

Matching Bloom's Levels of Taxonomy to Testing Techniques and Instruments

This document has been created by the Institute for Teaching and Learning to help faculty match learning objectives to testing techniques and instruments. The information herein has been drawn from several publicly available sources cited at the end of the document.

Bloom's Taxonomy	Verbs	Testing Techniques	*Testing Instruments/Items
*(Notice the repetition of certain instruments/items. By wording items differently, we can measure different levels of the taxonomy. Further, if worded correctly some instruments can measure several levels within one item (e.g. essay, portfolio,etc.)			
1. KNOWLEDGE common terms, facts, principles, procedures	define, memorize, repeat, record, list, recall, name, relate, collect, label, specify, cite, enumerate, tell, recount	<ul style="list-style-type: none"> • Have students recognize and/or identify information. • Have students recall and reproduce information. • Have students restate information. 	Multiple Choice True/False Matching Definitions Short Answer Questions Identification Questions
2. COMPREHENSION understanding of facts and principles, interpretation of material	restate, summarize, discuss, describe, recognize, explain, express, identify, locate, report, retell, review, translate	<ul style="list-style-type: none"> • Have students give a summary or restatement of information. • Have students describe or explain phenomena or concepts in their own words. 	Multiple Choice True/False Essays Report Short answer questions reflective journals/portfolios Concept mapping Case based article
3. APPLICATION solving problems, applying concepts and principles to new situations	exhibit, solve, interview, simulate, apply, employ, use, demonstrate, dramatize, practice, illustrate, operate, calculate, show, experiment	<ul style="list-style-type: none"> • Have students apply the material to a problem or situation. • Have students generate new examples and non-examples. • Have students choose types of problem-solving strategies for different situations. 	Multiple Choice Simulation Student produced artifacts Essay Report Clinical assessment Essay Question Observed long case Problem Based Learning (PBL) Poster Simulated patient interviews

<p>4. ANALYSIS recognition of unstated assumptions or logical fallacies, ability to distinguish between facts and inferences</p>	<p>interpret, classify, analyze, arrange, differentiate, group, compare, organize, contrast, examine, scrutinize, survey, categorize, dissect, probe, inventory, investigate, question, discover, text, inquire, distinguish, detect, diagram, inspect</p>	<ul style="list-style-type: none"> • Have students identify or classify concepts, examples, or phenomena into correct categories. • Have students identify types of thinking strategies to analyze and evaluate their own thinking. • Have students summarize different types of thinking strategies. • Have students choose the best type of thinking strategy to use in various situations. • Have students detect instances of open-v.-closed-mindedness. • Have students detect instances of responsible v. irresponsible and accurate v. inaccurate applications of thinking strategies. • Ask students questions that require their persistence in discovering and/or analyzing data or information. • Have students apply specific thinking strategies to different real world situations. • Have students solve structured and unstructured, simple and complex problems. • Have students state procedures, principles, or rules. • Have students choose which ones to apply in different situations. • Provide situations that require students to recognize the correct use of procedures, principles, or rules with routine problems. • Provide situations that require students to demonstrate the correct use of procedures, principles, or rules with routine problems. 	<p>Multiple Choice Essay Report Critical incident analysis Assessing Peer feedback Critical evaluation of the literature Critique on an issue Reflective journal writing Seminar presentation Problem Based Learning (PBL) Poster Simulated patient interviews Viva voce</p>
<p>5. SYNTHESIS integrate learning from different areas or solve problems by creative thinking</p>	<p>compose, setup, plan, prepare, propose, imagine, produce, hypothesize, invent, incorporate, develop, generalize, design, originate, formulate, predict, arrange, contrive, assemble, concoct, construct, systematize, create</p>	<ul style="list-style-type: none"> • Put students in situations requiring inquiry and discovery. • Have students resolve situations or solve problems that require speculation, inquiry, and hypothesis formation. • Have students resolve situations or solve problems requiring novel approaches. • Have students design a research study to resolve conflicting finding. • Have students write the limitations section of a research study. • Have students write the conclusions section of a research study. • Give students new problems to “turn upside down,” study, or resolve—perhaps puzzles, dance performances, drama performances, or products to create. • Have students develop products or solutions to fit within particular functions and resources. 	<p>Multiple Choice Peer assessment Essay Critical appraisal Clinical experience record Portfolios Project Reflective case summary Case based article Problem Based Learning (PBL)</p>
<p>6. EVALUATION judging and assessing</p>	<p>judge, assess, decide, measure, appraise, estimate, evaluate, infer, rate, deduce, compare, score, value, predict, revise, choose, conclude, recommend, select, determine, criticize</p>	<ul style="list-style-type: none"> • Have students evaluate information or results. • Have students critique a research study. • Have students use of analysis and research in arriving at best solutions. • Have students make choices among possible behaviors and give justifications 	<p>Critiques Peer evaluation Self-Reflection Case Analysis Critical appraisal Portfolios Project Reflective case summary Case based article Authentic real-world research and evaluation tasks</p>

<p>WHEN WRITING OBJECTIVES: Avoid words like..... Know Understand Be familiar with Appreciate Be aware of Have a good grasp of Have a knowledge of Realize the significance of Believe Be interested in</p>	<p>WHEN WRITING OBJECTIVES: Use words like..... List Describe, explain Evaluate Identify Design Explain Select Distinguish Construct Solve</p>
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Multiple Choice questions can be written to meet multiple levels of Bloom’s Taxonomy as shown in the examples below.

<p>1. Knowledge Which of the following are raw materials or photosynthesis? a. Water, heat, sunlight b. Carbon dioxide, sunlight oxygen c. Water, carbon dioxide, sunlight d. Sunlight, oxygen, carbohydrates e. Water, carbon dioxide, carbohydrates</p>	<p>2. 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</p>
<p>3. 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 would 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. $(1)(50)(0) = 100\% = \text{all}$ d. $(1)(50)(0) = 0 = \text{none}$ e. $1/50 = 2\%$, or 2/100</p>	<p>4. 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</p>
<p>5. 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 form of the Krebs cycle c. Observation of the form and arrangement of the endoplasmic reticulum d. Comparison of details of the molecular structure of DNA e. Determination of the total protein in the cell</p>	<p>This Handout draws from the following resources: Bannister, Sue “Developing Objectives and Relating them to Assessment” (http://www.ftcel.uncc.edu/pedagogy/assessment/DevelopingLearningOutcomes.html) Nilson, Linda B. “Teaching at Its Best”, Anker Publishing, Bolton, MA. 2003 Nilson, Linda B. “Effective Ways to Teach and Assess Students’ Facility in Bloom’s Cognitive Operations” Break Out Presentation at Summer Institute on Enhancement and Accreditation, July 2006. (http://access.nku.edu/oca/SLO/LinkingTeachingMethods.pdf)</p>

