

Multiple Choice Test Items

The multiple choice item consists of the stem, which identifies the question or problem and the response alternatives or choices. Usually, students are asked to select the one alternative that best completes a statement or answers a question. For example,

Item Stem: Which of the following is a chemical change?

Response Alternatives:

- a. Evaporation of alcohol
- b. Freezing of water
- c. Burning of oil
- d. Melting of wax

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Multiple choice items are considered to be among the most versatile of all item types. They can be used to test factual recall as well as levels of understanding and ability to apply learning. As an example, the multiple choice item below is testing not only information recall but also the ability to use judgment in analyzing and evaluating.

Multiple choice tests can be used to test the ability to:

- a) recall memorized information
- b) apply theory to known things
- c) apply theory to new situations
- d) use judgment in analyzing and evaluating

Possible answers:

- A. a) only
- B. a) and b) only
- C. a), b) and c), only
- D. a), b), c) and d)

Correct Answer is D. a), b), c) and d)

Note: Multiple choice items are difficult and time consuming to construct well.

Summary: Multiple Choice Items are good for: application, synthesis, analysis, and evaluation levels

Types of Multiple Choice:

- Question/Right answer
- Incomplete statement
- Best answer

Advantages:

- Very effective
- Versatile at all levels
- Minimum of writing for student
- Guessing is reduced
- Can cover broad range of content

Disadvantages:

- Difficult to construct good test items
- Difficult to come up with plausible distractors/alternative responses

Suggestions for Writing Multiple Choice Test Items

1. When possible, state the stem as a direct question rather than as an incomplete statement.	
Undesirable Form The capital of Kuwait is.....	Desirable Form What is the capital of Kuwait?
2. Present a definite, explicit and singular question or problem in the stem.	
Undesirable Form Social Studies is	Desirable Form The study of human society is called
3. Eliminate excessive verbiage or irrelevant information from the stem.	
Undesirable Form While ironing her clothes, Ayesha burned her hand accidentally on the hot iron. This was due to a transfer of heat between...	Desirable Form Which of the following ways of heat transfer explains why Ayesha's hand was burned after she touched a hot iron?
4. Include in the stem any word(s) that might otherwise be repeated in each alternative.	
Undesirable Form In national elections in Kuwait the Prime Minister is officially: a. chosen by the people.√ b. chosen by members of Parliament. c. chosen by the political party. d. chosen by the Districts	Desirable Form In national elections in Kuwait the Prime Minister is officially chosen by: a. the people.√ b. members of Parliament. c. the political party. d. the Districts
5. Use negatively stated stems sparingly. When used, underline and/or capitalize the negative word.	
Undesirable Form Which of the following is not a verb?	Desirable Form Which of the following is <u>NOT</u> a verb?
6. Make all alternatives plausible and attractive to the less knowledgeable or skilful student.	
Undesirable Form What process is probably the opposite of photosynthesis? A. Digestion B. Excretion C. Respiration √ D. Relaxation	Desirable Form What process is the opposite of photosynthesis? A. Digestion B. Relaxation C. Respiration √ D. Exertion
7. Make the alternatives mutually exclusive	
Undesirable Form The daily minimum required amount of milk that a 10 year old child should drink is A. 1-2 glasses. B. 2-3 glasses. √ C. 3-4 glasses. √ D. at least 4 glasses	Desirable Form What is the daily minimum required amount of milk a 10 year old child should drink? A. 1 glass. B. 2 glasses. C. 3 glasses. √ D. 4 glasses.
8. Make alternatives approximately equal in length.	
Undesirable Form The most general cause of low individual incomes in Kuwait is: A. lack of goods and services to sell √ B. unwillingness to work. C. automation. D. inflation.	Desirable Form What is the most general cause of low individual incomes in Kuwait? A. A lack of goods and services to sell √ B. The population's unwillingness to work. C. Too much reliance on automation D. Increasing cost of raw materials

Remember when writing Multiple Choice items:

- Use at least four alternatives for each item to lower the probability of getting the item correct by guessing.
- Randomly distribute the correct response among the alternative positions throughout the test, having approximately the same proportion of alternatives a), b), c), and d) as the correct response.
- Avoid irrelevant clues such as grammatical structure, well known verbal associations or simplistic connections between stem and answer.
- When possible, present alternatives in some logical order (e.g., chronological, most to least, alphabetical).
- Use the alternatives **none of the above** and **all of the above** sparingly. When used, such alternatives should occasionally be used as the correct response.
- In testing for definitions, use the term in the stem rather than as an option.
- List alternatives on separate lines (rather than including the options as part of the stem) so that all options can be clearly distinguished.
- Keep all alternatives in a similar format (i.e., all phrases, all sentences, etc.).
- Try to make alternatives for an item approximately the same length. (Making the correct response consistently longer is a common error.)
- Use misconceptions students have indicated in class or errors commonly made by students in the class as the basis for incorrect alternatives.
- The way to judge a good stem: students who know the content should be able to answer before reading the alternatives.

Note: Multiple choice exams provide easier conditions for cheating than CRQ tests since single letters or numbers are easier to see than extensive text. Cheating can be minimized by using alternative test forms and controlling seating.

True-False Test Items

There are many situations which call for either-or decisions, such as deciding whether a specific solution is right or wrong, whether to continue or to stop, whether to use a singular or plural construction, and so on. For such situations, the true-false item is an ideal measuring device.

The most basic format, true-false questions are those in which a statement is presented and the student indicates in some manner whether the statement is true or false. In other words, there are only two possible responses for each item, and the student chooses between them. True-false questions are well suited for testing student recall or comprehension. Students can generally respond to many questions, covering a lot of content, in a fairly short amount of time.

From the item writer's perspective, true-false questions can be written quickly. They are easy to score. Because they can be objectively scored, the scores are more reliable than for items that are at least partially dependent on the marker's judgment.

True-false questions require the students to select a response (true or false) that show recognition of correct or incorrect information that is presented to them. These are included among the items that are called **selection**, in contrast to **supply** items in which the student must supply the correct information.

Another term applied to true-false items is **forced choice** because the student must choose between two possible answers. Educational objectives that specify the student will *identify*, *select*, and *recognize* material are appropriately targeted to either forced choice questions or more complex matching or multiple choice questions.

In Summary, True/False items are

Good for testing:

- Knowledge level content
- Student understanding of popular misconceptions
- Concepts with two logical responses

Advantages:

- Can test large amounts of content
- Students can answer 3-4 questions per minute

Disadvantages:

- They are easy
- It is difficult to discriminate between students that know the material and students who do not
- Students have a 50-50 chance of getting the right answer by guessing
- Need a large number of items for high reliability, since true-false questions tend to be either extremely easy or extremely difficult, and do not discriminate between students of varying ability as well as other types of questions do.

1. Base true-false items upon statements that are absolutely true or false, without qualifications or exceptions.	
Undesirable Form Bad eyesight is hereditary in origin	Desirable Form Doctors and eye specialists believe that bad eyesight is hereditary in origin
2. Express the item statement as simply and as clearly as possible.	
Undesirable Form When you see a road with a sign that says Government of Kuwait on it, you know that the road has been built by the Government.	Desirable Form The construction of roads in Kuwait is the responsibility of the Government
3. Express a single idea in each test item..	
Undesirable Form Water will boil at a higher temperature in Kuwait compared with the Himalayas if more heat is applied to the container because of the greater atmospheric pressure in Kuwait	Desirable Form Water in Kuwait will boil at a higher temperature than water in the Himalayas because of the greater atmospheric pressure in Kuwait
4. Include enough background information and qualifications so that the ability to respond correctly to the item does not depend on some special, uncommon knowledge.	
Undesirable Form The second principle of education is that the individual gathers knowledge.	Desirable Form According to John Dewey, the second principle of education is that the individual gathers knowledge.
5. Avoid the use of extreme modifiers or qualifiers.	
Undesirable Forms —All sessions of Parliament are called by the Prime Minister ---The Supreme Court frequently rules on the law.	Desirable Forms —The sum of the angles of a triangle is always 180o. —The barometer is the instrument usually used for the measurement of air pressure.

<p>—An objective test is generally easier to score than an CRQ test.</p>																																	
<p>Extreme Modifiers:</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 50%;">all</td><td>none</td></tr> <tr><td>always</td><td>never</td></tr> <tr><td>only</td><td>nobody</td></tr> <tr><td>invariably</td><td>no one</td></tr> <tr><td>best</td><td>absolutely</td></tr> <tr><td>worst</td><td>absolutely not</td></tr> <tr><td>everybody</td><td>certainly</td></tr> <tr><td>everyone certainly not</td><td></td></tr> </table>	all	none	always	never	only	nobody	invariably	no one	best	absolutely	worst	absolutely not	everybody	certainly	everyone certainly not		<p>Qualifiers:</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 50%;">usually</td><td>frequently</td></tr> <tr><td>often</td><td>sometimes</td></tr> <tr><td>some</td><td>seldom</td></tr> <tr><td>many</td><td>much</td></tr> <tr><td>probably</td><td>a majority</td></tr> <tr><td>apt to</td><td>most</td></tr> <tr><td>might</td><td>a few</td></tr> <tr><td>may</td><td>unlikely</td></tr> </table>	usually	frequently	often	sometimes	some	seldom	many	much	probably	a majority	apt to	most	might	a few	may	unlikely
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many	much																																
probably	a majority																																
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<p>6. Avoid lifting statements from the text, lecture or other materials so that memory alone will not permit a correct answer.</p>																																	
<p>Undesirable Form For every action there is an opposite and equal reaction.</p>	<p>Desirable Form If you were to stand in a boat and throw a life jacket forward to another boat, the chances are your boat would jerk backwards.</p>																																
<p>7. Avoid using negatively stated item statements.</p>																																	
<p>Undesirable Form The Supreme Court in Kuwait is not composed of eight justices.</p>	<p>Desirable Form The Supreme Court in Kuwait is composed of eight justices.</p>																																
<p>8. Avoid the use of unfamiliar vocabulary.</p>																																	
<p>Undesirable Form According to some politicians, the <i>raison d'etre</i>¹ for capital punishment is retribution.</p>	<p>Desirable Form According to some politicians, the justification for capital punishment is revenge.</p>																																

Remember when writing True/False Items:

- Keep language as simple and clear as possible.
- Use a relatively large number of items (75 or more when the entire test is T/F).
- Be aware that extremely long or complicated statements will test reading skill rather than content knowledge.
- Require students to circle or underline a typed “T” or “F” rather than to fill in a “T” or “F” next to the statement, thus avoiding having to interpret confusing handwriting.
- If a proposition expresses a relationship, such as cause and effect or premise and conclusion, present the correct part of the statement first and vary the truth or falsity of the second part.
- Make true and false items of approximately equal average length throughout the test.
- Randomize the sequence of true and false statements.
- Make use of popular misconceptions/beliefs as false statements.
- Write items so that the incorrect response is more plausible or attractive to those without the specialized knowledge being tested.

Note: One method for developing true-false items is to write a set of true statements that cover the content, and then convert approximately half of them to false statements.

Remember: When changing items to false (as well as in writing the true statements initially), state the items positively, avoiding negatives or double negatives.

¹ The reason for capital punishment’s existence

Matching Test Items

Matching questions provide a most efficient way to test knowledge in courses in which events, dates, names, and places are important. Matching questions are also appropriate for the sciences in which numerous experiments, experimenters, results, and special terms and definitions have to be remembered.

A simple matching item consists of two columns: one column of **stems** or problems to be answered, and another column of **responses** from which the answers are to be chosen. Traditionally, the column of stems is placed on the left and the column of responses is placed on the right. An example is given below.

Directions: In the column (Answer) next to each children's book in Column A print the letter of the animal or insect in Column B that is a main character in that book. Each animal or insect in Column B can be used only once.

Answer	Column A	Column B
	1. Charlotte's Web	A. Bear
	2. Winnie the Pooh	B. Chimpanzee
	3. Black Beauty	C. Cricket
	4. Tarzan	D. Deer
	5. Pinocchio	E. Horse
	6. Bambi	F. Pig

The student reads a stem (Column A) and finds the correct response from among those in Column B. The student then prints the letter of the correct response in the answer column beside the stem in Column A. An alternative is to have the student draw a line from the correct response to the stem, but this is more time consuming to score

In the above example notice that the stems in Column A are assigned numbers (1, 2, 3, etc.). The items in Column B are designated by capital letters. Capital letters are used rather than lower case letters in case some students have reading problems. Also there are apt to be fewer problems in scoring the student's handwritten responses if capital letters are used.

Also in the above example, the student only has to know five of the six answers to get them all correct. Since each animal in Column B can be used only once, the one remaining after the five known answers have been recorded is the answer for the sixth premise. One way to reduce the possibility of guessing correct answers is to list a larger number of responses than premises.

In Summary Matching Test Items are

Good for testing:

- Knowledge
- Comprehension, if appropriately constructed

Types of items:

- Terms with definitions
- Phrases with other phrases
- Causes with effects
- Parts with larger units
- Problems with solutions

Advantages:

- Maximum coverage at knowledge level in a minimum amount of space/time
- Valuable in content areas that have a lot of facts

Disadvantages:

- Time consuming for students
- May not be appropriate for higher levels of learning

Possible Difficulties:

- Faulty Directions/Instructions for answering the item
- Using unrelated topics
- Mixing Matching items with Completion items

Suggestions For Writing Matching Test Items

<p>1. Include directions which clearly state the basis for matching the stimuli with the responses. Explain whether or not a response can be used more than once and indicate where to write the answer.</p>																											
<p>Undesirable Form Directions: Match the following.</p>	<p>Desirable Form Directions: On the line to the left of each identifying location and characteristic in Column I, write the letter of the country in Column II that it describes best. Each country in Column II may be used more than once.</p>																										
<p>2. Use only items that share the same foundation of information. Unrelated topics included in the same matching item may allow for obvious matches and mismatches.</p>																											
<p>Undesirable Form Directions: Match the following.</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">1. Water</td> <td style="width: 50%;">A. NaCl</td> </tr> <tr> <td>2. Discovered Radium</td> <td>B. Fermi</td> </tr> <tr> <td>3. Salt</td> <td>C. NH₃</td> </tr> <tr> <td>4. Ammonia</td> <td>D. 1942</td> </tr> <tr> <td>5. Year of the first Nuclear Fission</td> <td>E. H₂O</td> </tr> <tr> <td></td> <td>F. Curie</td> </tr> <tr> <td></td> <td>G. 1957</td> </tr> </table>	1. Water	A. NaCl	2. Discovered Radium	B. Fermi	3. Salt	C. NH ₃	4. Ammonia	D. 1942	5. Year of the first Nuclear Fission	E. H ₂ O		F. Curie		G. 1957	<p>Desirable Form Directions: On the line to the left of each compound in Column I, write the letter of the compound's formula presented in Column II. Use each formula only once.</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Column I</td> <td style="width: 50%;">Column II</td> </tr> <tr> <td>1. Water</td> <td>A. H₂S₀4</td> </tr> <tr> <td>2. Salt</td> <td>B. HCl</td> </tr> <tr> <td>3. Ammonia</td> <td>C. NaCl</td> </tr> <tr> <td>4. Sulphuric Acid</td> <td>D. H₂O</td> </tr> <tr> <td></td> <td>E. H₂HCl</td> </tr> </table>	Column I	Column II	1. Water	A. H ₂ S ₀ 4	2. Salt	B. HCl	3. Ammonia	C. NaCl	4. Sulphuric Acid	D. H ₂ O		E. H ₂ HCl
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<p>3. Avoid grammatical or other clues to the correct response</p>																											
<p>Undesirable Form Directions: Match the following in order to complete the sentences on the left.</p>	<p>Desirable Form Directions: On the line to the left of each statement write the letter of the animal from the right hand column that the statement describes. Use each animal once.</p>																										
<p>4. The column of stimuli on the left should set the question clearly.</p>																											
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	3. Move with grazing animals. 4. Till land for cash crops.	C. Hunter-gatherers D. City dwellers E. Farmers
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Remember:

- Review your teaching objectives to make sure that a matching component is appropriate.
- Keep matching items brief, limiting the list of stimuli to 10 - 15.
- When possible, reduce the amount of reading time by including only short phrases or single words in the response list.
- Use the more involved expressions in the stem and keep the responses short and simple.
- Arrange the list of responses in some systematic order if possible (chronological, alphabetical).
- Make sure that there are never multiple correct responses for one stem (although a response may be used as the correct answer for more than one stem).
- Avoid breaking a set of items (stems and responses) over two pages.

Completion or Fill-in-the-Blank Test Items

Completion items are especially useful in assessing mastery of factual information when a specific word or phrase is important to know. They prevent the kind of guessing that is possible on limited-choice items since they require a definite response rather than simple recognition of the correct answer. Because only a short answer is required, their use on a test can enable a wide sampling of content. A completion item requires the student to answer a question or to finish an incomplete statement by filling in a blank with the correct word or phrase.

Completion items tend to test only rote, repetitive responses and may encourage a fragmented study style since memorization of bits and pieces will result in higher scores. They are more difficult to score than forced-choice items and scoring often must be done by the test writer since more than one answer may have to be considered correct.

A distinction should be made between completion items—often referred to as fill-in-the-blank—and short answer questions. With completion questions the response is usually one or two words that fit on a line provided by the tester. Short answer questions may require one sentence or even a paragraph to fully answer the question. Short answer questions are appropriate in measuring a student's understanding of principles or the ability to solve problems or apply principles. Short answer questions go beyond simple recall or recognition. They require students to consider various factors and to arrive at solutions, whether they deal with mathematical or other situations.

In Summary Completion or Fill in the Blanks Items are:

Good for testing:

- Knowledge levels
- Recall and memorization of facts

Advantages:

- Good for **who, what, where, when** content
- Minimizes guessing

- Encourages more intensive study. Student must know the answer vs. recognizing the answer.
- Can usually provide an objective measure of student achievement or ability

Disadvantages:

- Difficult to assess higher levels of learning because the answers to completion items are usually limited to a few words
- Difficult to construct so that the desired response is clearly indicated
- May overemphasize memorization of facts
- Questions may have more than one correct answer
- Scoring is time consuming

On the whole, completion test items have little advantage over other item types unless the need for specific recall is essential.

Remember:

- When possible, provide explicit directions as to what amount of variation will be accepted in the answers.
- Give much more credit for completion items than for true-false or matching items.
- Avoid using a long quote with multiple blanks to complete.
- When working with definitions, supply the term, not the definition, for a better judge of student knowledge.
- For numbers, indicate the degree of precision/units expected.
- Facilitate scoring by having the students write their responses on lines arranged in a column to the left of the items.

It is difficult to write completion items so that there is only one correct answer. When preparing a scores key, list the correct answer and any other acceptable alternatives. Be consistent in using the key; it would not be fair to accept an answer as right on one paper and not accept it on others.