REVISED Bloom's Taxonomy Action Verbs

Definitions	I. Remembering	II. Understanding	III. Applying	IV. Analyzing	V. Evaluating	VI. Creating
Bloom's Definition	Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers.	Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas.	Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations.	Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria.	Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.
Verbs	• Choose • Define • Find • How • Label • List • Match • Name • Omit • Recall • Relate • Select • Show • Spell • Tell • What • When • Where • Which • Who • Why	• Classify • Compare • Contrast • Demonstrate • Explain • Extend • Illustrate • Infer • Interpret • Outline • Relate • Rephrase • Show • Summarize • Translate	• Apply • Build • Choose • Construct • Develop • Experiment with • Identify • Interview • Make use of • Model • Organize • Plan • Select • Solve • Utilize	• Analyze • Assume • Categorize • Classify • Compare • Conclusion • Contrast • Discover • Dissect • Distinguish • Divide • Examine • Function • Inference • Inspect • List • Motive • Relationships • Simplify • Survey • Take part in • Test for • Theme	• Agree • Appraise • Assess • Award • Choose • Compare • Conclude • Criteria • Criticize • Decide • Deduct • Defend • Determine • Disprove • Estimate • Evaluate • Explain • Importance • Influence • Interpret • Judge • Justify • Mark • Measure • Opinion • Perceive • Prioritize • Prove • Rate • Recommend • Rule on • Select • Support • Value	• Adapt • Build • Change • Choose • Combine • Compile • Compose • Construct • Create • Delete • Design • Develop • Discuss • Elaborate • Estimate • Formulate • Happen • Imagine • Improve • Invent • Make up • Maximize • Minimize • Modify • Original • Originate • Plan • Predict • Propose • Solution • Solve • Suppose • Test • Theory

Anderson, L. W., & Krathwohl, D. R. (2001). A taxonomy for learning, teaching, and assessing, Abridged Edition. Boston, MA: Allyn and Bacon.

Topic	Level of Taxonomy					
	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
Measurement Scales	1, 2, 3, 4, 5	6, 7, 8, 10, 11	13, 14	15, 16	17, 18	20
Reliability	9, 12	21, 22	23, 24	26		28
Validity	25, 26, 27	29, 30, 31	32		33, 34	35
Writing Short Answer Items	36, 37	38, 39	41, 42, 44			
Creating True-False Tests	40, 43, 45, 46	47, 48	49	50		

WHAT THEY ARE: A SAMPLING OF ACHIEVEMENT TESTS AND WHAT THEY DO

You're taking this class to learn about tests and measurement and not necessarily to become a psychometrician (one who designs and analyzes tests). So, although I give you a good deal of information about testing principles and the development of test items, in this part of *Tests & Measurement for People Who (Think They) Hate Tests & Measurement*, it's good to be familiar with what some of the most popular and successful achievement tests are.

At the end of every chapter from this one through Chapter 17 on career choices, we'll be providing you with an overview of some of the most common tests used in this country over the past 50 years and still very much in use today. You can see the set for this chapter in Table 13.2.

As you continue your education, you are bound to run into these in one setting or another. And now you'll know something about them—isn't school great?

SUMMARY

Achievement tests are the first kind of test you've learned about in *Tests & Measurement for People Who (Think They) Hate Tests & Measurement*, and they're also the type of test that you are most likely to encounter as someone taking the test as well as someone giving the test. Achievement tests focus basically on knowledge; are constructed using a variety of items you learned about earlier; and can be used as diagnostic, remedial, or just assessment-type tools. In almost every way, they can be powerful allies in the learning process.

Table of Specifications
Using Bloom's Revised Taxonomy

Instructions: Look at the first question on your test. First determine which of your objectives it is correlated with. Second, look at the verb in the question to determine which level of the taxonomy it is correlated with. Put the number of the question in the box that corresponds to the correct objective and level. Complete this process for each question on your test.

	Remember	Understand	Analyze	Apply	Evaluate	Create
Objective 1:						
Objective 2:						
Objective 3:						
Objective 4:						

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Table of Specifications

Two Grid TOS

Weight (Time Frame)	Content Outline	Knowledge 30%	Comprehension 40%	Application 30%	No. of items by content area
35%	1. Table of specifications	1	4	4	9
30%	2. Test and Item characteristics	2	3	3	8
10%	3. Test layout	1	1	0	2
5%	4. Test instructions	0	1	0	1
5%	5. Reproducing the test	1	0	0	1
5%	6. Test length	1	0	1	2
10%	7. Scoring the test	2	1	0	3
		8	10	8	26

The number of items in a cell is computed using the formula:

$$items = \frac{\text{Given time}}{\text{Total time}} X \text{ percentage of cognitive skill } X \text{ total number of items}$$

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Item Difficulty Index

The percentage or proportion of test takers who correctly answer the item.

$$p = \frac{\text{Number of examinees correctly answering the item}}{\text{Number of examinees}}$$

Can range from 0.0 to 1.0, with easier items having larger decimal values and difficult items having lower decimal values.

Items with p values of 0.0 or 1.0 provide no information about individual differences and are of no value from a measurement perspective. Some test developers will include one or two items with high p values at the beginning of a test to instill confidence, which is defensible from a motivational perspective, but from a technical perspective, these items do not contribute to the measurement characteristics of the test. The time spent answering ineffective items is largely wasted and could be better spent on items that enhance the measurement characteristics of the test.

For maximizing variability and reliability, the optimal item difficult level is 0.50, indicating that 50% of the test takers answered the item correctly and 50% answered the item incorrectly.

Be careful. The measurement process may be confounded if all the items have p values of 0.50. As a result, it is often desirable to select some items with p values below 0.50 and some above 0.50, but with a mean of 0.50. Some have recommended that there should be approximately a 0.20 range of these p values around the optimal value. For example, a difficulty level ranging from 0.40 to 0.60.

Guessing. On constructed-response items, for which guessing is not a concern, 0.50 is considered the optimal difficulty level. However, with selected-response items, for which examinees might answer the item correctly by guessing, the optimal level may be set higher. For example, for multiple-choice items with four options, the average p should be approximately 0.74.

Optimal p Values for items with varying numbers of choices

Number of Choices	Optimal Mean of p Value
2 (e.g., true-false)	0.85
3	0.77
4	0.74
5	0.69
Constructed response (e.g., essay)	0.50

Discrimination Index

The discrimination index (D) is a measure of how effectively an item discriminates between the high and low groups. D is based on the difference in total test performance between two groups. It may involve the top and bottom 27%, 33%, or 50%.

$$D = \frac{N_h - N_l}{(.5)\,T}$$

D = Discrimination Index
N_h = number of correct responses in the high group
N_l = number of correct responses in the low group

As a general rule, items with D values over .30 are acceptable, and items with D values below .30 should be reviewed.

Guidelines for Evaluating D values
Difficulty

0.40 and larger	Excellent
0.30-0.39	Good
0.11-0.29	Fair
0.00-0.10	Poor
Negative values	Miskeyed or major flaw

Based on Hopkins (1998)

Distracter Analysis

Distracter analysis is the analysis of individual distracters. Look for items with p or D values that suggest problems.

Did the distracter distract some examinees?

Did the distracter attract more examinees from the bottom group than the top group?