Supplemental Directions for Administering
the Braille Edition of the
KeyMath Revised
A Diagnostic Inventory of Essential Mathematics

Form A

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To replace the *KeyMath Revised Manual* (catalog number TH2641) or to order additional *KeyMath Revised Individual Test Record* (catalog number TH2643) booklets contact:

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P.O. Box 99
Circle Pines, MN 55014-1796
1-800-328-2560
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 tactiley.

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

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)

<table>
<thead>
<tr>
<th></th>
<th>string and blocks</th>
<th>circles with squares</th>
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</thead>
<tbody>
<tr>
<td>4</td>
<td>division problems</td>
<td>same</td>
</tr>
<tr>
<td>5-6</td>
<td>computation--division</td>
<td>same</td>
</tr>
</tbody>
</table>

### 8 Mental Computation

<table>
<thead>
<tr>
<th></th>
<th>no illustration</th>
<th>same</th>
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<tbody>
<tr>
<td>1-3</td>
<td>subtraction problem</td>
<td>same</td>
</tr>
<tr>
<td>4</td>
<td>no illustration</td>
<td>same</td>
</tr>
<tr>
<td>5-6</td>
<td>addition and subtraction problem</td>
<td>same</td>
</tr>
<tr>
<td>7-8</td>
<td>multiplication problems</td>
<td>same</td>
</tr>
<tr>
<td>9-10</td>
<td>no illustration</td>
<td>same</td>
</tr>
<tr>
<td>11</td>
<td>division problems</td>
<td>same</td>
</tr>
<tr>
<td>12-13</td>
<td>addition and subtraction problem</td>
<td>same</td>
</tr>
<tr>
<td>14-15</td>
<td>multiplication problems</td>
<td>same</td>
</tr>
</tbody>
</table>

### 9 Measurement

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

8
9 Measurement (continued)

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

same
line and ruler
same
rectangle
box and block
same
same
same

10 Time and Money

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

same
same
use actual cash
illustrations described
use actual cash
same
same
same
use actual cash
same
use actual cash
same
use actual cash
actual amount stated
use actual cash
same
same
amounts are listed in the question
same
same
10 Time and Money (continued)

24 chart of money same

11 Estimation

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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<tbody>
<tr>
<td>1</td>
<td>cherries</td>
</tr>
<tr>
<td>2</td>
<td>pencil and bean</td>
</tr>
<tr>
<td>3</td>
<td>buttons in ring</td>
</tr>
<tr>
<td>4</td>
<td>card</td>
</tr>
<tr>
<td>5</td>
<td>guesses</td>
</tr>
<tr>
<td>6</td>
<td>pencil</td>
</tr>
<tr>
<td>7</td>
<td>mistake in sentence</td>
</tr>
<tr>
<td>8</td>
<td>table and chair</td>
</tr>
<tr>
<td>9-10</td>
<td>clothes and prices</td>
</tr>
<tr>
<td>11</td>
<td>addition problem</td>
</tr>
<tr>
<td>12</td>
<td>map (distance between two cities)</td>
</tr>
<tr>
<td>13</td>
<td>shape (divided into two parts)</td>
</tr>
<tr>
<td>14</td>
<td>measurements (estimated)</td>
</tr>
<tr>
<td>15</td>
<td>subtraction problem</td>
</tr>
<tr>
<td>16</td>
<td>prices added together make dollar</td>
</tr>
<tr>
<td>17</td>
<td>what part fraction</td>
</tr>
<tr>
<td>18</td>
<td>turkey--price per pound</td>
</tr>
</tbody>
</table>

12 Interpreting Data

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>children with various hair shades</td>
</tr>
<tr>
<td>2</td>
<td>chart</td>
</tr>
<tr>
<td>3-4</td>
<td>chart showing animals on farm</td>
</tr>
<tr>
<td>5</td>
<td>circle with different colors</td>
</tr>
<tr>
<td>6</td>
<td>five gumball machines</td>
</tr>
<tr>
<td>7</td>
<td>chip--yellow on top, green on bottom</td>
</tr>
<tr>
<td>8</td>
<td>bus schedule</td>
</tr>
<tr>
<td>9</td>
<td>milage chart</td>
</tr>
<tr>
<td>10</td>
<td>student population chart</td>
</tr>
</tbody>
</table>

dotted and shaded circles |
same |
same with braille words |
same |
5 cylinders with circles and dots |
same |
same |
same |
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.