

**STUDY OF CRITERIA AND TESTS
FOR MEASURING PUPIL PERFORMANCE
IN VIRGINIA PUBLIC SCHOOLS**

**REPORTED TO
THE GOVERNOR AND THE GENERAL ASSEMBLY
OF THE COMMONWEALTH OF VIRGINIA**



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This report is submitted by the Board of Education in response to House Joint Resolution 269, adopted by the 1973 session of the Virginia General Assembly, in which the Board of Education was "directed to study and develop a set of criteria and reasonable tests and standards to measure a child's level of performance."

To assist the Board in carrying out its assignment, the Superintendent of Public Instruction designated the State Advisory Committee on Testing and Assessment to work with Frank A. Cain, Director of Program Evaluation, and Claude A. Sandy, Supervisor of Testing, in preparing this report.

The Advisory Committee is composed of the following persons:

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Miss Donna G. Doyle, Coordinator of Testing, Norfolk

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Periodic evaluation of pupil achievement in all curricular areas is necessary in an effective instructional program. Therefore, the Board of Education welcomes the opportunity to study and report to the General Assembly on the need for criteria and reasonable tests and standards for measuring pupil performance.

I. Analysis of Current Assessment Practices

Reasons for Assessment

The objectives of an assessment program are:

1. To evaluate pupil progress toward the achievement of instructional objectives;
2. To diagnose strengths and weaknesses of pupils as individuals and groups;
3. To aid in the development of appropriate instructional programs for individuals and groups;
4. To discover special abilities, interests, and aptitudes of pupils;
5. To help pupils and their parents understand how the pupil compares with some pupil reference group, or how he stands with regard to achievement of the objectives of the instructional program;
6. To provide information for guiding pupils toward educational and vocational goals;
7. To evaluate the effectiveness of an instructional program.

As indicated above, assessment may involve a pupil or a group of pupils (e.g., a class, an entire school, or an entire school division).

Regardless of the objective of a pupil assessment program, it should be recognized that the purposes are not likely to be achieved without the use of a combination of assessment procedures. Frequently, objective test data are used in combination with other more informal information as bases

for reaching conclusions as to pupil achievement and school placement. This is particularly true when assessment is directed toward individual pupils rather than groups.

Methods of Assessment in Current Use

Assessment of students' performance is carried on in various ways in the public schools of Virginia. Although tests are a primary assessment device, they are by no means the only ones that are used. A brief description and analysis of assessment procedures in current use in Virginia follows:

Standardized tests. Standardized (norm-referenced) tests are administered as part of the State Testing Program. Standardized ability and achievement tests are required in grades four, six, eight, and eleven. Other standardized tests, including readiness, achievement, and aptitude tests, are administered at certain grade levels at the option of local school divisions.

Standardized ability and achievement tests are designed to measure general ability and general achievement. They are not designed to measure how well pupils are achieving the objectives of a specific instructional program. Because they are prepared for use over a broad geographic area they do provide a sound basis for comparing the general ability and achievement of an individual or group with the ability and achievement of a national sample.

More and more, standardized achievement test publishers are providing detailed analyses of achievement for individual pupils and groups. Such analyses, called skills profiles, are being provided for students tested in Virginia in grades four, six, and eight. Copies of individual skills

profiles are furnished so that teachers, administrators, parents, and pupils will have a graphic representation of each child's strengths and weaknesses in the instructional areas tested. In addition, group skills profiles are provided for each class tested so that administrators and teachers will have more specific achievement information for the entire class. These skills profiles are designed to help teachers diagnose the strengths and weaknesses of pupils as a basis for determining areas of instructional emphasis.

Standardized tests also may be used to compare general achievement with general ability for a group of pupils. This comparison gives some indication of the degree to which pupils are achieving in relation to their ability. In a majority of local school divisions achievement compared favorably with ability in the 1973-74 State Testing Program. Average achievement in the fundamental skills (reading, mathematics, and language arts) equaled or exceeded average ability in 130 of the 132 school divisions in Virginia in the fourth grade and in 128 school divisions in the sixth grade. Average reading achievement equaled or exceeded average ability in all except one school division in the eighth grade and in all except four school divisions in the eleventh grade.

While standardized tests have many advantages, they also have certain limitations. For example, standardized tests cannot: (1) measure all learning that takes place in the classroom; (2) predict accurately the future success of a pupil; (3) measure achievement of all of the objectives of a subject, school, or school division; or (4) evaluate the effectiveness of one teacher as compared with that of another teacher.

Teacher-made tests. The primary purpose of teacher-made tests is to aid the teacher in determining the extent to which pupils have mastered

the subject matter that he has taught. There may be other purposes, such as motivating pupils, diagnosing weaknesses, planning an instructional program, and evaluating pupils for assigning course grades. Generally, little effort is made to determine the reliability and validity of teacher-made tests; therefore, there is no guarantee that they do, in fact, accurately measure the achievement of instructional objectives.

Teacher-made tests can be very effective, however, because they can be designed to measure the attainment of specific skills and understandings that are being taught. As a teacher recognizes unique needs in the classroom, tests can be prepared quickly to determine steps to be taken to meet these needs.

Criterion-referenced tests. Criterion-referenced tests have gained popularity rapidly in recent years as a means of assessing the achievement of instructional objectives. They are developed to determine whether or not specified skills and information (criteria) have been achieved. In general, they are not designed to provide comparisons of the performance of individuals or groups of pupils. Their primary purpose is to measure the extent to which an individual group has mastered specific instructional objectives.

Criterion-referenced tests are being used in Virginia in the Supplemental Skill Development Program in reading and mathematics for low-achieving fifth- and sixth-grade pupils. The tests being used were designed specifically for this program to accomplish two purposes: (1) to provide a basis for individualizing classroom instruction, and (2) to assess the extent to which pupils in the program achieved instructional objectives in reading and mathematics.

Prior to developing the criterion-referenced tests it was necessary that the instructional objectives of the Supplemental Skill Development Program be defined in terms of pupils' performance. The development of these objectives began in December 1973 and was completed in May 1974.

The steps in the process were:

1. Development of lists of basic skills in reading and mathematics by members of the State Department of Education's Division of Elementary Education;
2. Review of lists of basic skills and development of instructional objectives by members of a committee composed of local supervisors in mathematics and reading, teachers of fifth- and sixth-grade pupils, and college personnel in teacher education;
3. Review of the committee's list of instructional objectives by at least two persons in each school division; and
4. Refinement of the instructional objectives by the committee

This process resulted in the development of 65 instructional objectives --30 in reading and 35 in mathematics--which were the basis for the development of the items for the criterion-referenced tests. These objectives, which are contained in the Appendix, are the criteria for measuring the reading and mathematics skills and knowledge of low-achieving fifth- and sixth-grade pupils for whom this program was designed. These objectives could also be used by teachers at the end of the primary grades to determine whether pupils had acquired the fundamental skills that constitute the essential foundation for further learning in reading and mathematics.

The tests to be used in measuring pupil achievement in this program were developed by a commercial firm, Westinghouse Learning Corporation, based on the instructional objectives developed through the process already outlined

Plans are being formulated in the Department of Education to develop criterion-referenced tests for a statewide assessment program to measure the extent to which significant instructional objectives are being achieved by students throughout the State. The objectives to be assessed would relate to the major academic subjects and perhaps to such areas as citizenship, physical fitness, career development, etc.

The assessment program was recommended in January 1973 by the State Testing Committee and was approved by the Board of Education. The results of this assessment should provide information about the achievement of pupils in terms of the information and skills that are designated as educational objectives for Virginia pupils. The program would utilize criterion-referenced tests with a representative sample group of seventh- and twelfth-grade pupils throughout the State. It is anticipated that the development process to be followed will be similar to the Supplemental Skill Development Program process already described.

Informal methods of assessment. Besides the more formal methods of assessment described, a variety of informal methods are in common use. Most of them are based on either direct or indirect observation of the pupil in the school setting. These methods may involve evaluation of written work, oral presentations, classroom discussion, verbal and non-verbal interaction, and behavioral expressions of attitudes. Although basically informal, a teacher may structure this approach somewhat by recording her observations in a systematic way, maintaining a file of written work, or recording oral work. In the development and use of informal assessment techniques, the professional experience of the teacher is vitally important in providing a basis for increased objectivity in the informal assessment of pupil performance.

II. Evaluation of Assessment Practices

Most assessment methods have strengths and weaknesses. There does not appear to be any one method of assessment which does the complete job satisfactorily. Standardized tests provide a sound basis for comparing a pupil with a norm group, but cannot adequately measure pupil progress toward achieving the objectives of an instructional program. Criterion-referenced tests are designed to measure the extent to which pupils have achieved the objectives of an instructional program, but generally do not provide a basis for comparison with pupils outside the program. Teacher-made tests and informal assessment methods can make a unique contribution to the assessment process because they are designed especially for a specific program by the individuals who are closest to it and to the pupils; however, their major weakness is that they frequently lack objectivity.

Despite the contributions of the various methods of assessment, the precise determination of a pupil's level of performance is a complex task. This is especially true where a pupil's level of performance is assessed to determine grade placement. The difficulty results from the need to consider various aspects of pupil development, such as:

1. The placement that will provide the pupil with the greatest opportunity for intellectual development, considering his level of performance in each area of instruction;
2. Individual differences in patterns of physical development and its relationship to intellectual development, since skill building is dependent upon both; and
3. Individual differences in patterns of social and emotional development, which may not be consistent with intellectual and physical development.

In the final analysis, grade placement of the pupil must be determined by the teacher and other professionals who work with the pupil. To make a decision concerning grade placement on the basis of objective test data

alone is inadequate because such data fail to take into account all the complex aspects of intellectual development. The teacher must consider assessment data that are available and, at the same time, also understand that there are factors outside the academic sphere for which adequate measures have not been developed. This gap is bridged by the experienced judgment of the teacher.

III. Conclusions

The Board of Education believes that the attached objectives (skills and information) for reading and mathematics, which were developed during the 1973-74 school year in connection with the Supplemental Skill Development Program, can be used as criteria by teachers at the end of the primary grades to determine whether pupils have acquired the fundamental skills that constitute the essential foundation for further progress in these subjects.

The Board believes also that the development of instructional objectives and criterion-referenced tests to measure the achievement of these objectives in grades 7 and 12 should be undertaken. The objectives would relate to the major academic subjects and to such areas as citizenship, physical fitness, career development, etc.

The attached objectives and the proposed assessment program for grades 7 and 12 would provide criteria which teachers and the public might use to determine the extent to which important educational objectives are being achieved in the early grades, at the end of the elementary school program, and at the end of high school.

APPENDIX

READING OBJECTIVES for Supplemental Skill Development Program

I. WORD ANALYSIS

- A. The student will be able to look at a picture of an object which represents a word beginning with a consonant sound and select from a list of words the one beginning with that same sound.
- B. The student will be able to recognize final consonants by choosing from a list of words the one that has the same final consonant as a given word that is represented by a picture.
- C. The student will recognize the sound of a long vowel in a given written word by choosing from a list of words the one which has the same vowel sound as the given word.
- D. The student will recognize the sound of a short vowel in a given written word by choosing from a list of words the one which has the same vowel sound as the given word.
- E. The student will be able to recognize diphthongs by identifying the words in a given list that have the same diphthongs as the first word in the list.
- F. The student will demonstrate a knowledge of letter symbols for consonant blends by choosing from a group of blends the one that begins the word which names a given picture.
- G. The student will demonstrate a knowledge of consonant digraphs by choosing a digraph from the list which completes the name of the object represented by the picture.
- H. The student will demonstrate the ability to identify symbols for medial consonant sounds by selecting from a list the words having the same medial consonant sounds as a word illustrated in a picture.
- I. The student will demonstrate the ability to recognize silent consonants in a word by selecting each silent consonant in a given list of words.
- J. The student will demonstrate the ability to recognize silent vowels in words by choosing the words that have silent vowels in a given group of words.
- K. The student will be able to identify the singular nouns when given a set of singular and plural nouns.

- L. The student will be able to identify the compound word in a list of words containing one compound word.
- M. The student will demonstrate an understanding of root words by identifying the roots of given words to which beginnings or endings have been added.
- N. The student will be able to select a word containing a prefix from a list of words.
- O. The student will be able to select a word containing a suffix from a list of words.
- P. The student will demonstrate a comprehension of contractions when presented given pairs of words by identifying contractions formed by combining each pair.
- Q. The student will demonstrate an understanding of the use of the apostrophe showing possession by selecting the correct singular or plural possessive form to fill the blank in given sentences.

II. VOCABULARY

- A. The student will demonstrate knowledge of the 220 most frequently used words (Dolch Basic Word List) by saying the given word.
- B. The student will be able to match given words with their correct definitions.
- C. The student will be able to demonstrate a comprehension of synonyms antonyms, and homonyms by identifying words that have the same meaning, the opposite meaning, or words that have the same sound but which are spelled differently.

III. LITERAL COMPREHENSION

- A. The student will demonstrate the ability to recall specifics about a story he has read by choosing the correct answers to questions based on the story.
- B. The student will be able to identify from a list of responses the response which indicates that specific directions have been correctly followed.
- C. The student will be able to arrange a series of statements about a given story into correct order.

IV. INTERPRETATIVE COMPREHENSION

- A. The student will demonstrate comprehension of the given definitions of a word having multiple meanings by choosing one which applies in a given sentence.

- B. The student will be able to select the topic sentence of a given paragraph from a list of sentences.
- C. The student will be able to identify the main idea in a reading selection.

V. CRITICAL COMPREHENSION

- A. The student will be able to distinguish fact from fiction in particular sentences from a given story by categorizing them as such.
- B. The student will be able to distinguish fact from opinion by categorizing given statements based on a passage the student has read.

VI. STUDY SKILLS

- A. The student will be able to locate the page number in a given table of contents that tells where to find information on a subject or where a story begins.
- B. The student will be able to identify the correct alphabetical order of several words whose first and second letters are the same.

MATHEMATICS OBJECTIVES
for
Supplemental Skill Development Program

I. WHOLE NUMBERS

A. Numeration

1. The student will be able to identify or write the correct place value for a digit in a given seven place number.
2. The student will be able to identify or write the relationship between two one- to four-place numbers, as greater than, less than, or equal to. (Note: Symbols are not used.)

B. Operations

1. Addition

- a. The student will be able to identify or write the sum of two one-place numbers.
- b. The student will be able to solve a one- to four-place addition problem without regrouping.
- c. The student will be able to solve a one- to four-place addition problem with regrouping.
- d. The student will be able to identify or write the solution to a word problem which involves addition of one- to four-place whole numbers with regrouping.

2. Subtraction

- a. The student will be able to identify or write the difference of a one- or two-place number and a one-place number where the two place number is less than 19.
- b. The student will be able to solve a one- to four-place subtraction problem without regrouping.
- c. The student will be able to solve a one- to four-place subtraction problem with regrouping.
- d. The student will be able to identify or write the solution to a word problem which involves subtraction of one- to four-place whole numbers with regrouping.

3. Multiplication

- a. The student will be able to identify or write the product of any two one-place numbers.
- b. The student will be able to identify or write the product of a one-place factor times a two-, three-, or four-place factor without regrouping.

- c. The student will be able to identify or write the product of a two-place factor times a two-, three-, or four-place factor with regrouping.

4. Division

- a. The student will be able to divide a one- to four-place number by a one-place divisor and identify or write the quotient without a remainder.
- b. The student will be able to divide a one- to four-place number by a one-place divisor and identify or write the quotient with a remainder. (Note: The remainder to be expressed as $\frac{21}{6}$ r 5.

II. FRACTIONAL NUMBERS (FRACTIONAL FORM)

A. Numeration

- 1. The student will be able to identify or write the fraction which represents the shaded part of a diagram.

B. Operations

1. Addition

- a. The student will be able to identify or write the sum of fractional numbers with like denominators. (Note: No simplification to be performed.)
- b. The student will be able to identify or write the sum of an addition problem of mixed numbers with like denominators. (Note: No simplification to be performed.)

2. Subtraction

- a. The student will be able to identify or write the difference in a given subtraction problem of like fractions less than one. (Note: No simplification to be performed.)
- b. The student will be able to identify or write the difference in a given subtraction problem of mixed numbers with like denominators. (Note: No simplification to be performed.)

3. Multiplication

- a. The student will be able to identify or write the product of a whole number and a fractional number without simplifying the product. (Example: $6 \times \frac{3}{5} = \frac{18}{5}$.)
- b. The student will be able to identify or write the product of two fractional numbers less than one. (Note: No simplification to be performed.)

III. FRACTIONAL NUMBERS (DECIMAL FORM)

A. Operations

1. The student will be able to identify or write the sum of an addition problem of mixed numbers with decimal fractions of tenths or hundredths with regrouping.
2. The student will be able to identify or write the difference of a subtraction problem of mixed numbers with decimal fractions of tenths or hundredths with regrouping.
3. The student will be able to identify or write the solution to a word problem which involves multiplying an amount in dollars and cents (decimal notation) by a one-place factor.

IV. GEOMETRY

- A. The student will be able to identify a specific plane figure in a set of plane figures including a line, a line segment, a ray, and/or an angle.
- B. The student will be able to identify a given pair of lines as parallel, perpendicular, and/or intersecting.
- C. The student will be able to identify a specific plane figure in a set of plane figures including a triangle, a square, a rectangle, a non-rectangular parallelogram, and/or a circle.

V. MEASUREMENT

- A. The student will be able to measure a given line segment and identify or write the measure as a mixed number. (Note: The given line segment will be $1\frac{1}{2}$, $2\frac{1}{2}$, $3\frac{1}{2}$, or $4\frac{1}{2}$ inches.)
- B. The student will be able to measure a given line segment and identify or write the length to the nearest inch.
- C. The student will be able to identify or write the area of a rectangular region by counting the number of square units in a given diagram.
- D. The student will be able to identify or write the time to the nearest quarter hour, given the diagram of a clock showing time.
- E. The student will be able to order any subset of the set: ounce, pint, quart, gallon in terms of volume.
- F. The student will be able to identify or write the indicated temperature given a diagram of a thermometer.

VI. GRAPHING

A. Interpreting Graphs

1. The student will be able to identify or write a specific fact, according to the information given on a simple bar graph.