



Dear Colleague,

You will soon be introducing your students to Hands-On Equations. **Would you like to have achievement results to let you know whether or not this program is effective for your students?** Attached you will find a procedure for you to consider, including pre and post-tests you can use, instructions for administering the tests, and a Summary Form in which to enter the data.

Pre-Test Before Beginning Instruction on the Program

We recommend that the initial **pre-test** be given cold, without any introductory comments of any kind and prior to introducing Hands-On Equations to the students. If you have already introduced Hands-On Equations to your class, this study design will be of little value to you. **Note:** Both the pre and the post-tests have a place for the student to write in the value of the check. Nonetheless, the scoring of the pre and post-tests will be based exclusively on the values for x that the student provides.

Once the pre-test is administered, the teacher is to teach the students the first six lessons of the program. Ideally, these lessons will be taught on consecutive days or the same day on consecutive weeks. By "lesson" it is understood a typical 40 to 50-minute lesson in which the teacher introduces the concept of the lesson using the Teachers Demonstration Balance Scale and then provides the students with the opportunity to complete the accompanying worksheet using the student game pieces.

Post-Test Following Lesson #6

The **Post-Test Following Lesson #6** may be administered to the students either immediately at the conclusion of Lesson #6, later that same day, or the next day. Please indicate which you do on the reverse side of the Summary Form that is enclosed. **For this post-test, the students are to be provided with their student kits.**

Post-Test Following Lesson #7

The students are next taught Lesson #7, where they learn to solve the equations using the pictorial notation. The **Post-Test Following Lesson #7** may be administered either immediately at the conclusion of Lesson #7, later that same day, or the next day. Please indicate which you do on the reverse side of the Summary Form that is enclosed. **For this post-test, the students are not to be provided with their student kits; they may solve the problems mentally or using the pictorial notation.** **Note:** If you have students who have been absent for any of the lessons, please provide the post-tests to these students after they have made up the lessons.

Attached you will find the pre-test and both post-tests. You will also find a Summary Form. Please assign each student a code number or code name to be used on each of the pre and post-tests, as well as for recording their responses on this Summary Form. **IT IS ESSENTIAL THAT YOU KEEP CAREFUL RECORD OF THIS CODE**, since all the scores on any horizontal line must belong to the same student.

If a student is classified as gifted or learning disabled or English Language Learner, please enter the symbols “GT” or “LD” or “ELL” after the student code for that student on the Summary Form. If a student has previously used Hands-On Equations, please enter “HOE” next to the student code for that student on the Summary Form.

If the student response is correct, that is, he/she has the correct value for x , please place a check mark in the appropriate box. If it is not correct, please place a horizontal dash, “-”, in the appropriate box. (The correct responses are provided below.)

Please tally the number of correct responses for each student for each test and enter that number in the last column of each test, the column labeled “# Correct”. Please tally the number of correct responses for each test for the entire class by adding up the numbers in each column labeled “# correct” and enter that number in the last row of the column, the row labeled, “Item Summary Results.”

Please tally the number of correct responses for each item for your class by adding up the number of check marks in each column and entering that number in the last row of the column, the row labeled, “Item Summary Results.” This data will enable you to compare how the students did on any particular item on each of the tests.

By dividing the total number of correct responses for each test by the number of students who took the test, you will be able to obtain a percentage score for the class on each test. This data will enable you to compare how the students did on each of the tests.

Correct Responses to the Questions

<u>Pre-Test</u>	<u>Post-Test following Lesson #6</u>	<u>Post-Test following Lesson #7</u>
1. $x = 4$	1. $x = 5$	1. $x = 3$
2. $x = 5$	2. $x = 5$	2. $x = 7$
3. $x = 6$	3. $x = 4$	3. $x = 3$
4. $x = 6$	4. $x = 2$	4. $x = 1$
5. $x = 3$	5. $x = 6$	5. $x = 4$
6. $x = 2$	6. $x = 3$	6. $x = 4$

We are happy to assist you with the statistical analysis if you wish to do pre- and post-testing with your students on the Hands-On Equations program.

Sincerely,



Henry Borenson, Ed. D.

HANDS-ON EQUATIONS PRE-TEST

Student's Name: _____

Code: _____

Teacher's Name: _____

I am in grade: _____

Today's Date: _____

Instructions to the Student:

Soon you will be introduced to a program called Hands-On Equations. Before introducing the program to you, we wish to know how much you already know about this topic. For this reason, we are simply giving you this pre-test without any instructions on how to answer the questions. Please look over the questions and write down the answers to those problems you already know how to do. You will have 15 minutes to complete this pre-test. How you do on this test will not affect your grade in any way. Thank you for your participation.

QUESTION**ANSWER****CHECK**

1. $2x = 8$

1. $x = \underline{\quad}$

Check: _____

2. $x + 3 = 8$

2. $x = \underline{\quad}$

Check: _____

3. $2x + 1 = 13$

3. $x = \underline{\quad}$

Check: _____

4. $3x = x + 12$

4. $x = \underline{\quad}$

Check: _____

5. $4x + 3 = 3x + 6$

5. $x = \underline{\quad}$

Check: _____

6. $2(2x + 1) = 2x + 6$

6. $x = \underline{\quad}$

Check: _____

HANDS-ON EQUATIONS POST-TEST AFTER LESSON #6

Student's Name: _____

Code: _____

Teacher's Name: _____

I am in grade: _____

Today's Date: _____

Instructions to the Student:

You have now been introduced to the first six lessons of Hands-On Equations. We now wish to know if this program was effective and if it helped you to learn something you did not know before. Please look over the questions below and write down the answers to those problems you are able to do. **You may use the student game pieces to do this test.** You will have 15 minutes to complete this post-test. How you do on this test will not affect your grade in any way. Thank you for your participation.

QUESTION**ANSWER****CHECK**

1. $2x = 10$

1. $x = \underline{\quad}$

Check: _____

2. $x + 3 = 8$

2. $x = \underline{\quad}$

Check: _____

3. $2x + 2 = 10$

3. $x = \underline{\quad}$

Check: _____

4. $3x = x + 4$

4. $x = \underline{\quad}$

Check: _____

5. $4x + 3 = 3x + 9$

5. $x = \underline{\quad}$

Check: _____

6. $2(2x + 1) = 2x + 8$

6. $x = \underline{\quad}$

Check: _____

HANDS-ON EQUATIONS POST-TEST AFTER LESSON #7

Student's Name: _____

Code: _____

Teacher's Name: _____

I am in grade: _____

Today's Date: _____

Instructions to the Student:

You have now been introduced to the first seven lessons of Hands-On Equations, including the pictorial notation. We now wish to know if this program helped you to solve equations without using the game pieces. Please look over the questions below and write down the answers to those problems you are able to do. **You will not be using the student game pieces for this post-test.** You may solve the problems mentally or you may use the pictorial notation, that is, you may draw pictures to solve the problems. You will have 15 minutes to complete this post-test. How you do on this test will not affect your grade in any way. Thank you for your participation.

QUESTION**ANSWER****CHECK**

1. $2x = 6$

1. $x = \underline{\hspace{2cm}}$

Check: _____

2. $x + 3 = 10$

2. $x = \underline{\hspace{2cm}}$

Check: _____

3. $2x + 1 = 7$

3. $x = \underline{\hspace{2cm}}$

Check: _____

4. $3x = x + 2$

4. $x = \underline{\hspace{2cm}}$

Check: _____

5. $4x + 3 = 3x + 7$

5. $x = \underline{\hspace{2cm}}$

Check: _____

6. $2(2x + 1) = 2x + 10$

6. $x = \underline{\hspace{2cm}}$

Check: _____

TEACHER QUESTIONNAIRE
IMPORTANT: Please complete this form in its entirety

Teacher's Name: _____ School: _____

Please indicate below the amount of time given to each lesson?

	<u>Introduction of Lesson</u>	<u>Worksheet</u>
Lesson #1		
Lesson #2		
Lesson #3		
Lesson #4		
Lesson #5		
Lesson #6		
Lesson #7		

- Which of the following is the best approximation to the length of time that it took for **most** of the students to complete the test or to stop trying?
Pre-Test: 5 minutes _____ 10 minutes _____ 15 minutes _____
Post-Test after Lesson #6: 5 minutes _____ 10 minutes _____ 15 minutes _____
Post-Test after Lesson #7: 5 minutes _____ 10 minutes _____ 15 minutes _____
- The pre-test was administered without any prior explanation of the questions: True _____ False _____
- The Post Test after Lesson #6 was administered: immediately _____ one hour _____ one day _____ after Lesson #6 was taught.
- The Post Test after Lesson #7 was administered: immediately _____ one hour _____ one day _____ after Lesson #7 was taught.
- Have you received formal training in Hands-On Equations? _____ Was this training provided by Borenson and Associates? _____ Was this training provided by school district personnel? _____
- If you did not receive formal training on the program, how did you learn to use the program?
 from the written manuals _____ from the video manual _____ from a colleague _____
- Are you aware of any major modification you have made to the program? No ___ Yes ___ (If yes, please explain)
- What is the highest degree you have: Bachelors _____ Masters _____ Other _____
- How many years of teaching experience do you have: less than one year _____ between 1 to 3 years _____ between 3 to 5 years _____ between 5 to 10 years _____ more than 10 years _____
- How long have you taught HOE? Less than 1 year _____ this is my second year _____ more than two years _____
- The students in this study are: inner city students _____ suburban students _____ rural students _____
- Do you have an inspirational story to share about your experience in using this program? If so, please submit it to us and indicate whether we may consider your story for posting on our website or Facebook page.

THANK YOU.

Signature: _____

Date: _____

Teacher's Name: _____ How long have you been teaching Hands-On Equations? _____

School/District Name: _____ City: _____ State: _____

Contact Phone #: _____ E-Mail Address: _____

Grade Level: _____ Type of Students: Average: _____ Gifted: _____ LD: _____ Total # of Students: _____

Please place **GT** or **LD** next to the student code **below** for **any** students in these **categories**;

Instructions: Place a check mark in the box if the student had a correct response for the item; place a horizontal line in the box if the student had an incorrect response for the item.

Add the number of correct responses for each student for each test and place the sum in the "# Correct" column.

See instructions above for adding LD or GT next to the student code		Pre-Test							Post-Test after Lesson #6							Post-Test after Lesson #7						
		Date of Test:							Date of Test:							Date of Test:						
#	Student Code	1	2	3	4	5	6	"# Correct"	1	2	3	4	5	6	"# Correct"	1	2	3	4	5	6	"# Correct"
1																						
2																						
3																						
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30																						
Item Summary Results: Please Place Total # of correct responses for each column on this line																						