



College of Medicine

# ***Bloom's Taxonomy***

***Sample Multiple-Choice Items***

**OMSE**

Office of Medical Student Education

## BLOOM'S TAXONOMY: Cognitive Domain

| <b>Level</b>         | <b>Definition</b>  | <b>Sample Verbs</b>   | <b>Sample Behaviors</b>   |
|----------------------|--|---|---|
| <b>KNOWLEDGE</b>     | Student recalls or recognizes information, ideas, and principles in the approximate form in which they were learned. | Write, List, Label, State, Define, Identify Name, Who? When? Where? What?   | The student will define the 6 levels of Bloom's taxonomy of the cognitive domain.   |
| <b>COMPREHENSION</b> | Student translates, comprehends, or interprets the meaning of information based on prior learning.                   | Explain, Predict, Interpret, Infer, Convert, Translate, Give example, Account for., Summarize, Paraphrase, Describe, Illustrate | The student will explain the purpose of Bloom's taxonomy of the cognitive domain.   |
| <b>APPLICATION</b>   | Student selects, transfers, and uses data and principles to solve a problem or task.                                 | Compute, Solve, Demonstrate, Apply, Construct, Show, Use, Make use of, Modify   | The student will write an instructional objective for each level of Bloom's taxonomy.   |
| <b>ANALYSIS</b>      | Student breaks down material into its component parts to see interrelationships/hierarchy of ideas.                  | Differentiate, Distinguish, How does ___ relate to ___? Why does ___ work? Analyze, Categorize, Compare, Contrast, Separate     | The student will compare and contrast the cognitive and affective domains.  |
| <b>SYNTHESIS</b>     | Student originates, integrates, and combines ideas into a product, plan or proposal that is new to him or her.       | Create, Design, Construct, Formulate, Imagine, Change, Write a poem or a short story, Hypothesize, Invent. Develop              | The student will design a classification scheme for writing educational objectives that combines the cognitive, affective, and psychomotor domains. |
| <b>EVALUATION</b>    | Student appraises, assesses, or critiques on a basis of specific standards and criteria.                             | Appraise, Evaluate, Which would be better?, Judge, Recommend, Critique, Justify   | The student will judge the effectiveness of writing objectives using Bloom's taxonomy.  |

# Bloom's Taxonomy in More Detail

**Knowledge** refers to the recall of previously learned material. Students are required to remember facts, principles, steps in a sequence, and other information in the same way in which the material was presented in class. The key activity is **to recall**.

**Example: Which of the following is a non-opioid analgesic?**

**Comprehension** refers to the understanding of learned material. Students must show that they grasp the meaning of the material by explaining, interpreting, translating to a new form or symbol system, and extrapolating. The key activity is **to explain**.

**Example: Which of the following would occur as part of the second step of the nursing process?**

**Application** refers to the ability to use learned material in new and concrete situations. Students must use abstractions, such as concepts, principles, rules, theories, and laws to find solution to new problems. The key activity is **to transfer**.

**Example: Using the stress test inventory, calculate the client's stress index.**

**Analysis** refers to the ability to break down material into its component parts so that the organizational structure is understood. Students are required to determine distinguishing characteristics, show the relationship between parts, and so on. The key activity is **to separate**.

**Example: Based on the following lab values from Patient X, what would be the best priority intervention?**

**Synthesis** refers to the ability to put parts together to form a new whole that was not previously present. Students must think creatively to produce new products, such as a theme, speech, article, or research proposal. The key activity is **to combine**.

**Note that multiple-choice test formats are not good for testing synthesis.**

**Evaluation** refers to the ability to judge the value of material for a given purpose using definite criteria. Students are required to make value judgments, to create ideas or objects, and to accept or reject materials based on standards. The key activity is **to judge**.

**Example: In a research study, clinicians did A, B, and C, in order to investigate X. Which of the following additional steps would be most likely to improve patient compliance with the study protocols?**

# Sample Multiple-Choice Items

## Knowledge

Which of the following are the raw materials for photosynthesis?

- a. Water, heat, sunlight.
- b. Carbon dioxide, sunlight, oxygen
- c. Water, carbon dioxide, sunlight
- d. Sunlight, oxygen, carbohydrates
- e. Water, carbon dioxide, carbohydrates

## Comprehension

If living cells similar to those found on earth were found on another planet where there was no molecular oxygen, which cell part would most likely be absent?

- a. Cell membrane
- b. Nucleus
- c. Mitochondria
- d. Ribosome
- e. Chromosomes

## Application

Phenylketonuria (PKU) is an autosomal recessive condition. About one in every fifty individuals is heterozygous for the gene but shows no symptoms of the disorder. If you select a symptom-free male and a symptom-free female at random, what is the probability that they could have a child afflicted with PKU?

- a.  $(.02)(.02)(.25) = 0.0001 = 0.01\%$ , or about 1/10,000
- b.  $(.02)(.02) = 0.0004 = 0.04\%$ , or about 1 / 2,500
- c.  $(1)(50)(2) = 100\% = \text{all}$
- d.  $(1)(50)(0) = 0 - \text{none}$
- e.  $1 / 50 = 2\%$ , or 2 / 100

## Analysis

Mitochondria are called the powerhouses of the cell because they make energy available for cellular metabolism. Which of the following observations is most cogent in supporting this concept of mitochondrial function?

- a. ATP occurs in the mitochondria
- b. Mitochondria have a double membrane
- c. The enzymes of the Krebs cycle, and molecules required for terminal respiration, are found in mitochondria
- d. Mitochondria are found in almost all kinds of plant and animal cells
- e. Mitochondria abound in muscle tissue

## Evaluation

Disregarding the relative feasibility of the following procedures, which of these lines of research is likely to provide us with the most valid and direct evidence as to evolutionary relations among different species?

- a. Analysis of the chemistry of stored food in female gametes
- b. Analysis of the enzymes of the Krebs cycle
- c. Observations of the form and arrangement of the endoplasmic reticulum
- d. Comparison of details of the molecular structure of DNA
- e. Determination of the total percent protein in the cells

## **References**

Case, S.M. & Swanson, D.B. (1998). Constructing written test questions for the basic and clinical sciences (2<sup>nd</sup> ed.). Philadelphia, PA: National Board of Medical Examiners.

Educational Psychology Interactive. Valdosta, GA: Valdosta State University  
<http://chiron.valdosta.edu/whuitt/col/cogsys/bloom.html>