Supplemental Directions for Administering the Braille Edition of the KeyMath Revised

A Diagnostic Inventory of Essential Mathematics

Form A

by

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INTRODUCTION

The examiner should become thoroughly familiar with these directions, the four volumes of the braille edition of *KeyMath Revised (KeyMath-R),* and especially the regular print *KeyMath Revised Manual* before administering the braille edition of the test for diagnostic results.

In the four volumes of the braille edition of *KeyMath-R,* the examiner's instructions are in print. The student's pages generally include braille and/or tactile graphics. There are some items, however, where actual money or three-dimensional objects should be used. In a few cases, the student's page is simply blank.

While it is not absolutely necessary that the examiner know braille in order to administer the braille edition of the *KeyMath-R* , it is essential that the test administrator know what is brailled and/or embossed on the student's pages. If the examiner is unfamiliar with braille, therefore, it is necessary in preparation for administering the test to review the student's pages with someone who can read braille. In this case, it is recommended that the examiner keep some notes regarding what the braille says and/or what is presented tactilely.

While the test format has not been changed in the braille edition, there are changes that facilitate the handling of the materials as well as the administration of the test.

There are six (6) items within the Geometry subtest that could not be adapted into tactile format. Appendix B of this supplement will tell you how to handle this and how to obtain a total score for the *KeyMath-R.*

Again, it is important to read the purpose of the *KeyMath-R* test in the print *KeyMath Revised Manual.* There are, in addition, some aspects of the four booklets of the braille edition that need to be explained. The sections of the regular print test are divided into 13 subtests within three major areas: Basic Concepts (1, 2, & 3), Operations (4, 5, 6, 7, & 8), and Applications (9, 10, 11, 12, & 13). While the print test is contained in two binders, the braille edition arranges them in four volumes: Basic Concepts - **Volume I** (parts 1-3), Operations - **Volume II** (parts 4-8),

and Applications - **Volume III** (parts 9-10) and **Volume IV** (parts 11-13). The *Individual Test Record*, packaged with the kit of *KeyMath-R* materials from the American Printing House for the Blind (APH) or purchased separately from American Guidance Service (AGS), will give you a quick reference to the subtests.

The four computation sections (addition, subtraction, multiplication, and division) which appear in the *Individual Test Record* are placed in Volume II of the braille edition in their natural order at the end of Sections 4, 5, 6, and 7. So that the student will not be confused, it is important to explain that the problems in the computation portions are numbered consecutively following the questions that have already been asked orally. For example, in Section 4 the addition problems begin with number seven on the computation section since items one through six have already been asked orally.

During the administration of the computation sections of the test, the student will be allowed to use whatever equipment or material he/she customarily uses for arithmetic computation with the exception of a calculator or computer having memory banks. The responses to the computation questions may be either oral or written. This is a decision the examiner must make after becoming familiar with these sections.

Most items in the *KeyMath-R Diagnostic Inventory* require the student to respond verbally to open-ended questions that are presented verbally by the examiner. When appropriate, braille and/or embossed illustrations accompany the oral presentation. **Appendix A of this supplement lists the content of the original items and indicates what necessary content changes were made to enable a braille adaptation.** With the exception of the dropped items on the Geometry Subtest, all items reflect the same specific behavioral objectives.

A print graphic cannot always be represented realistically by an embossed graphic. In the lower right portion (below the question) of the examiner's page in the braille edition of the *KeyMath-R* , therefore, there is often a word(s) in parenthesis describing the illustrated object which was used as the original test item. For example, in the subtest Numeration, items 1 and 2 refer to a print graphic of sheep and this is replaced by an embossed

graphic of circles for ease of administration. The question is changed accordingly and the word "sheep" is placed in parenthesis in the lower right of the question. This arrangement enables use of the original AGS *Individual Test Record* with the braille edition. The examiner records each answer on the *Individual Test Record* as it is given. The process is described in the print *KeyMath Revised Manual* for further clarification. As indicated, Appendix A of this supplement provides the specifics of the changes.

While the pages are not numbered in the print edition of the *KeyMath-R,* the examiner's pages in the braille edition are numbered consecutively. This enables an easier reference for these *Supplemental Directions* and for the print/tactile production of the test.

It is important that the examiner be thoroughly familiar with the test materials before administration. These include the *KeyMath Revised Manual*, these *Supplemental Directions*, the four braille test volumes with examiner information (use Appendix A of supplement in doing this), and the *Individual Test Record.* A practice administration of parts of the test should be done before administering the test for diagnostic results. For this trial administration, an *Individual Test Record* should be used. Giving the test to another adult is acceptable for practice and familiarization purposes.

Before administering the test, the student's name and other information should be recorded on the *Individual Test Record.* Any sheets used to record the answers to the computation problems in Volume II of the braille test volumes should also be identified with the student's name.

The *KeyMath-R* is a power test rather than a speed test. It is important, therefore, that the examiner allow enough time to give predetermined sections of the test within any given test session. This estimated amount of time should be indicated to the student. Page 11 of the print *KeyMath Revised Manual* indicates that students in the primary grades will complete the test in 30-40 minutes and that older students may take 40 to 50 minutes. Since the handling of braille and graphics will take longer (approximately 2 1/2 times as long), it is most likely inappropriate that the entire test be given in one sitting. Remember that the student begins

each section at the basal item established in the Numeration subtest. Read pages 12 through 15 carefully in the *KeyMath Revised Manual* to clarify this process. Less time may be needed at the lower grade levels. If basal level is observed, however, the difference will not be great. For information on the interpretation of performance, refer to Chapter 4 in the *KeyMath Revised Manual.*

IN READINESS FOR THE TEST ADMINISTRATION

1. Since the test items are designed to be read simultaneously by the examiner and the student, a table should be used where both are seated comfortably across from each other.

2. It is important that the test be administered in a setting that is free from distraction and interruptions.

3. In addition to the test volumes, the examiner should have an *Individual Test Record*, four blank braille sheets, the actual money needed to administer a number of the test problems, and whatever else is normally used by the student while working computation problems (a calculator or computer with memory banks is not an allowable item).

4. Make sure that the emphasis of the examination rests on the level at which the student is working rather than how much he/she can do. Pages 12 through 15 in the print *KeyMath Revised Manual* gives you specifics on where to find the correct level to begin a subtest.

5. If the examiner is familiar with the material, the directions should be clear to the student. The verbatim directions can be supplemented with limited explanation and/or guidance in locating information on a page if such need arises.

APPENDIX A

Print test illustration	Braille test illustration
1 Numeration	
1-2 sheep	circles
3-4 boxes with numbers	same
5-6 line of people	stick figures
7 numbers (series)	same
8 boxes with numbers	same
9 bundles of rods	same
10 dots in circles	same
11 boxes with numbers	same
12 blue dot	textured dot
13 numbers (series)	same
14 boxes with numbers	same
15 small blocks	same
16 boxes with numbers	same
17 pencils	same
18 boxes with numbers	same
19 box with number	same
20 boxes with numbers	same
21 small blocks	same
22 three-digit number	same
23 positive-negative line	same
24 ten to the power of five	same
2 Rational Numbers	
1 marbles	circle
2 colored shape	textured shape
3 divided circle, colored	divided circle, textured
4 flowers, colored	circles, textured

2 Rational Numbers (continued)

5	shape, colored	shape, textured
6	divided circle, colored	divided circle, textured
7	fraction	same
8	numbers (series)	same
9-10	hot air balloons, colored	hot air balloons, textured
11	decimal	same
12	boxes with fractions	same
13	boxes with mixed numbers	same
14	ducks	circles
15-16	percent and decimal	same
17	decimals	same
18	fraction	same

3 Geometry

1	picture of objects	shapes
2	shapes	same
3	shapes	same
4	blocks	same
5	shapes	same
6	beads and string	same
7	shapes	same
8	beads and string	same
9-10	shape	same
11	shapes	same
12	blocks and mirror	not tested
13	animals	shapes
14	shapes	not tested
15	blocks (visual)	not tested
16	shapes	same
17	shapes	same
18	circle and lines	same
19	blocks stacked	not tested
20	shapes	not tested
21	blocks (visual)	not tested

3 Geometry (continued)

22	shape	same
23	shape	same
24	shapes	same

4 Addition

1	children	circles
2	five baseballs and two soccer balls	5 small and 2 large circles
3	cookies and paper sack	circles and box
4	dots on domino	same
5-6	number sentences	same
7-18	computation--addition	same

5 Subtraction

1	doughnuts	circle
2	seal and 4 balls	same (described)
3	two children holding fish	two sets of braille cells
4	four balloons (1 popped)	four full circles
5-6	subtraction problems	same
7-18	computation--subtraction	same

6 Multiplication

1	donkey	no illustration
2	envelope and stamps	same (described)
3	bags	boxes
4-6	multiplication problems	same
7-18	computation--multiplication	same

7 Division

1	ten jars, 2 boxes with 4 holes each	10 cylinders and 2 squares
2	twelve glasses of juice	12 cylinders
3	eighteen squares of chocolate	same

7 Division (continued)

4	string and blocks	circles with squares
5-6	division problems	same
7-18	computation--division	same

8 Mental Computation

1-3	no illustration	same
4	subtraction problem	same
5-6	no illustration	same
7-8	addition and subtraction problem	same
9-10	multiplication problems	same
11	no illustration	same
12-13	division problems	same
14-15	addition and subtraction problem	same
16-18	multiplication problems	same

9 Measurement

1	pieces of yarn	lines
2	trees	sticks
3	picture of food	foods listed
4	shapes	same
5	picture of objects	objects listed
6	picture of containers	same
7	cubes and pencil	cubes and line
8	ruler and pen	ruler and line
9	fish tank and bucket	same
10	shape (how much blue)	shape (how much shaded)
11	envelope and paper clips	rectangle and line segments
12	ruler and line	same
13	scale with pear and spoons	same (with description)
14	ton, ounce, and pound	same
15	square with triangular shape inside	square with triangle shape shaded
16	thermometer	same

9 Measurement (continued)

17	units for measuring area	same
18	comb and ruler	line and ruler
19	no illustration	same
20	rug	rectangle
21	box and cube	box and block
22	gram weights	same
23	liquid measurements	same
24	kilograms	same

10 Time and Money

1	no illustration	same
2	clock	same
3	coins--assorted, $.91	use actual cash
4	building chair with illustrations	illustrations described
5	coins--assorted, $.13	use actual cash
6	The word Saturday	same
7	calendar	same
8	clock	same
9	coins--assorted, $.88	use actual cash
10	calendar	same
11	units of time	same
12	coins--assorted, $1.03	use actual cash
13	word problem	same
14	March 6, 1989	same
15	coins--assorted, $.53	use actual cash
16	bills and coins--$3.08	use actual cash
17	bank machine	actual amount stated
18	coins--assorted, $.68	use actual cash
19	clock	same
20	check and statement	same
21	admission price $5.00	amounts are listed in the question
22	U.S. map (time difference)	same
23	passage of times listed	same

10 Time and Money (continued)

24	chart of money	same

11 Estimation

1	cherries	circles
2	pencil and bean	diagram explained--same
3	buttons in ring	circles in ring
4	card	same
5	guesses	same
6	pencil	line
7	mistake in sentence	same
8	table and chair	word problem
9-10	clothes and prices	same
11	addition problem	same
12	map (distance between two cities)	same
13	shape (divided into two parts)	textured circle
14	measurements (estimated)	same
15	subtraction problem	same
16	prices added together make dollar	same
17	what part fraction	same
18	turkey--price per pound	same

12 Interpreting Data

1	children with various hair shades	dotted and shaded circles
2	chart	same
3-4	chart showing animals on farm	same with braille words
5	circle with different colors	same
6	five gumball machines	5 cylinders with circles and dots
7	chip--yellow on top, green on bottom	same
8	bus schedule	same
9	milage chart	same
10	student population chart	same

12 Interpreting Data (continued)

11	graph of cars and trucks	same
12	graph of car expenses	same
13	graph of monthly car sales	same
14	graph of population	same
15	graph of spelling scores	same
16	block with numbers	same
17	tax table	same
18	blocks with numbers	same

13 Problem Solving

1	add 6 rabbits and 2 rabbits	same
2	subtract 2 balloons from 7 balloons	same
3	subtract younger age from older age	same
4	make up story involving 20 - 8 = 12	same
5	sequence of numbers (what comes next)	same
6	age and weight of two boys	same
7	number of fish caught	same
8	word problem involving 4 coins	same
9	subtract 70 bricks from 256 bricks	same
10	multiply 6 rows by 15 in each row	same
11	divide 6 cans into 180 cans	same
12	subtract two girls' ages	same
13	time and distance word problem	same
14	objects and prices	same
15	inches of snow into water	same
16	sequence of numbers (what comes next)	same
17	cost of bat and ball	same
18	number puzzle	same

APPENDIX B

The Geometry Subtest and Obtaining a Total Score

We were unable to successfully adapt the Geometry subtest. Two changes have been made. First, six items were dropped from the subtest because a conversion of those items to a three-dimensional format would not provide the same information that the pictorial or graphic display gives. Second, the subtest should not be scored using the norms given in the print manual. Even though the items in the subtest range in difficulty and are presented in the same order that they would be taught, it is unlikely that incidental learning in Geometry occurs at the same rate for students with visual impairments as that for sighted students and thus the norms are not appropriate for students with visual impairments. Personnel at American Guidance Service, Inc. suggest that this subtest be treated as a criterion type test even though it only assesses a sample of the skills taught. Use this subtest with caution.

If an overall normative score is needed for the *KeyMath-R Inventory,* the following procedure to prorate the missing Geometry score should be used:

1. For each subtest administered (with the exception of the Geometry subtest), convert the subtest raw score to a scale score. If the subtest raw score does not have a corresponding scale score, omit that subtest from the following steps.

2. Calculate the average of the scale scores by adding the scale score for all the subtests that have scale scores and divide by the number of subtests with scale scores.

3. Convert the average scale score to a prorated Geometry raw score by entering the Geometry norm table with the average scale score and recording the corresponding raw score. If there is a range of scores, use the midpoint of the range.

Appendix B (continued)

4. After the prorated Geometry raw score is obtained, follow the standard procedure to obtain standard scores, percentile ranks, etc. using the prorated score for the Geometry subtest.