

GRADUATE SCHOOL OF EDUCATION

George Mason University

COURSE SYLLABUS

EDRS 531: Educational & Psychological Measurement

Spring 2004

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Instructor

Overall Goal and Course Objectives

This course is designed to facilitate students acquiring the fundamental concepts, principles, theories, and techniques of educational measurement and classroom assessment. The underlying premise for the value of such knowledge for educators is that it is necessary for sound educational decision-making. Moreover, students will acquire competence in the planning and development of informal classroom assessments and the evaluation of standardized tests.

Attainment of the overall goal will be demonstrated by attainment of the following course objectives:

- **Comprehension and competence in applying the principles of educational assessment and measurement to relevant classroom problems.**
- **Competence in the planning, construction and evaluation of informal classroom tests and assessment techniques.**
- **Knowledge of current professional practices and issues related to educational measurement and classroom assessment.**
- **Knowledge and competence in the use of alternative classroom assessment methods.**
- **Application of sound principles of measurement and assessment in classroom settings reflecting cultural and linguistic diversity.**

Course Description

Organization

Class periods are devoted to a number of different activities, including small group and whole-class discussions, video presentations, and mini-lectures. While the mini-lectures are relevant to specific chapters in the required textbook, they are not taken exclusively from this source. The general purpose of the lectures is to clarify, amplify, and supplement your textbook, not to duplicate it. Therefore, it is important that you attend class regularly and read the relevant chapters prior to a given lecture in order that you may raise questions if your concerns are not covered in the prepared presentation to the class. The class calendar lists the instructional units, pertinent assignment due dates, and the chapters related to each instructional unit (see **Appendix A**).

Course Requirements

Besides active class participation, there are several written assignments and a major project that are part of the course requirements. **General guidelines for all written assignments are found in Appendix C.**

Action Research (55%)

Inquiry-based learning that requires students to investigate current issues and practices in classroom assessment will be used to attain some of the course objectives. **Three (3) action research activities are required.** The findings from the action research will be written up in a series of action research mini-reports (ARMRs). Reports 1&2 should be no more than 4 ½ pages (double-space) in length. Report #3 should be no more than ten pages in length. **Specific guidelines for the action /research activities will be distributed under separate cover. Reports 1-2 are worth a maximum of 15 points each, and Report 3 is worth a maximum of 25 points.**

Assessment Planning and Development (45%)

Demonstration of understanding of the methods associated with the planning and development of various assessment tools will be demonstrated by students devising three (3) mini-assessment tools: a) a cognitive test; b) a brief individual survey; and c) a performance-based assessment. **Each assessment will be worth a maximum of 15 points.**

Summary of Course Requirements

The course requirements are listed below along with their relative weights.

Table I. Relative Weights of Course Requirements

Course Requirements	Relative Weights
Action Research	55%
Assessment Planning & Development	45%
Total	100%

Course Materials

Required Textbook and Readings

Marzano, R.J. (2001). **Designing a new taxonomy of educational objectives.**

Thousand Island, CA: Corwin Press.

McMillan, J. H. (2001). **Classroom assessment. Principles and practice for effective instruction.** (2nd ed.) Needham, Hts. MA: Allyn and Bacon. (For Education Majors)

Oermann, M. H. & Gaberson, K.B. (1998). Evaluation and testing in nursing education. New York, NY: Springer Publishing. (For Nursing Majors)

Recommended:

American Psychological Association. (2002). **Publication manual of the American Psychological Association.** (5th ed.). Washington, DC: Author.

Bloom, B. S. (Ed.). (1956). Taxonomy of educational objectives, handbook I: Cognitive domain. New York: McKay

Ennis, R. H. (1987). A taxonomy of critical thinking dispositions and abilities. In J.B.

Baron and J. J. Sternsberg (Eds.) Teaching thinking skills: Theory and practice. New York: W. H. Freeman.

Marzano, R. J., Pickering, D., & McTighe, J. (1993). Assessing student outcomes. Performance assessment using the dimensions of learning model. Alexandria, VA: Association for Supervision and Curriculum Development.

Quellmalz, E. S. (1987). Developing reasoning skills. In J.B. Baron and J. J. Sternsberg (Eds.) Teaching thinking skills: Theory and practice. New York: W. H. Freeman.

Office Contact Information

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APPENDIX A

<i>CLASS SCHEDULE: SUMMER 2003</i>	
DATES	LECTURE & READING TOPICS
JAN 20	Orientation to the course and introduction to the study of educational testing and assessment Related Readings: Marzano, Chapter 6 (p. 115); McMillan (McM), Chapter 1 Oermann & Gaberson (O&G), Chapters 1 & 14
JAN 27	Standards, Goals, Objectives, and Learning Targets Related Readings: Marzano, Chapters 1-3 McM, Chapter 2 O&G, Chapter 1
FEB 3 - 10	Attributes of High Quality Assessment Methods and Tools Related Readings: McM, Chapter 3; O&G, Chapter 2
FEB 17-24	Planning for Assessment <ul style="list-style-type: none"> • Test Blue Printing • Types of Assessment Methods • Assembling and Administering Tests Related Readings: Marzano, Chapter 4, also pp116-130 McM, Chapters 4 & 6 O&G), Chapters 3-4, & 8
MAR 2-16	Administering and Interpreting Standardized Test Scores Related Readings: McM, Chapter 13 O&G, Chapter 12
MAR 23	Assessing Simple Knowledge and Understanding Related Readings: Marzano, Chapter 5(pp 59-70) McM, Chapter 6 O&G, Chapter 5 Action Research Report #1 Shared and Submitted
APR 6-13	Assessing Complex Knowledge and Reasoning <ul style="list-style-type: none"> • Paper and Pencil Methods: Marzano, 5(pp 71-98); McM, 7;

	<p>O&G, 6</p> <ul style="list-style-type: none"> • Case Methods : O&G, Chapter 7 • Performance Assessment: McM, Chapter 8; O&G, Chapter 10 • Portfolio Assessment: McM, Chapter 9: O& G, Chapter 11 • Action Research Report #2 Shared and Submitted on March 23
APR 20	<p>Assessment in the Affective Domain Related Readings: Marzano Chapter 5(pp 98-105) McM, Chapter 10 O&G, Chapter 10</p>
APR 27	<p>Scoring & Analyzing and Grading & Reporting Related Readings: McM, Chapter 12 O&G, Chapters 9 & 13 Instrument Planning & Development Paper Due</p>
MAY 11	<p>Action Research Report #3 Shared and Submitted</p>

APPENDIX B

GENERAL GUIDELINES TO WRITTEN ASSIGNMENTS^{i[1]}

All course projects should be typed, double-spaced, and include a cover page. In addition, **the text of the papers should be preceded by an abstract of no more than 250 words** that provides a synopsis of the content, such as purpose, procedures, findings and conclusions. In terms of general style, the format provided in the fourth edition of **Publication Manual of the American Psychological Association** (American Psychological Association, 2002) should be followed.^{i[1]} The features that should be given close attention are:

! Margins ! Headings ! Citations in the Text ! Reference Page

The *cover page* should include the title of the assignment, the standard course requirement statement, your name, date, and institutional affiliation information.

You should make a copy of your projects before submitting it to the instructor. **In the case of the Applications Project, the instructor will keep the original.** You are welcomed, of course, to make an appointment to see the instructor concerning the evaluation of the project.

APPENDIX C

Guidelines to Specific Assignments

I. Action Research Papers

A. Action Research Paper #1: *Researching the General & Specific Objectives in Your Teaching Area*

1. Using your place of employment, professional association, or some instructional area, locate and list:
 - a. Mission Statement, General Objectives, and
 - b. any specific objectives for a selected area;
2. Conduct a *content analysis* of the mission statement and general objectives. For example, what values are being reflected in the statements? What assumptions are made (implicitly or explicitly) about learning or what is important to know? Why are the goals viewed to be important?
3. Examine the specific objectives and identify:
 - a. Their approximate classification according to Bloom's taxonomy with a rationale
 - b. Their approximate classification according to Marzano's taxonomy with a rationale.

B. Action Research Paper #2: *Researching Assessment Practices in Your Professional Area*

1. Interview someone in your profession who has an instructional responsibility.
2. The focus of the interview should be:
 - a. What instructional decisions are pertinent during and at the end of the instructional period? For example, some decisions may be for refining instruction, placing students in differential learning settings, summarizing their progress, etc.

- b. What assessment procedures or instruments are used for each of the decisions that are identified?
 - c. What are the strengths and limitations of the currently used assessments?
 - d. What recommendations would the Instructor make for future assessments if such impediments as time and expenses did not exist?
3. Summarize your findings into a narrative report. Attach a copy of the interview “raw data” to the narrative.

B. Action Research #3: Identification and Evaluation of an Important Standardized Test in Your Professional Area.

1. Locate a standardized test that plays a prominent role in your professional area. This may be a test taken during preparation in the profession, tests used for certification, admissions, etc.
2. Complete an assessment form that summarizes data on the quality of the instrument (distributed by the Instructor). One important source for such data is the *Buros Mental Measurement Yearbooks* found in Johnson Center Library. It is also on CD-ROM at each of the compute stations there in the library.
3. Based on the information you collect in the assessment form, write a description and evaluation of the instrument.

II. Instrument Planning and Development

A. Cognitive Test

1. **Critical Elements. Critical Elements. Critical Elements.** Decide on the subject matter area and the instructional unit of material you wish to use for the construction of the test. The first section of the paper should provide descriptive information about the test regarding:

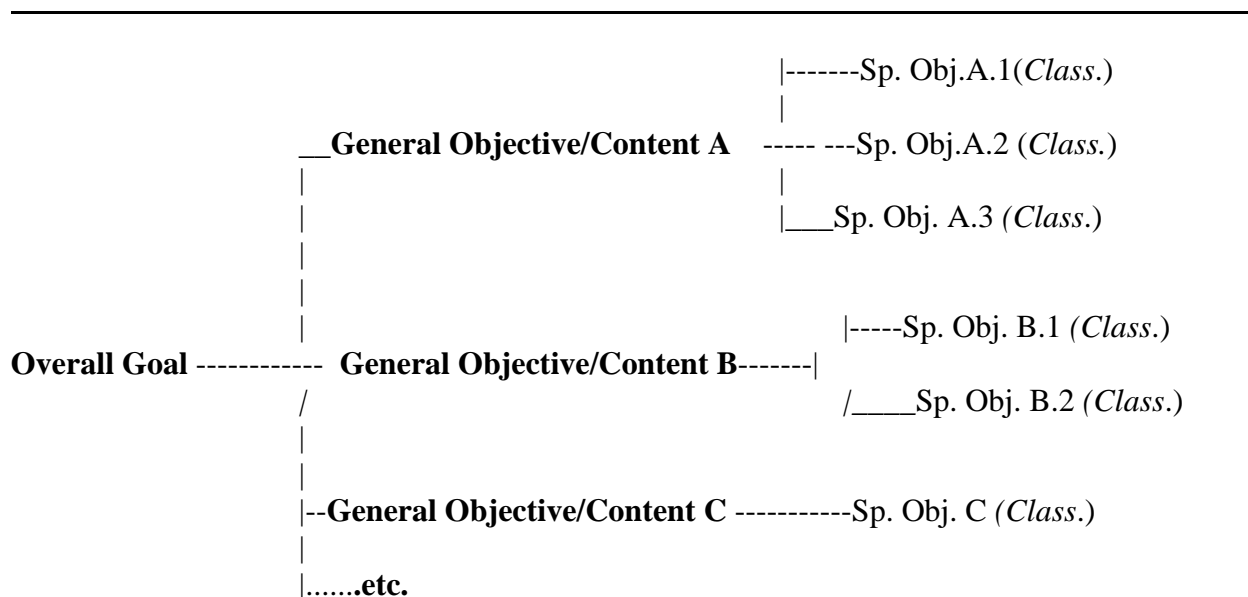
- a) the purpose of the test
- b) the characteristics of the individual or group appropriate for the tested
- c) the nature of the subject matter covered in instruction
- d) the instructional and learning activities involved
- e) the specific instructional content covered in the test
- f) general instructions to the user for test administration
- g) a test key
- h) an evaluation of the test.

The second section of the paper should contain the actual test. The test items should reflect sound principles of test construction. Your textbook provides specific information related to the writing of test items. The test may contain a combination of selected-response (e.g., multiple-choice and true-false) and constructed response items (e.g., short answer and completion).

2. **Specific Description of Critical Elements.**
 - a. **Statement of Purpose. Statement of Purpose. Statement of Purpose.** Provide a description of the general purpose of the test, its coverage (e.g., a two-week segment of a unit of instruction, comprehensive coverage of an entire instructional unit, etc.), and format (i.e., the number and types of test items).
 - b. **Description of Students, Patients, or Clients.** Describe the fictional or actual groups for which the test is appropriate. Your description should include grade level (if appropriate), age, the diversity in background (e.g., ethnicity level of prior knowledge, and social economic status), and the variability of their achievement status.
 - c. **The Subject Matter and Classroom Activities** Give a general description of the subject matter area covered in instruction (e.g., American history, religious practices during the colonial period, a unit on normal pregnancy, etc.), along with the identification of the textbooks and other instructional resources used by the students. Imagine a scenario that captures the teacher's activities to facilitate learning and the types of learning activities that students might engage in during the teaching of the instructional unit. Write a brief description of these activities to serve as the context for the test.

- d. **Description of Specific Content to be Tested.** Describe the specific instructional content covered in the test. This section should culminate with the presentation of the overall instructional goal, general objectives, and specific student outcomes that clearly reflect their interrelationship. The specific objectives should not only present the *content* and *behaviors* to be exhibited; they should also specify the *cognitive skills involved*, using either Bloom's Taxonomy or Marzano's Taxonomy. The linkage among the goal, general objectives, and specific outcomes may be presented as a tree diagram or a list. The general scheme using the tree diagram is illustrated in Figure I below.

Figure 1. Tree Diagram of Instructional Goals, Objectives, and Student Outcomes



You may find it more convenient to arrange the overall goal, general objective/content area, and student outcomes in a list similar to that illustrated in Table 1. You will note that the content in Table 1 is equivalent to that in Figure 1. The one difference is that the link between the overall goal and the three general objectives are not as apparent in Table 1 as in Figure 1.

Table 1.
Illustration of a the Instructional Goal, General Objectives, and Specific Outcomes.

Statement of Overall Goal of Instruction

A. Statement of General Objective/Content A

- 1. Specific Objective A.1 (*class.*)
- 2. Specific Objective A.2 (*class.*)
- 3. Specific Objective A.3 (*class.*)

B. Statement of General Objective/Content B

- 1. Specific Objective B.1 (*class.*)
- 2. Specific Objective B.2 (*class.*)

C. Statement of General Objective/Content C

Specific Objective C (*class.*)

- e. **The overall goal statement** may originate from a number of sources. It may be developed by you. It may be taken from a school district's curriculum guide or a teacher's edition of the textbook used in the unit of instruction. It may also be derived from your action research project #1.
- f. **The specific objectives** can be considered to be two dimensional: one involves a statement of content (condition), specific student behavior to be exhibited, and perhaps the criterion of mastery; the other dimension is the cognitive skills or processes presumed to underlie the exhibited behavior. The traditional source of classifying cognitive skills is found in Bloom et al (1956) and Gagné (1985) but other sources exist as well (for example, see Chase, 1978). An example of a specific objective using the Bloom's classification system is found below (Table 2), along with the identification of each critical component of the statement.

Table 2. An Example of a Statement of Specific Learner's Objective

Example:	<u>Given a set of decimals, including whole numbers (mixed decimals), the</u>
	↑
	(1)
	student will be <u>able to round off</u> the values <u>to the nearest hundredth.</u>
	(2) ↑ (3) ↑
	(Application level)
	(4)

Components: (1) Content/condition; (2) specific student behavioral outcome; (3) Criterion of mastery (when feasible); (4) Classification based on Bloom's Taxonomy

You should refer to the relevant chapter in your textbook for information on the classification of cognitive skills and general principles of writing instructional objectives. The appendix also contains a document, **Stages in Developing Statements of Specific Objectives** that should also be read.

- g. **Test Blue Print.** An important feature that is required is the two-way table of test specifications, commonly referred to as the test blueprint. This table serves as a critical link between the instructional objectives, the targeted cognitive skills (as presented in Figure 1 or Table 1) and the content of specific test items. One dimension of the table lists the general objectives or unit topics to be tested and the other specifies the cognitive skills or processes that were learned and to be assessed. The body of the table contains the specific objectives (usually coded for brevity) and the *identification of the specific test items developed to assess each specific objective.*
- h. **Instructions to the User.** One way to assure that the test is unambiguous, both in terms of construction and administration is to think in terms of it being administered by someone else. Will the substitute instructor, for example, be able to give the test appropriately? To assure clarity, you need to provide descriptions of any conditions, special materials, and general directions that are associated with the test administration. Examples include the amount of time estimated for test administration, the handling of answer keys, the need for test monitoring, and any special attention that must be provided to individuals with special needs or who are bilingual/multicultural. Any directions that are used to orient the students to the test, such as how they should handle the testing material, allocation of time, or recording their answers should also be included if appropriate. *The test key should be presented in this section of the paper.*
- i. **The Actual Test.** The test may contain a combination of item types but *must* include some selected response test items. The number of test items may range from 15-20. Please confer with me if these parameters are not appropriate for your targeted students or subject matter area. Both general directions (used to orient the students) and specific directions (used to guide student through specific sections of the test) should be included. Your textbook should be reviewed concerning the principles of test item construction. In formatting your test items on the test page, be sure that no items overflow to the next page; simply place the entire item on the next page, even if this may result in extra space at the bottom of the preceding page. The font size should not be smaller than 12 pitch.

Organization of the Report

The previous section provided specific information related to the content of the test construction project. This section describes the organization and sequence of the content in the writing of the paper. The paper should adhere to the general guidelines for written assignments. The assignment should **include a cover page, table of contents and an abstract** that briefly describes the general purpose of the test, the subject matter area, and the specific content tested.

It also specifies the students for whom it was written and the number and types of test items constructed.

The body of the paper should be divided into distinct sections:

a) Introduction: Statement of the purpose of the test, characteristics of the students to be tested, the nature of the subject matter covered in instruction and the types of instructional and learning activities involved. Since most of you will not be actually drawing current teaching experiences, you will have to fabricate these descriptions. (Be creative!);

b) Test Description: Description of the test in terms of the number and types of test items and your reason for selecting the test format. This section should also include the overall objective, general objectives, and the specific instructional objectives to be assessed. The two-way table of specification should follow the listing of objectives;

c) User's Section: General instructions to the user for test administration and scoring of the test, including the test key should be placed in this section. Any other information that would be helpful to someone else to administer the test should be included (see the relevant section above);

d) Test Evaluation: Evaluation of the strengths and limitations of the test based on your self-evaluation and the peer review. Please indicate if the test presented in the body of the paper has been revised based on the evaluations; and

e) The Classroom Test: The final draft of the classroom test.

f) A Reference List: List of all sources used in the test construction project, including your textbook, the students' textbooks, curriculum guides, etc. information that would be useful in understanding your project.

ReferencesReferencesReferences

Anderson, R. (1972). How to construct achievement tests in assessing comprehension. Review of Educational Research. 42, 146 - 170.

Carey, L. M. (1994). Measuring and evaluating school learning (2nd ed.). Needham, Mass: Allyn and Bacon.

Chase, C.I. (1978). Measurement for educational evaluation (2nd ed.). Reading, Mass: Addison-Wesley.

B. Performance-Based Assessment or Clinical Evaluation

General Objective and Initial PreparationGeneral Objective and Initial PreparationGeneral Objective and Initial Preparation

The **second alternative assessment project** that may be selected is the planning for a performance-based assessment or clinical evaluation. Performance-based assessments are commonly used in public school education and are appropriate when the educator is focusing on *skill outcomes* under more or less realistic conditions (Gronlund, 1988). In nursing, such assessments are sometimes referred to as clinical evaluation, and characterized by Oermann and

Gaberson (1998) as a process by which judgments are made about learners' in practice." (p. 167) The skill outcomes include performances related to specific procedures, such as laboratory skills in science, demonstrations of communication skills, identification of crucial components in complex machinery, and the like. The performances may have both important motor and intellectual components (Carey, 1994).

If you decide to choose this option for your course project, you should read Norm Gronlund's chapter on constructing performance tests (Gronlund, 1988). (A 5th edition of this classic paperback may be available by now). This is a highly readable and popular reference that you may find to be invaluable in the future and therefore worth the investment. It is also found in the library.

ProceduresProceduresProcedures

The Performance Assessment Project is essentially a plan for assessing behavioral skills, and the student's ability to demonstrate the integration of complex cognitive processes. The major sections of this project are outlined below:

I. Introduction

- A. Description of the general purpose for the performance-based assessment or clinical evaluation** and the reason why it is found to be a more appropriate method than other techniques
- B. Description of the subject matter area**
- C.** Description of the specific instructional unit used in the planning, including the sequence of instruction associated with the expected performance.
- D. Description of the students targeted for the assessment**, particularly in terms of prior learning experiences and unique needs of certain students (your descriptions, of course, will be fictional)
- E. The salient educational materials and equipment to be used.**

II. Specification of the Performance Outcomes to be Assessed

A. Statement of General Objectives

B. Associated Performance Outcomes

Each General Objective should be paired with its respective set of specific skill outcomes; these specific skill outcomes may include both intellectual and motor skills.

C. Selection of Performance Outcomes to be Assessed

All of the specific outcomes may not be used for a given performance assessment; indeed, many may not even be amenable to this technique. In this section identify those specific outcomes that will be the target of your performance assessment. Remember that these skill outcomes must be readily observable and reliably assessable.

III. Selection of Appropriate Performance Assessment Technique

A. General Description of Type of Performance Assessment

Identify the type of performance assessment technique(s) to be used; Classify the techniques (paper-and pencil performance, identification test, simulated performance, or work sample)²

² Gronlund classifies performance assessments according to the degree of "authenticity" reflected in the assessment situation:

1. Minimum authenticity: Paper-and-Pencil Performance

Example: Construct a set of test specifications for chapter 5 in your test and measurement textbook

Gronlund (1988) sees this type of assessment as being less realistic than others when used as an initial or intermediate step prior to the "real" or "hand-on" performance. For example, the test blueprint may be viewed as a necessary but insufficient competence in the construction of the informal paper-and pencil test.

2. **Identification Test:** This test includes a number of different activities that reflect varying degrees of realism. Examples of identification tests include students **selecting** appropriate objects or equipment, locating specific objects, **choosing** correct equipment, or correctly **identifying** terms, instances, or objects as instructed.

3. **Simulated Performance:** Select this type of assessment procedure if your primary emphasis is on **proper procedures**. This is one of the types of performance-based assessment technique that is characterized as "authentic assessment." It is also characteristic on many clinical evaluations in the health field. While the student is required to produce the same actions as required for the "real-world" performance, the conditions are simulated. The degree of realism will depend on the quality of the simulation conditions. An example of a very realistic simulation condition would be the computer simulations used in flight training for pilots. Less realistic, but still effective, are role playing and vocational educational training procedures. Simulations may be more appropriate when expense or safety is the primary consideration.

4. **The Most Authentic: The Work Sample:** Select this technique if you wish the students' performances to actually be representative of the total performance to be assessed. Here the sample tasks must be carefully selected as representative of actual work found in the real-world setting but yet carefully controlled. The driving test that requires the student to steer the car through a training course that has the common driving obstacles and challenges found on the roads is an example of this type of performance-based assessment. Other examples include apprenticeships, interns and mentoring requiring the operation of equipment under supervision and actual job-based laboratory tasks.

B. Description of the Setting

Describe the conditions in which the students are to perform, including any equipment/apparatuses required, amount of time for allotted for the performance, and whether an audience will be present.

IV. Instructions Assume you are providing directions for a substitute teacher to follow in your absence. Your instructions should include the following points:

A. Purpose of the Assessment

B. List of equipment and materials to be used

C. Testing procedure, including:

1. Condition of equipment
2. Controls (e.g., role of other students, if any; whether conducted in a group, etc)
3. Description of the required performance
4. Time limits, if any
5. Method of scoring performance appraisal instrument

V. The Performance Appraisal Instrument

Include the actual performance appraisal instrument that will be used in the assessment. The appraisal instrument may be in the form of an observational checklist, a procedures rating scale, a product rating scale, or some combination of these formats. The instrument should be accompanied by a description, the rationale for the selection of the adopted format, and the standards for judging the quality of performance, if ratings are to be used.

VI. Evaluation

At minimum, you should conduct a self-evaluation of your plan. If possible, have a colleague to examine your plan as well. In each case, briefly respond to the questions below that refer to criteria for evaluating a performance assessment (Oosterhof, 1996):

1. Does the performance assessment present a task relevant to the instructional goal and general objectives?
2. Are the number and nature of qualities to be observed at one time sufficiently limited to allow accurate assessment?
3. Is each quality to be measured directly observable?
4. Are conditions under which the performance assessment will occur clearly established?
5. If the stimulus is structured, are instructions to the student concise and complete?
6. Does the scoring plan delineate essential qualities of a satisfactory performance?
7. Will the scoring plan result in different observers assigning similar scores to a student's performance?

Gronlund, N. E. (1988). How to construct achievement tests (4th ed.) Englewood Cliffs, NJ: Prentice-Hall, Inc.

Oosterhof, A. (1996). Developing and using classroom assessments. Englewood Cliffs, NJ: Prentice-Hall, Inc.
