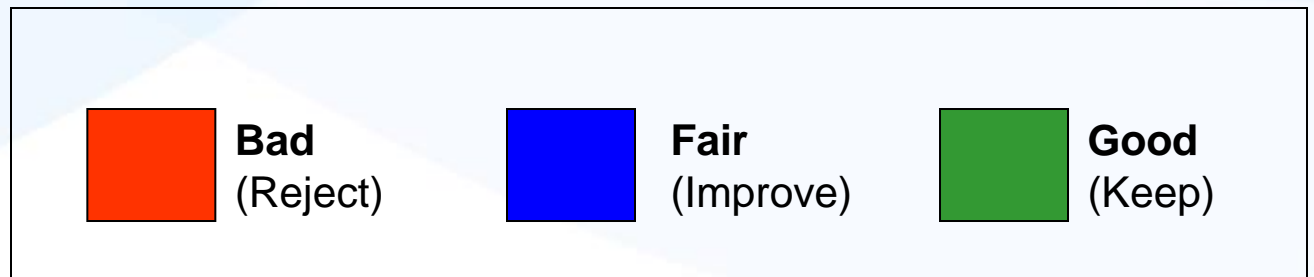
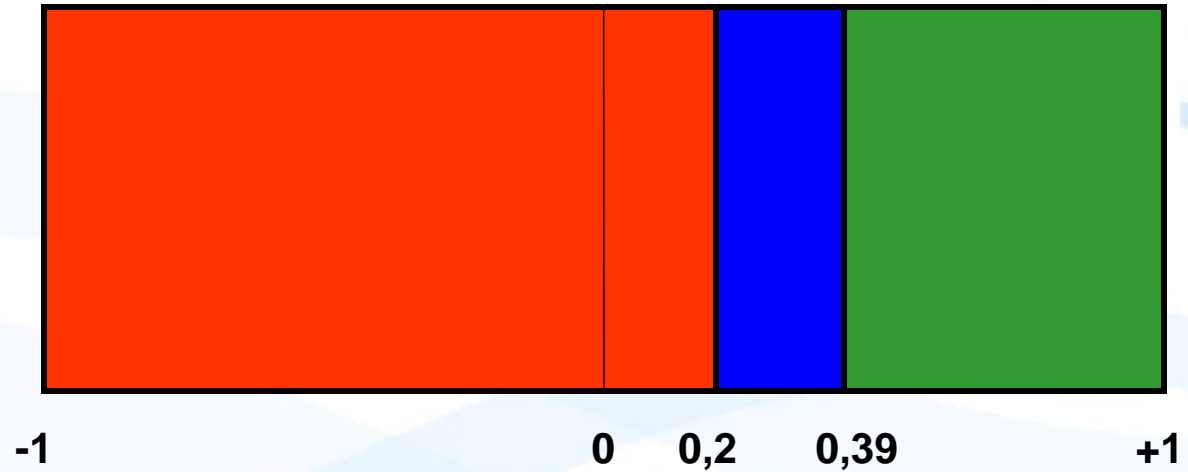
- % of candidates who responded correctly
- Population sensitive
- **Number of students who responded correctly x 100**
Total number of students

Discrimination Index

- Ability of item to discriminate between capable and less capable students (+ and -)
- Process:
 - Rank test scores (high to low)
 - Divide into four equal parts
 - Top = bottom (25%)

- Calculation
$$D = \frac{N_h - N_l}{N_h \text{ (or } l)}$$

Discrimination Index



Effectivity of alternatives

- All alternatives to attract responses
- Distracters: Acceptable, but wrong!
- Avoid success by elimination

Effectivity of alternatives

- Option A = 30%
- **Option B = 27%**
- Option C = 25%
- Option D = 18%

Difficulty = .27

Discrimination = 0.29

Effectivity of alternatives

- Option A = 22%
- **Option B = 58%**
- Option C = 19%
- Option D = 1%

Difficulty = .58

Discrimination = -0.13

Effectivity of alternatives

- Option A = 8%
- Option B = 50%
- Option C = 30%
- **Option D = 12%**

Difficulty = .12

Discrimination = 0.46

Item analysis

Consider all indicators when evaluating an item!

Good practice

- Keep a notebook and jot down possible items.
- Collect items from others.
- To develop challenging items think of the problems first and translate into items, and check.
- Put the drafts to one side for a few days.
- Revise them.
- Try them on a critical friend.
- Include problem solving, applied and practical questions.
- Group items according to acceptable classification (subject matter or type).
- Ideally have all items checked by departmental(?) committee.
- Analyze statistics to improve practice.

Questions?

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