

Supplemental Material

CBE—Life Sciences Education

Larsen *et al.*

Probing Internal Assumptions of the Revised Bloom's Taxonomy

Supplemental material

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Table S1. Contingency table. The table shows the number of assessment items coded as specific combinations of knowledge types and cognitive processes. These data correspond to the stacked bar graph in Figure 4A.

	Factual	Conceptual	Procedural	Total
Remember	302	92	20	419
Understand	19	233	25	377
Apply	2	14	31	47
Analyze	2	41	2	45
Evaluate	0	28	6	34
Create	0	16	2	18
Total	425	429	86	940

Figure S1. Example low-frequency items. We selected examples to highlight some possible combinations of knowledge types and cognitive processes in our dataset.

A Procedural and Remember

Match the type of microscopy with the corresponding description. There is one best match for each.

- i. Confocal
- ii. Transmission electron
- iii. Fluorescence
- iv. Phase contrast
- v. Scanning electron
- vi. Bright-field

___ uses a light microscope to take advantage of the different refractive indexes of light passing through different regions of an unstained cell.

___ requires the use of two sets of filters: The first filter narrows the wavelength range that reaches the specimen, and the second blocks out all wavelengths that pass back up to the eyepiece except for those emitted by the eye in the sample.

C Procedural and Analyze

An octapeptide was determined to have the following amino acid composition using HCl hydrolysis:

Lys (2), Phe (2), Gly (1), His (1), Leu (1), Met (1)

When the native peptide was exposed to cyanogen bromide (CNBr), a heptapeptide and free glycine were recovered. Incubation of the native protein with trypsin gave a tetrapeptide, a tripeptide, and free lysine. The peptides were separated and each run through one cycle of the Edman degradation. The tetrapeptide yielded the PTH-leucine derivative, and the tripeptide yielded the PTH-phenylalanine derivative. Incubation of the native peptide with pepsin produced a dipeptide and two tripeptides. The amino acid composition of the tripeptides (not the order) were determined to be (Phe, Gly, Met) and (Phe, Lys, Lys). What is the sequence of the octapeptide?

B Conceptual and Apply

A hypothetical combination of independently assorting genes Alpha, Beta, Gamma, Delta, and Epsilon determine percentage of fast and slow muscle twitch in humans. If the unique combination of AABbggDdee produces a person with the potential to be a collegiate miler, and the unique combination of aaBBggDDee produces a person with the potential to be a collegiate sprinter, what are the chances that the first child of parents with mediocre track abilities (genotypes AaBbGgDDee and AaBgggDeEe) will inherit genes for either a collegiate miler or sprinter?

- i. 1/64
- ii. 1/128
- iii. 1/256
- iv. 3/128
- v. 5/256

D Procedural and Evaluate

Your friend has isolated a protein present in the cheek cells of all straight-A seniors at your school. She says that this protein helps you remember everything you read and therefore will help cut down on the number of hours needed to study for exams. She sequences the protein, which she calls "geniuszyme", and designs a probe to isolate the gene that encodes it. To make sure she designed the probe correctly, she consults with the company that cloned Factor VIII. They have 100% confidence that her probe will work. She also obtains a high-quality liver cDNA library from the company and uses her probe to try to isolate the gene for geniuszyme. Unfortunately, she is unable to isolate any clones. What is the likely explanation for her failure?