Annotated MCQs

Seeing things differently
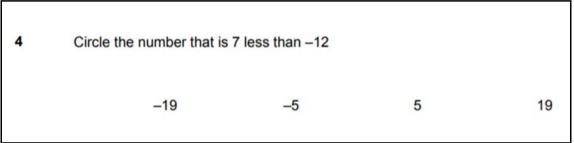
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Distractors

The validity of multiple choice questions rests heavily on the choice of distractors (wrong options). It is crucial that the distractors are plausible to students who lack the relevant subject knowledge.

0 1 . 1 In the maths example below, the distractors are all based around misconceptions test takers may have regarding calculations involving negative numbers.

> **4** Circle the number that is 7 less than −12
>
> −19   −5   5   19

0 1 . 2 Plausible distractors are not always based on common misconceptions.

In the science example below, the distractors have been chosen because they are related to the correct answer (they are all organs).

> **0 1 . 2** Where does the pulmonary artery take blood to?
>
> Tick **one** box.
>
> Brain   ☐
>
> Liver   ☐
>
> Lungs   ☐
>
> Stomach   ☐

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0 1 . 3   Similarly to the above question, in the example below, the options are all tests for other substances.

In both cases, these distractors are effective because they are plausible to test takers who lack the relevant knowledge to answer.

0 1 . 3   What is the test for chlorine gas?

Tick **one** box.

A glowing splint relights ☐

A lighted splint gives a pop ☐

Damp litmus paper turns white ☐

Limewater turns milky ☐

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Language

The use of negative words like 'not' can increase the reading demand of test questions. However, in relatively simple sentences such as the ones in the question above, this added complexity is acceptable, and there are occasions when a question only works effectively when asked in the negative.

In addition, negative words, and 'not' in particular, are often overlooked by the reader. This is because the majority of questions are written in the positive, and because the question usually makes sense even when the word is overlooked, therefore students are unlikely to read the question again. Due to this, it is usually appropriate to embolden negative words such as 'not' in test questions.

0 2 . 1 Most multiple choice questions are written in a classic question format, where the stem itself forms a question (and therefore ends in a question mark) and one of the options is the correct answer to that question. This is demonstrated in the example below.

Which one of the following indicates a contractionary monetary policy?

A A fall in the budget deficit

B A rise in the money supply

C An increase in the national debt

D Appreciation of the exchange rate

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| 0 | 2 | . | 2 | Some multiple choice questions do not use this classic format, and instead the stem forms the start of a sentence which is completed by the correct option.

The central purpose of the production of goods and services is to

A achieve more technological innovation.

B maximise exports.

C maximise profits.

D satisfy consumer wants.

Both formats are effective, but when a question uses the stem completion format it is important that, as with the example above, the question does not require an excessive amount of reading. Specifically, questions where the sentences formed by the stem and options are long and complex should be avoided, as this places excessive working memory demands on the test taker.

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0 2 . 3 As with all question formats, question writers will aim to word questions as simply as possible. This means avoiding the use of (non-subject specific) complex vocabulary, and splitting longer sentences to reduce reading demand.
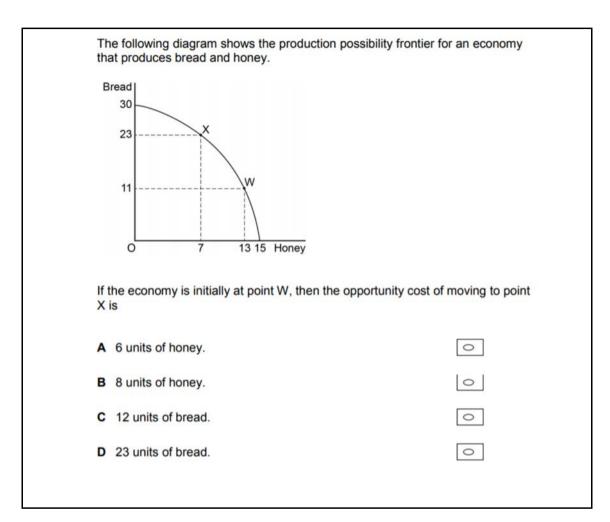
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0 3 . 6 A sample of drinking water contains 1.5 mg of fluoride per dm^3 of water.
A person drinks 1 dm^3 of this water.

The recommended daily amount of fluoride is 4.0 mg.

Which calculation gives the percentage of the recommended daily amount of fluoride in 1 dm^3 of this water?

[1 mark]

Tick **one** box.

$\dfrac{1.5 \times 100}{4.0}$ ☐

$\dfrac{1.5 \times 4.0}{100}$ ☐

$\dfrac{4.0 \times 100}{1.5}$ ☐

$\dfrac{100}{1.5 \times 4.0}$ ☐

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Higher-level skills

A common debate about multiple choice questions is whether or not they can assess higher-level skills (ie those beyond recall of knowledge). In fact, multiple choice questions can be very effective at assessing higher-level skills such as application and analysis. In general, the key requirement is that the question is preceded by some novel information. This could, for example, be in the form of data (eg within a graph or table) or a description of an experiment in science.

0 3 . 1 The question below has little or no context, and, as a result, assesses recall of knowledge. It is important to note that there is nothing wrong with this. Knowledge is a key component of many GCSEs and A Levels, and multiple choice questions can be very effective at assessing knowledge of a topic.

Greenhouse gases affect the temperature of the Earth.

Which gas is a greenhouse gas?

Tick **one** box.

Argon ☐

Methane ☐

Nitrogen ☐

Oxygen ☐

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0 3 . 2 The example below, however, does contain some novel information, and as a result it is possible to assess higher-level skills such as application.

The following diagram shows the production possibility frontier for an economy that produces bread and honey.

If the economy is initially at point W, then the opportunity cost of moving to point X is

A 6 units of honey. ◯

B 8 units of honey. ◯

C 12 units of bread. ◯

D 23 units of bread. ◯

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| 0 | 3 | . | 3 |

The example below also contains some novel information, and as a result it is possible to assess higher-level skills such as application.

| 0 | 8 |

A 10% increase in the price of grapes leads to a 4% increase in the quantity supplied. What is the price elasticity of supply of grapes in this case?

A   -2.5

B   +0.4

C   +2.5

D   +4.0