

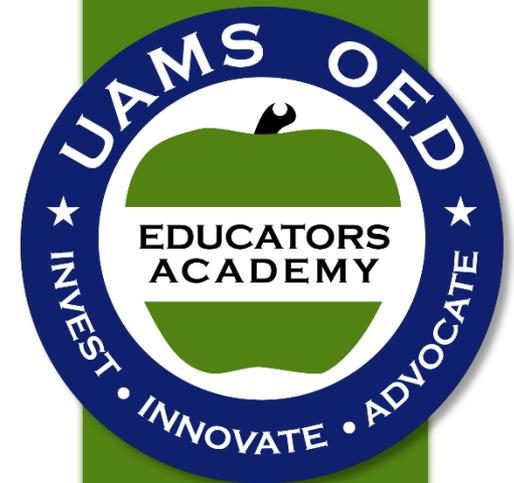
Test Your Skills: Item and Item Analysis Examples

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Time to put your skills to the test!
Look at the examples and think
about which rule applies to them.

Examples

Which of the following would decrease radiation dose by 1/2?

- A. Decreasing mA by $\frac{1}{4}$
- B. Decreasing mA by $\frac{1}{3}$
- C. Decreasing mA by $\frac{1}{2}$
- D. Decreasing mA by $\frac{3}{4}$

Examples

Decreasing mA by what amount would decrease the radiation dose by $\frac{1}{2}$?

- A. $\frac{1}{4}$
- B. $\frac{1}{3}$
- C. $\frac{1}{2}$
- D. $\frac{3}{4}$

If a phrase can be stated in the stem, it should not be repeated in the options.

Examples

An otherwise healthy 28-year-old woman presented with a two-day history of cough, fever and shortness of breath, and the following chest radiograph. What is the most likely diagnosis?

- A. Tuberculosis**
- B. Community-acquired streptococcal pneumonia**
- C. Varicella pneumonia**
- D. Blastomycosis**

Examples

An otherwise healthy 28-year-old woman presented with a two-day history of cough, fever and shortness of breath, and the following chest radiograph. What is the most likely diagnosis?

- A. Tuberculosis
- B. Streptococcal pneumonia
- C. Varicella pneumonia
- D. Blastomycosis

The distractors should appear as similar as possible to the correct answer in terms of grammar, length, and complexity. There is a tendency to make the correct answer longer than the distractors.

Examples

A chest radiographic finding of left upper lobe collapse is ____.

- A. Hyperlucency of the upper and lower left hemithorax.
- B. Elevation of the left diaphragm.
- C. When the mediastinum shifts to the right.
- D. Posterior displacement of the minor fissure.

Examples

A chest radiographic finding of left upper lobe collapse is _____.

- A. Hyperlucency of the upper and lower left hemithorax.
- B. Elevation of the left diaphragm.
- C. Mediastinal shift to the right.
- D. Posterior displacement of the minor fissure.

Because an item writer tends to pay more attention to the correct option than to the distractors, grammatical errors are more likely to occur in the distractors.

Examples

What is the average effective radiation dose from chest CT?

- A. 1-8 mSv**
- B. 24-32 mSv**
- C. 16-24 mSv**
- D. 8-16 mSv**

Examples

What is the average effective radiation dose from chest CT?

- A. 1-7 mSv
- B. 8-15 mSv
- C. 16-23 mSv
- D. 24-32 mSv

Options should be placed in logical order, if there is one. If the answer is a number, the options should proceed from the smallest to the largest (or vice-versa). Dates should be listed in chronological order. Options should be independent and not overlap,

Examples

Thrombocytopenia results from the deficiency of which blood component?

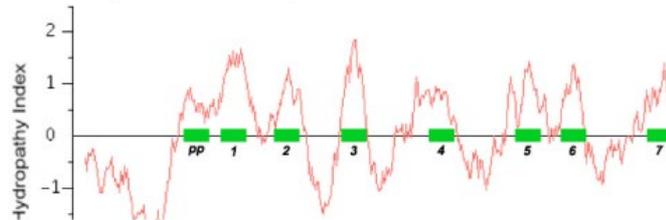
- A. Prothrombin**
- B. Fibrinogen**
- C. Thrombin**
- D. Platelets**
- E. Iron**

Examples

TESTING HIGHER ORDER THINKING

A hydropathy plot for the protein AmGr2 is shown below. This protein has a signal peptide at its amino-terminus, and its hydrophobicity is shown in the hydropathy plot. Regions of the protein with a hydropathy index greater than zero are considered hydrophobic; regions with a hydropathy index less than zero are considered hydrophilic. Based on this information, what kind of protein do you think AmGr2 is?

- A. Integral membrane protein with a single transmembrane domain
- B. Cytosolic protein
- C. Multi-pass integral membrane protein with multiple transmembrane domains
- D. Lipid-anchored membrane protein
- E. Peripheral membrane protein



NOTE: This item tests higher order thinking skills because it requires that test-takers be able to *interpret* the plot and *apply* biochemical principles to choose the best answer.

Figure Source: Kent, Lauren B. and Robertson, Hugh M. Evolution of sugar receptors in insects. *BMC Evolutionary Biology* 9: 41, 2009

Examples

TESTING HIGHER ORDER THINKING

The nurse is making a home visit to a 75-y-o male client who has had Parkinson's disease for the past five years. Which finding has the greatest implication for this patient's care?

- A. The client's wife tells the nurse that the grandchildren have not been to visit for over a month.
- B. The nurse notes that there are numerous throw rugs throughout the client's home.
- C. The client has a towel wrapped around his neck that the wife uses to wipe her husband's face.
- D. The client is sitting in an armchair, and the nurse notes that he is gripping the arms of the chair.

NOTE: *This item tests higher order thinking skills because it requires that test-takers be able to apply multilogical thinking and a high level of discrimination to choose the best answer.*

Source: Morrison, Susan and Free, Kathleen Walsh. Writing multiple-choice test items that promote and measure critical thinking. *Journal of Nursing Education* 40: 17-24, 2001.

Examples

A 32 year old woman is admitted to the Emergency Department complaining of fatigue and generalized weakness. She reports that her gums have been bleeding excessively when brushing her teeth. An assessment reveals small red dots over her trunk and gums and bruising on her upper arms. A blood chemical analysis would most likely reveal a deficiency of which blood component in this patient?

- A. Prothrombin**
- B. Fibrinogen**
- C. Thrombin**
- D. Platelets**
- E. Iron**

This question assesses knowledge recall, but by adding some information, it can assess application of knowledge rather than recall. This new format is called scenario or vignette, which includes information about the patient and his/her health condition.

Examples

Avoid Multiple Choice Type K (Summarized Directions)

A: 1, 2, 3 only

D: 4 only

B: 1, 3 only

E: All are correct

C: 2, 4 only

Clinical situations likely to be associated with glucose intolerance include:

1. physical inactivity
2. starvation
3. stress, infection, or trauma
4. thiazide diuretic therapy

Examples

Avoid Multiple Choice Type X

Compared with normal pregnancies, a pregnancy with an IUD – in situ has an increased risk of:

 T being an ectopic pregnancy

 F congenital anomalies

 T premature labor

 T spontaneous abortion

Sample Item Analysis

<i>p</i> value	PBI	Option	<i>p</i> value for option	PBI	Key
0.73	0.44	A	0.23	-0.28	
		B	0.04	-0.43	
		C	0.06	-0.31	
		D	0.73	0.45	*

Sample Item Analysis

<i>p</i> value	PBI	Option	<i>p</i> value for option	PBI	Key
0.76	0.29	A	0.15	-0.17	
		B	0.12	0.04	
		C	0.68	0.23	*
		D	0.07	-0.28	

Sample Item Analysis

<i>p</i> value	PBI	Option	<i>p</i> value for option	PBI	Key
0.27	-0.02	A	0.043	-0.059	
		B	0.27	-0.011	*
		C	0.72	0.037	
		D	0.00	-	

Sample Item Analysis

<i>p</i> value	PBI	Option	<i>p</i> value for option	PBI	Key
1.00	-	A	0.00	-	
		B	1.00	-	*
		C	0.00	-	
		D	0.00	-	