

Item Development 101



Multiple-Choice
Test Questions for
Licensure and
Certification
Exams

Item Development 101 – Multiple-Choice Test Questions for Licensure and Certification Exams

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Welcome!

- ★ Introductions
- ★ Purpose of the Seminar
- ★ Overview of the Seminar

★ The Test Development Cycle

- * Job Task Analysis
- * Test Blue Prints
- * **Item Development**
- * Field Testing
- * Statistical Review
- * Operational Testing
- * Reporting

Item Types - Terminology

Multiple-Choice

A question with answer choices from which the examinee selects the best or correct response

Open-Ended or Constructed Response

A problem or question for which the examinee produces his/her own response

Getting Started

What are the characteristics of good multiple-choice test questions?


Terminology

Item	Each problem or question presented to the examinee
Stimulus	The material upon which the question is based (e.g., reading passage, graphic art, tables, charts, diagrams)
Stem	The question or statement to which the examinee must respond
Distractors	The plausible yet incorrect answer options
Key	The best or correct answer of the choices presented
Rationale	A brief explanation or justification for the key and each distractor

Example Item

Stem Mr. Flores stands on a scale that measures weight in pounds. How much does he weigh?

Art



Distractor A. 163 pounds
Rationale [The needle is 3 marks past 160: $160 + 3 = 163$.]

Distractor B. 167 pounds
Rationale [There are 2 marks showing past 165: $165 + 2 = 167$.]

Key C. 168 pounds
Rationale [The needle is 3 marks past 165: $165 + 3 = 168$.]

Distractor D. 172 pounds
Rationale [The needle is 2 marks from 170: $170 + 2 = 172$.]

Considerations for Writing Test Items

- ★ Understanding the Purpose of the Exam
- ★ Creating Effective Questions
- ★ Linking Items to Objectives
- ★ Assessing Thinking Skills
- ★ Identifying Potential Bias/Sensitivity

★ Understanding the Purpose of the Exam

Example: The purpose of the National Board Examination (NBE) is to provide official licensing agencies with a national evaluation of an applicant for licensure in the diverse areas of competency required for the field of funeral service.

★ Creating Effective Questions

Effective questions...

- * assess important knowledge, skills, or abilities.
- * are realistic and practical.
- * are challenging and engaging.

★ Linking Items to Objectives

Items must measure what they purport to measure.

- * Use the objective as the guide to write the item
- * Use the objective to evaluate the item
- * Use content-specific terminology appropriate for the targeted audience

★ Assessing Thinking Skills

Challenge candidates to demonstrate the full range of their knowledge and skills.

- * Lower-level skills – recall, rote skills, comprehension, and application
- * Higher-level skills – critical thinking, analysis, non-routine application and problem solving, and evaluation

★ Assessing Thinking Skills

Low-level skills

- * Predict
- * Summarize
- * Describe
- * Interpret
- * Distinguish
- * Apply
- * Demonstrate
- * Classify
- * Solve
- * Calculate

High-level skills

- * Explain
- * Analyze
- * Compare
- * Contrast
- * Combine
- * Generalize
- * Hypothesize
- * Formulate
- * Justify
- * Conclude

★ Identifying Potential Bias/Sensitivity Concerns

- * Sensitivity
- * Fairness
- * Bias

Sensitivity

Be aware of issues that are emotionally upsetting or distracting to an examinee.

- * Extremes in socioeconomic conditions
- * Unfair representation of groups
- * Controversial topics

Fairness

Provide an equal opportunity for success.

- * Item measures the intended objective
- * Content, context, and vocabulary are level appropriate for the desired licensure or certification
- * Groups treated with dignity and respect

Bias

Present when the performance of a group differs noticeably from that of the overall examinee population.

Evaluate for Potential Bias

- Groups
 - Ethnic, racial, or cultural background
 - English language learners
 - Gender
- Geography
 - Geographic setting
 - Slang and regional terms
- Stereotypes
 - Names
 - Roles

Avoid Gender Stereotyping

man's search for knowledge

man, mankind

manpower

chairman

foreman, policeman,
stewardess, mailman

congressman

housewife

Avoid Gender Stereotyping

man's search for knowledge	the search for knowledge
man, mankind	person, people, humanity, human beings
manpower	work force, personnel
chairman	chairperson
foreman, policeman, stewardess, mailman	supervisor, police officer, flight attendant, postal worker/letter carrier
congressman	congressional representative
housewife	homemaker

Techniques to Reduce Bias

- ★ Avoid unnecessary references to ethnic, racial, socioeconomic, or cultural backgrounds.
- ★ Distribute a variety of occupations across ethnic backgrounds.
- ★ Use a wide variety of contemporary multicultural names.
- ★ Use proper references for ethnic, racial, and cultural groups.

Techniques to Reduce Bias, cont.

- ★ Avoid stereotyping genders by associating them with certain professions or activities.
- ★ Avoid using local vernacular that many candidates might not understand.
- ★ Use a variety of geographic settings.
- ★ Avoid moral and controversial issues.
- ★ Avoid topics that evoke unpleasant emotions.

A Set of Items Linked to an Objective Should . . .

- * reflect the depth and breadth of the objective.
- * assess somewhat different aspects of the objective when possible.
- * include items asked or presented in a variety of ways.
- * represent a range of difficulty and cognitive skills.
- * be fair and free of bias and sensitivity issues or concerns.

Writing Effective Stems

Effective stems ...

- ★ focus on one idea.
- ★ are clear and concise.
- ★ are phrased appropriately.
- ★ use negative phrasing appropriately.
- ★ assess important and accurate information.

- ★ Effective stems focus on one idea.

The examinee should understand the intent of the question before reading the answer options.

Writing Effective Stems

Flawed item

Objective	Answer questions based on given data
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Andrea collects and trades postage stamps. The bar graph shows the number of stamps she traded each month. Use the graph to determine which statement is true about the number of stamps Andrea traded.

A. If Andrea traded 16 stamps in a month, then that month was March.
 B. If Andrea traded half the number of stamps that she traded in March in a certain month, then that month was February.
 C. If Andrea adds the number of stamps traded in January and February, then the sum will equal the number of stamps traded in March.
 D. If Andrea traded half the number of stamps that she traded in April in a certain month, then that month was January.

Key: B

Writing Effective Stems

Improved item

Andrea collects and trades postage stamps. The bar graph shows the number of stamps she traded each month. Altogether, how many stamps did Andrea trade in March and May?

A. 16 stamps
 B. 22 stamps
 C. 30 stamps
 D. 32 stamps

Key: D

- ★ Effective stems are clear and concise.

- * Avoid opinions
- * Avoid window dressing
- * Provide meaningful contexts

Writing Effective Stems

Objective	Multiply whole numbers
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Multiply: 25×19 .

A. 425
 B. 435
 C. 465
 D. 475

Key: D

Writing Effective Stems *Flawed item*

Objective	Multiply whole numbers
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The Theater Club of West High School is performing a play in the school auditorium. There are 19 rows of seats. Each row contains 25 seats. What is the greatest number of tickets that the Theater Club can sell to fill the auditorium for one performance?

A. 425 tickets
 B. 435 tickets
 C. 465 tickets
 D. 475 tickets

Key: D

Writing Effective Stems *Improved item*

Grade	4
Objective	Multiply whole numbers

The West Elementary auditorium has 19 rows of seats. Each row has 25 seats. How many seats are in the auditorium?

A. 425 seats
 B. 435 seats
 C. 465 seats
 D. 475 seats

Key: D

★ Effective stems are phrased appropriately.

- * Commands
- * Sentence completion
- * Direct questions (preferred)

★ Effective stems use negative phrasing appropriately.

- * Negatively phrased stems are often confusing and difficult for examinees.
- * Negative words are used only when the situation calls for them.

Writing Effective Stems *Appropriately phrased item*

Objective	Evaluate problem scenario to identify questions and necessary and unnecessary information
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A \$4 ticket is sold for every seat in the West Elementary auditorium. The auditorium has 19 rows of seats. Each row has 25 seats. Four times as many students as adults attend the school play. What piece of information is **not** needed to find how much money is collected for tickets to the play?

A. A \$4 ticket is sold for every seat in the West Elementary auditorium.
 B. Four times as many students as adults attend the school play.
 C. The auditorium has 19 rows of seats.
 D. Each row has 25 seats.

Key: B

Effective Stems...

- ★ model correct grammar and usage.
- ★ contain appropriate vocabulary.

Effective Stems Summary

- ★ Include the main idea of the question.
- ★ Be clear and concise.
- ★ Phrase the stems appropriately by determining the most effective questioning technique.
- ★ Use negative phrasing appropriately.
- ★ Assess important content; check accuracy of facts and content
- ★ Check grammar, usage, and vocabulary.

Writing Convincing Response Options

- ★ Use only one best, clearly correct answer
- ★ Develop plausible distractors
- ★ Avoid implausible distractors
- ★ Use homogeneous answer choices
- ★ Avoid clues
- ★ Be efficient

★ Use only one best, clearly correct answer

- * Avoid answer choices that overlap.
- * Avoid answer choices that are subsets of another option.
- * Avoid answer choices that could be defended as equally correct.

★ Develop plausible distractors

Plausible distractors include...

- * typical mistakes (e.g. computation errors).
- * statements that sound logical and that may or may not be based on the material given in the question.
- * true statements that do not answer the question.

★ Avoid implausible distractors

Implausible distractors include responses that...

- * are glaringly wrong.
- * are inappropriate or absurd.
- * are cute or humorous.
- * contain all-inclusive qualifiers.

Avoid implausible distractors

Flawed item

Objective	Compute with percents
<p>Pat waits tables on Saturday nights. One Saturday Pat receives tips totaling \$95 on sales of \$475. What percent of the total sales are Pat's tips?</p> <p>A. 2% B. 5% C. 20% D. 50%</p> <p>Key: C</p>	

★ Use homogeneous answer choices

Answer choices should be parallel in terms of content, structure, and length.

- * Distractors should be in the same form as the key.
- * No answer option should stand out.

★ Use homogeneous answer choices

Distractor Guidelines	
If the key contains:	Then distractors should NOT contain:
a long phrase or sentence	short phrases or sentences
a general rule	specific instances
a complete statement	incomplete statements
a means to an end	end products
simple, common language	professional jargon
unqualified words or statements	qualifying words
negative descriptions	positive descriptions

★ Avoid clues

- * **Cueing**
material in the stem is repeated in one of the distractors
- * **Grammatical clues**
verb tense and modifiers can be used to eliminate distractors

Writing Convincing Response Options: Clang

Flawed item

Objective	Describe relationship between variables in real-life situations
<p>Carrie runs around the school eight times for exercise. What can Carrie do to add miles to her running route?</p> <p>A. run faster B. run slower C. run the same distance on a track D. run home after running around the school eight times</p> <p>Key: D</p>	

Writing Convincing Response Options: Clang

Improved item

Objective	Describe relationship between variables in real-life situations
<p>Carrie runs around the school eight times for exercise. What can Carrie do to add miles to her running route?</p> <p>A. run the same distance on a track B. run faster around the school eight times C. run slower around the school eight times D. run home after running around the school eight times</p> <p>Key: D</p>	

★ Be Efficient

Answer choices should be brief.

- * no longer than a sentence
- * repeated phrases should be placed into the stem

Answer choices should be organized.

- * alphabetical
- * ascending or descending
- * shortest to longest
- * same order as presented in stimulus

Writing Convincing Response Options:
Additional Considerations

- * Avoid use of "none of the above," "all of the above," and "I don't know"
- * Avoid use of negative words in the answer options
- * Be aware of project-specific styles
- * Balance the keys

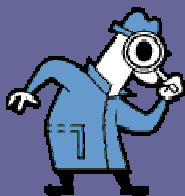
Summary: Writing Convincing Response Options

- ★ Use only one best, clearly correct answer
- ★ Develop plausible distractors
- ★ Avoid implausible distractors
- ★ Use homogeneous answer choices
- ★ Avoid clues
- ★ Be efficient
- ★ Avoid negative phrasing

Qualities of a Good Multiple-Choice Item

- * Measures the skill for which it is written
- * Presents the problem or question as clearly as possible
- * Has only one best and correct answer
- * Is as straightforward and concise as possible
- * Has four choices that are parallel in structure and logic
- * Contains options that are plausible, but incorrect

★ Critiquing Test Items



Evaluating Items

- * Does this item measure the objective it is intended to measure?
- * Does this item ask something worth asking?
- * Is this item written in a way that is appropriate for the level of knowledge required by the license or certification?
- * Is this item unnecessarily easy or hard?
- * Is this item biased, or does it require background knowledge?
- * Does this item break item-writing guidelines?

Wrap-Up

- ★ Responsibilities of Item Writers
 - * Accuracy
 - * Security
 - * Originality
 - * Art
- ★ Summary

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