



National Center and State Collaborative

# **NCSC Math Activities with Scripted Systematic Instruction (MASSI): Elementary Equations Progress Monitoring and Skills Test**

Reposted for NCSC state use on March 11, 2013. All materials in this version have been approved for public distribution with all necessary permissions. Selected excerpts are accompanied by annotated links to related media freely available online at the time of the publication of this document.



National Center and State Collaborative

The National Center and State Collaborative (NCSC) is applying the lessons learned from the past decade of research on alternate assessments based on alternate achievement standards (AA-AAS) to develop a multi-state comprehensive assessment system for students with significant cognitive disabilities. The project draws on a strong research base to develop an AA-AAS that is built from the ground up on powerful validity arguments linked to clear learning outcomes and defensible assessment results, to complement the work of the Race to the Top Common State Assessment Program (RTTA) consortia.

Our long-term goal is to ensure that students with significant cognitive disabilities achieve increasingly higher academic outcomes and leave high school ready for post-secondary options. A well-designed summative assessment alone is insufficient to achieve that goal. Thus, NCSC is developing a full system intended to support educators, which includes formative assessment tools and strategies, professional development on appropriate interim uses of data for progress monitoring, and management systems to ease the burdens of administration and documentation. All partners share a commitment to the research-to-practice focus of the project and the development of a comprehensive model of curriculum, instruction, assessment, and supportive professional development. These supports will improve the alignment of the entire system and strengthen the validity of inferences of the system of assessments.



The contents of this assessment were developed as part of the National Center and State Collaborative by Keri Bethune, Julie Thompson, Alicia Saunders, and Diane Browder at University of North Carolina at Charlotte and verified by Amy Lehew, math content expert, under a grant from the Department of Education (PR/Award #: H373X100002, Project Officer, [Susan.Weigert@Ed.gov](mailto:Susan.Weigert@Ed.gov)). However, the contents do not necessarily represent the policy of the U.S. Department of Education and no assumption of endorsement by the Federal government should be made.

The University of Minnesota is committed to the policy that all persons shall have equal access to its programs, facilities, and employment without regard to race, color, creed, religion, national origin, sex, age, marital status, disability, public assistance status, veteran status, or sexual orientation.

These materials and documents were developed under the National Center and State Collaborative (NCSC) General Supervision Enhancement Grant and are consistent with its goals and foundations. Any changes to these materials are to be consistent with their intended purpose and use as defined by NCSC.

This document is available in alternative formats upon request.

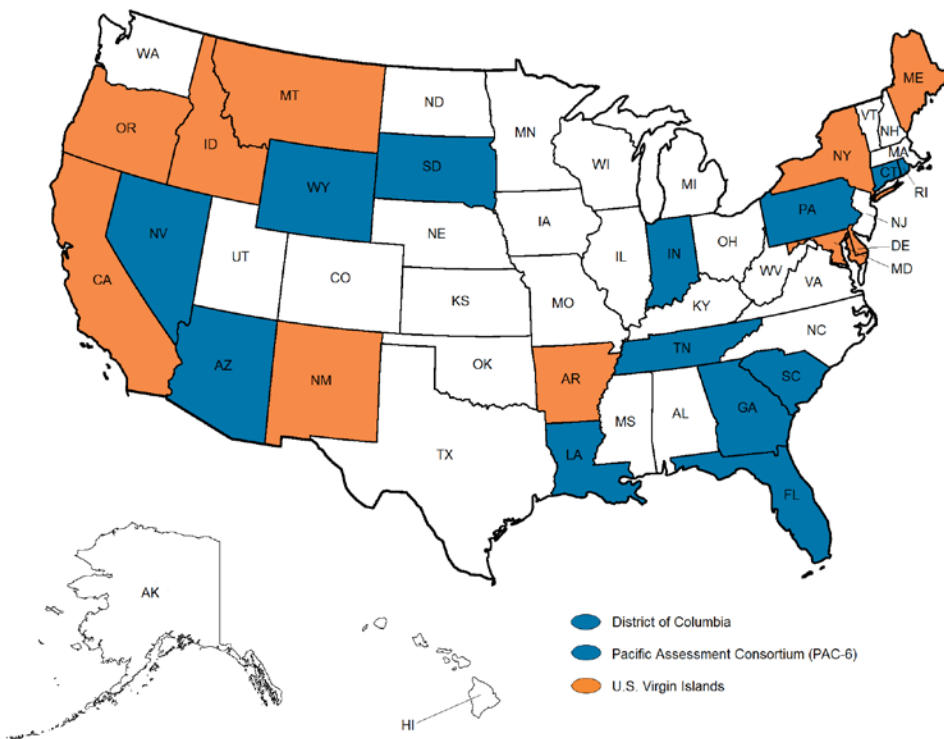


National Center and State Collaborative

NCSC is a collaborative of 15 states and five organizations.

The states include (shown in blue on map): Arizona, Connecticut, District of Columbia, Florida, Georgia, Indiana, Louisiana, Nevada, Pacific Assessment Consortium (PAC-6)<sup>1</sup>, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, and Wyoming.

Tier II states are partners in curriculum, instruction, and professional development implementation but are not part of the assessment development work. They are (shown in orange on map): Arkansas, California, Delaware, Idaho, Maine, Maryland, Montana, New Mexico, New York, Oregon, and U.S. Virgin Islands.



\*Core partner states are blue in color and Tier II states are orange in color.

<sup>1</sup> The Pacific Assessment Consortium (including the entities of American Samoa, Commonwealth of the Northern Mariana Islands, Federated States of Micronesia, Guam, Republic of Palau, and Republic of the Marshall Islands) partner with NCSC as one state, led by the University of Guam Center for Excellence in Developmental Disabilities Education, Research, and Service (CEDDERS).



National Center and State Collaborative

The five partner organizations include: The National Center on Educational Outcomes (NCEO) at the University of Minnesota, The National Center for the Improvement of Educational Assessment (Center for Assessment), The University of North Carolina at Charlotte, The University of Kentucky, and edCount, LLC.



150 Pillsbury Drive SE  
207 Pattee Hall  
Minneapolis, MN 55455  
Phone: 612-708-6960  
Fax: 612-624-0879  
[www.ncscpartners.org](http://www.ncscpartners.org)



National Center and State Collaborative

# **NCSC Math Activities with Scripted Systematic Instruction (MASSI): Elementary Equations Progress Monitoring and Skills Test**

Keri Bethune  
Julie Thompson  
Alicia Saunders  
Diane Browder  
Amy Lehew

January 2013

# MASSI: Elementary School Equations

## Options for Progress Monitoring/Formative Assessment

1. Elementary Equations Progress Monitoring (pg. 6-9): record student responses made during instruction on data sheet provided; teacher records each step correct during the lesson.
2. Elementary Equations Skills Test (pg. 10-15): a brief on demand performance assessment; could be given weekly to see if student has mastered this lesson; also helps student practice responding in a test format.
  - a. NOTE: The Skill Test can be used as a baseline assessment to check for any skills the student may already have prior to beginning the MASSI.
  - b. NOTE: The Skill Test can also be readministered to check for maintenance throughout the year

## Elementary Equations Progress Monitoring

*Directions: Score each step during instruction or as soon as the lesson is complete. Score the step as unprompted correct with a “+.” Use a system to code level of prompting required for incorrect responses (e.g., V = verbal prompt, G = gesture, P = physical). Graph the number of unprompted correct responses to monitor progress.*

### BUILD ESSENTIAL UNDERSTANDING: CONCEPT AND SYMBOLS: Composing and Decomposing Sets BUILD ESSENTIAL UNDERSTANDING: SYMBOL USE: +, -, =

<i>Materials and Directions for Teacher</i>	<i>Instructional Cue</i>	<i>Student Expected Response</i> <i>Date:</i>							
1. GO: Addition and new addition equation	<b>Put the first number on your Setmaker.</b>	Student places first number under first circle.							
2. See above.	<b>Put second number on your Setmaker.</b>	Student places second number under second circle.							
3. See above.	<b>Count out the number of _____ you need to put in the first circle.</b>	Student counts out ___ [items] and puts them in first circle.							
4. See above.	<b>Count out the number of _____ you need to put in the second circle.</b>	Student counts out ___ [items] and puts them in second circle.							
5. See above.	<b>Show me what to do to find out how many you have altogether.</b>	Student slides [items] into 3 <sup>rd</sup> circle (or indicates where to place [items] with eye gaze).							
6. See above.	<b>Count the _____.</b>	Student counts the [items].							
7. See above.	<b>How many do you have altogether?</b>	Student says/indicates total number of [items].							
8. GO: Subtraction and a new subtraction equation.	<b>Now, put the first number on your Take Away chart.</b>	Student places first number under first circle.							
9. See above.	<b>Put second number on your Take Away chart.</b>	Student places second number under the trash can.							
10. See above.	<b>Count out the number of _____ you need to put in the first circle.</b>	Student counts out ___ [items] and puts them in first circle.							
11. See above.	<b>Now take away the number of _____ you need to put in the trash can.</b>	Student takes away ___ [items] from first circle and puts them in trash can.							
12. See above.	<b>Show me what to do to find out how many you have left over.</b>	Student slides [items] into green circle (or indicates where to place items with eye gaze).							
13. See above.	<b>Count the _____.</b>	Student counts the [items].							
14. See above.	<b>How many do you have left over?</b>	Student says/indicates total number of [items].							
15. Symbol flash cards (+, -, =, ?, !, x, ÷)	<b>Show me equal.</b>	Student points/eye gazes to the equal sign.							

Student Name: \_\_\_\_\_

16. Move symbol flash cards around.	<b>Again. Show me equal.</b>	Student points/eye gazes to the equal sign.							
17. Move symbol flash cards around.	<b>Show me plus.</b>	Student points/eye gazes to the plus sign.							
18. Move symbol flash cards around.	<b>Again. Show me plus.</b>	Student points/eye gazes to the plus sign.							
19. Move symbol flash cards around.	<b>Show me minus.</b>	Student points/eye gazes to the minus sign.							
20. Move symbol flash cards around.	<b>Again. Show me minus.</b>	Student points/eye gazes to the minus sign.							
		NUMBER CORRECT:							
<p><b>3<sup>rd</sup> GRADE BUILD A GRADE ALIGNED COMPONENT: MATCHING EXPRESSIONS TO WORD PROBLEMS</b></p> <p><b>4<sup>th</sup> and 5<sup>th</sup> GRADE BUILD ESSENTIAL UNDERSTANDING: SYMBOL USE</b></p> <p><b>BUILD ESSENTIAL UNDERSTANDING: CONCEPT: EQUALITY (“=”)</b></p>									
21. Student has word problem. Display + and 2 distracters AND “in all” card.	<b>A story problem says “in all.” Show me the symbol that tells us to put our sets together.</b>	Student selects +.							
22. Display + and 2 distracters in different order AND “total” card. Point to “total” card.	<b>A story problem says, “total.” Show me the symbol that tells us to put our sets together.</b>	Student selects +.							
23. Display + and 2 distracters in different order AND “altogether” card.	<b>A story problem says “altogether.” Show me the symbol that tells us to put our sets together.</b>	Student selects +.							
24. Display new word problem and expression choices ( $2 + 4$ , $2 \times 4$ , $2 \div 4$ ).	<b>“Elijah passed out the paintbrushes. He had 2 paintbrushes in his left hand and 4 in his right hand. Which of these will show how many paintbrushes Elijah has in all?”</b> Read each expression aloud while pointing to it: $2 + 4$ , $2 \times 4$ , $2 \div 4$	Student selects correct expression.							
25. Display new word problem and expression choices ( $6 - 3$ , $6 + 3$ , $6 \times 3$ ).	<b>Arlo collected the crayons in pencil cases. He had 6 crayons in one case and 3 crayons in the other. Which of these show how many crayons he had total?</b> Read each expression aloud while pointing to it: $6 - 3$ , $6 + 3$ , $6 \times 3$	Student selects correct expression.							
26. Display - and 2 distracters AND “left” card.	<b>A story problem says “left.” Show me the symbol that tells us to take away.</b>	Student selects -.							
27. Display - and 2 distracters in different order AND “remain” card.	<b>A story problem says, “remain.” Show me the symbol that tells us to take away.</b>	Student selects -.							



Student Name: \_\_\_\_\_

28. Display – and 2 distracters in different order AND “difference” card.	<b>A story problem says, “difference.” Show me the symbol that tells us to take away.</b>	Student selects -.						
29. Display new word problem and expression choices (10 – 4, 10 + 4, 10 X 4).	<b>Zatrel had 10 markers. He passed out 4. Which of these will show how many markers Zatrel has left?</b> Read each expression aloud while pointing to it: <b>10 – 4, 10 + 4, 10 X 4</b>	Student selects correct expression.						
30. Display new word problem and expression choices.	<b>Nehemiah collected 6 crayons. He threw 2 broken ones away. Which of these show how many crayons remain?</b> Read each expression aloud while pointing to it. <b>6 ÷ 2, 6 X 2, 6 – 2.</b>	Student selects correct expression.						
31. Display new word problem and expression choices.	<b>Hannah has 8 apples. Karen has 4 apples. Which of these shows the difference between the number of apples Hannah has and the number Karen has?</b> Read each expression aloud while pointing to it: <b>8+4, 8-4, 8X4.</b>	Student selects correct expression.						
32. Display subtraction word problem and expression choices.	<b>This says Cora has 4 crayons. She gave 2 to Mike. How many does she have left?</b> Read each expression aloud. <b>4 – 2, 3 + 7, 4 X 2. Point to an answer choice that has the same numbers.</b>	Student points to an answer choice with numbers 4 and 2. (doesn't have to be correct answer yet)						
33. See above.	<b>Now, point to the word that tells you what symbol to use.</b>	Student points to “left.”						
34. See above.	Point to the answer choice student selected. <b>Now look here. Is this the symbol that tells us how many are left?</b>	Student indicates yes or no.						
35. See above.	*If yes: <b>Good job. You found the expression 4 minus 2.</b> Mark this step correct on assessment. *If no: Read each answer choice aloud. <b>Try again. 4 – 2, 3 + 7, 4 X 2. Which one tells us how many she has left?</b>	Student selects 4 – 2.						
36. Write a number and = sign (e.g., 5 = ____).	Read ‘ <b>five equals ____.</b> ’ <b>Which number goes on this side?</b> Point to right side.	Student says or selects the same number (e.g., 5).						
37. Write a different number and = sign (e.g., 3 = ____).	Read ‘ <b>three equals ____.</b> ’ <b>Which number goes on this side?</b> Point to right side.	Student says or selects the same number (e.g., 3).						
38. Write a different number and = sign (e.g., 8 = ____).	Read ‘ <b>eight equals ____.</b> ’ <b>Which number goes on this side?</b> Point to right side.	Student says or selects the same number (e.g., 8).						
39. Display Equality Visual with sign erased and place markers on each side.	Point to left side. <b>How many on this side?</b>	Student counts items.						
40. See above.	Point to right side. <b>How many on this side?</b>	Student counts items.						

Student Name: \_\_\_\_\_

41. See above.	<b>Are the numbers on each side the same? If they are, write the equal sign.</b>	Student indicates yes or no and/or writes the equal sign if same amount (students who cannot write may eye gaze to or Velcro the equal sign).							
		NUMBER CORRECT:							
<b>4<sup>th</sup> BUILD A GRADE ALIGNED COMPONENT: MATCHING EQUATIONS TO REPRESENTATIONS</b>									
42. Display new array of [items] with different number of rows and items per row and three equations.	<b>Show me the rows.</b>	Student runs fingers (or eye gazes) across each row.							
43. See above.	<b>How many in each row?</b>	Student counts each item in row.							
44. See above.	<b>Count the rows.</b>	Student counts the rows.							
45. See above.	<b>Find the equation that matches.</b>	Student selects correct addition equation.							
46. Display new array of [items] with different number of rows and items per row and three equations.	<b>How many [items] are there in all?</b>	Student counts the [items].							
47. See above.	<b>Point the equation that equals ____.</b>	Student selects correct equation.							
		NUMBER CORRECT:							
<b>5<sup>th</sup> BUILD A GRADE ALIGNED COMPONENT: INDICATE WHETHER AN EQUATION IS TRUE</b>									
48. Display GO: Addition and GO: Subtraction Give student an equation (e.g., 3 + 4).	<b>Show me which chart you will use to solve this equation.</b>	Student indicates correct chart.							
49. Present a new equation.	<b>Show me which chart you will use to solve this equation.</b>	Student indicates correct chart.							
50. Display new equation.	<b>You are going to tell me if this equation is true. An equation is true if the expressions on both sides of the equation are equal. Here is an equation. Before you decide if it is true you have to solve each side. Point to left side. Solve this side and write your answer below.</b>	Student solves left side of equation and writes/indicates answer.							
51. See above.	Point to right side of equation. <b>Now solve this side and write your answer below.</b>	Student solves right side of equation and writes/indicates answer.							
52. See above.	<b>Are both sides equal?</b>	Student answers yes (or no).							
53. See above.	<b>Is the equation true?</b>	Student answers yes (or no).							
		NUMBER CORRECT:							

**EQUATION SKILL TEST 1: CONCEPT AND SYMBOLS**

Note to teachers: It may be helpful to use a cover sheet of paper. Pull the cover sheet down far enough to show the model and read the text. Then, pull the sheet of paper down to show the problem and read the directions. Record “+” for an independent correct response or “-“ for incorrect response in blank.

\_\_ **MODEL: Watch me as I use the Setmaker to solve this addition equation.**

$$4 + 5 = \underline{\quad}$$

**STUDENT PROBLEM: Use your Setmaker to solve this addition equation.**

$$6 + 2 = \underline{\quad}$$

\_\_ **MODEL: Watch me as I use the Take Away chart to solve this subtraction problem.**

$$7 - 2 = \underline{\quad}$$

**STUDENT PROBLEM: Use your Take Away chart to solve this subtraction problem.**

$$6 - 3 = \underline{\quad}$$

\_\_ MODEL: Watch me point to equal.

=

STUDENT PROBLEM: Now you point to equal

= ? X

\_\_ MODEL: Watch me point to minus.

—

STUDENT PROBLEM: Now you point to minus.

! ÷ —

\_\_ MODEL: Watch me point to plus.

+

STUDENT PROBLEM: Now you point to plus.

÷ ? +

## EQUATION SKILL TEST 2: Matching Expressions to Word Problems

Note to teachers: It may be helpful to use a cover sheet of paper. Pull the cover sheet down far enough to show the model and read the text. Then, pull the sheet of paper down to show the problem and read the directions. Record “+” for an independent correct response or “-“ for incorrect response in blank.

\_\_\_ Point to symbol for a story problem that says, “in all.”

$$+ \quad ? \quad =$$

\_\_\_ Point to symbol for a story problem that says, “total.”

$$+ \quad ! \quad \div$$

\_\_\_ Point to symbol for a story problem that says, “altogether.”

$$\times \quad ! \quad +$$

\_\_\_ Maddie has 2 erasers she picks up 2 more. How many does she have total? Which of these matches the word problem?

$2 - 2$	$2 + 2$	$2 \times 2$
---------	---------	--------------

\_\_\_ Point to symbol for a story problem that says, “left.”

$$- \quad ? \quad !$$

\_\_\_ Point to symbol for a story problem that says, “remain.”

$$\div \quad \times \quad -$$

\_\_\_ Point to symbol for a story problem that says, "difference."

+

-

X

\_\_\_ La'Shandra has 7 pencils. She trashes 3 broken ones. How many remain?

$6 + 2$

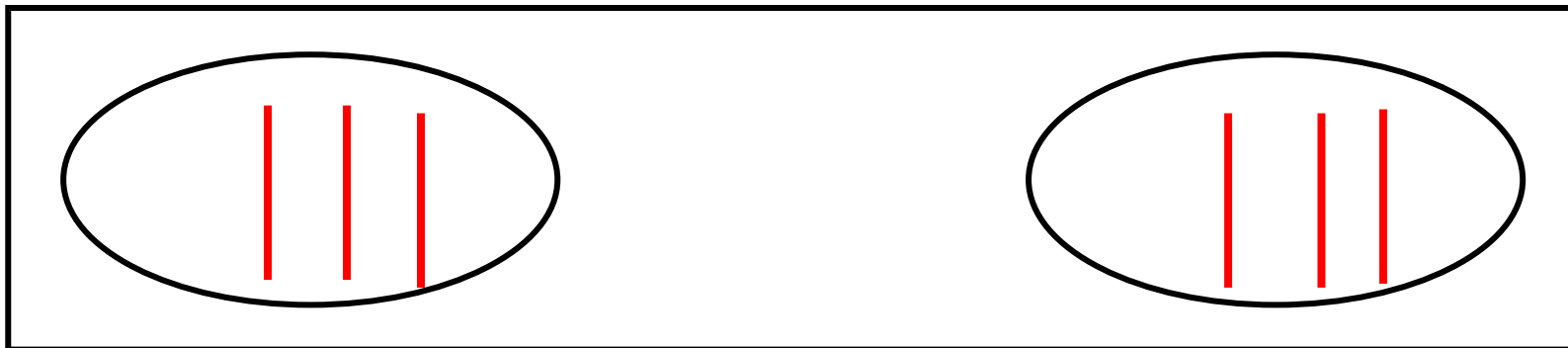
$7 \times 3$

$7 - 3$

\_\_\_ Are the numbers on each side the same? If they are, write the equal sign.



\_\_\_ Are the numbers on each side the same? If they are, write the equal sign.



**EQUATION SKILL TEST 3: Matching Equations to Representation**

Note to teachers: It may be helpful to use a cover sheet of paper. Pull the cover sheet down far enough to show the model and read the text. Then, pull the sheet of paper down to show the problem and read the directions. Record “+” for an independent correct response or “-“ for incorrect response in blank.

\_\_\_ **Circle the equation that shows what you see in this picture.**



$$2 + 2 + 2 + 2 = 8$$



$$2 + 4 = 6$$



$$4 + 4 + 4 = 12$$



\_\_\_ **Circle the equation that shows what you see in this picture.**



$$3 + 3 + 3 = 9$$



$$3 + 6 = 9$$



$$6 + 6 + 6 = 18$$

Student Name: \_\_\_\_\_

\_\_\_ Circle the equation that shows what you see in this picture.



$$5 + 3 = 8$$

$$5 + 5 + 5 = 15$$

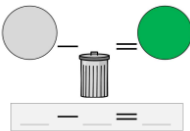
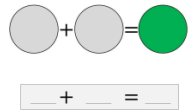
$$3 + 3 + 3 = 9$$



### EQUATION SKILL TEST 4: Indicating Whether an Equation is True

Note to teachers: It may be helpful to use a cover sheet of paper. Pull the cover sheet down far enough to show the model and read the text. Then, pull the sheet of paper down to show the problem and read the directions. Record “+” for an independent correct response or “-“ for incorrect response in blank.

\_\_\_ Match the equations to the chart you can use to solve it.

$8 - 1$	●	●	
$2 + 9$	●	●	

\_\_\_ Solve the each side of the equation and write your answer below.

$$10 - 1 = 8 + 2$$

\_\_\_\_\_ = \_\_\_\_\_

\_\_\_ Are both sides equal?  
           Yes           No

\_\_\_ Is the equation true?  
           Yes           No

\_\_\_ Solve the each side of the equation and write your answer below.

$$4 + 2 = 8 - 2$$

\_\_\_\_\_ = \_\_\_\_\_

\_\_\_ Are both sides equal?  
           Yes           No

\_\_\_ Is the equation true?  
           Yes           No