



National Center and State Collaborative

NCSC Math Activities with Scripted Systematic Instruction (MASSI): High School Equations Progress Monitoring and Skills Test

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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). 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.

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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.

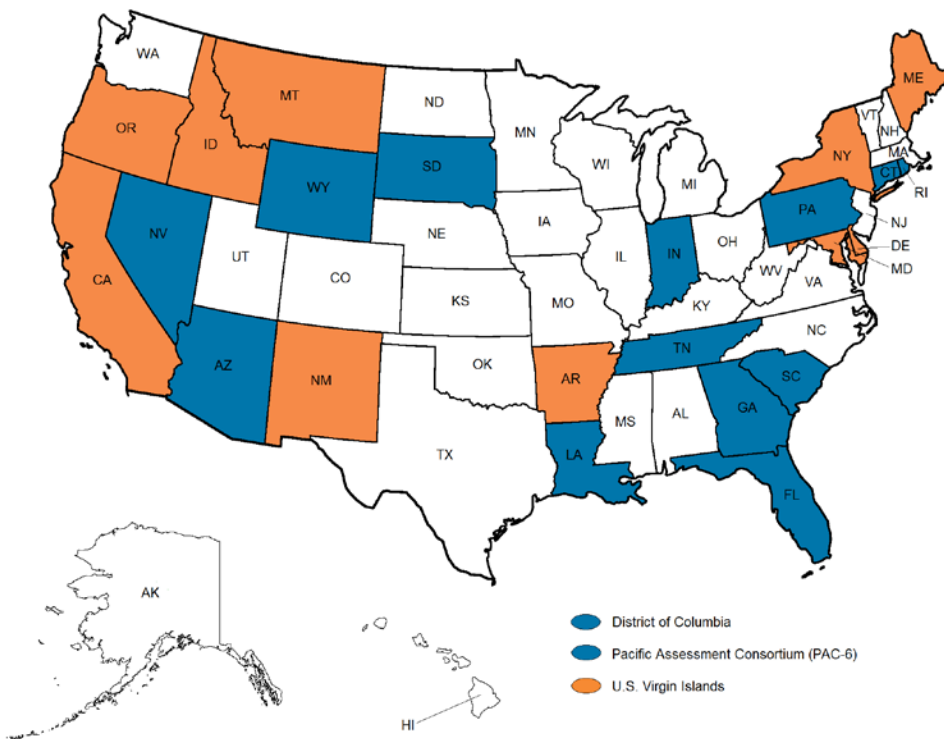


National Center and State Collaborative

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)¹, 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.

¹ 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).



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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.



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NCSC Math Activities with Scripted Systematic Instruction (MASSI): High School Equations Progress Monitoring and Skills Test

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MASSI: High School Equations

Options for Progress Monitoring/Formative Assessment

1. High School Equations Progress Monitoring (pg. 7-12): record student responses made during instruction on data sheet provided; teacher records each step correct during the lesson.
2. High School Equations Skills Test (pg. 13-21): 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.

High School 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: Creating Sets and Using Variables to Represent Unknown Numbers

<i>Materials and Directions for Teacher</i>	<i>Instructional Cue</i>	<i>Student Expected Response</i> <i>Date:</i>							
1. Give each student 21-24 bolts. Give student more bolts than needed to ensure that s/he stops at the proper stopping point.	Make five sets of five bolts.	Student moves five bolts into the first set while counting 1, 2, 3, 4, 5.							
2. See above.	Wait after student finishes the first set for them to independently initiate making the second set of five or say "What's next?"	Student moves five bolts into the second set while counting 1, 2, 3, 4, 5.							
3. See above.	Wait after student finishes the second set for them to independently initiate making the third set of five or say "What's next?"	Student moves five bolts into the third set while counting 1, 2, 3, 4, 5.							
4. See above.	Wait after student finishes the third set for them to independently initiate making the fourth set of five or say "What's next?"	Student moves five bolts into the fourth set while counting 1, 2, 3, 4, 5.							
5. See above.	Wait after student finishes the fourth set for them to independently initiate making the fifth set of five or say "What's next?"	Student moves five bolts into the fifth set while counting 1, 2, 3, 4, 5.							
6. Give each student 33-36 washers. Give student more washers than needed to ensure that s/he stops at the proper stopping point.	Make four sets of eight washers.	Student moves eight washers into the first set while counting 1, 2, 3, 4, 5, 6, 7, 8.							
7. See above.	Wait after student finishes the first set for them to independently initiate making the second set of eight or say "What's next?"	Student moves eight washers into the second set while counting 1, 2, 3, 4, 5, 6, 7, 8.							
8. See above.	Wait after student finishes the second set for them to independently initiate making the third set of eight or say "What's next?"	Student moves eight washers into the third set while counting 1, 2, 3, 4, 5, 6, 7, 8.							
9. See above.	Wait after student finishes the third set for them to independently initiate making the fourth set of eight or say "What's next?"	Student moves eight washers into the fourth set while counting 1, 2, 3, 4, 5, 6, 7, 8.							

Student Name: _____

10. Give each student 20-25 brackets. Give student more brackets than needed to ensure that s/he stops at the proper stopping point.	I need some help. Make six sets of three brackets.	Student moves three brackets into the first set while counting 1, 2, 3.						
11. See above.	Wait after student finishes the first set for them to independently initiate making the second set of three or say “What’s next?”	Student moves three brackets into the second set while counting 1, 2, 3.						
12. See above.	Wait after student finishes the second set for them to independently initiate making the third set of three or say “What’s next?”	Student moves three brackets into the third set while counting 1, 2, 3.						
13. See above.	Wait after student finishes the third set for them to independently initiate making the fourth set of three or say “What’s next?”	Student moves three brackets into the fourth set while counting 1, 2, 3.						
14. See above.	Wait after student finishes the fourth set for them to independently initiate making the fifth set of three say “What’s next?”	Student moves three brackets into the fifth set while counting 1, 2, 3.						
15. See above.	Wait after student finishes the fifth set for them to independently initiate making the sixth set of three say “What’s next?”	Student moves three brackets into the sixth set while counting 1, 2, 3.						
16. Give each student 5 bags of bolts and worksheet 1.	If we didn’t know how many bolts are in each bag, how would we write the total number of bolts. Use the letter “x” to represent an unknown number.	Student counts the number of bags (either out loud or to themselves) and writes “5x”.						
17. Give each student 7 bags of washers and worksheet 1.	If we didn’t know how many washers were in each bag, how would we write the total number of washers. Use the letter “w” to represent an unknown number.	Student counts the number of bags (either out loud or to themselves) and writes “7w”.						
18. Give each student 4 bags of brackets and worksheet 1.	If we didn’t know how many brackets were in each bag, how would we write the total number of brackets. Use the letter “b” to represent an unknown number.	Student counts the number of bags (either out loud or to themselves) and writes “4b”.						
		NUMBER CORRECT:						

HS BUILD A GRADE ALIGNED COMPONENT (Part 1): Creating an Expression to Represent a Problem

19. Student worksheet 2.	Look at your worksheet. Let's read the problem together. Nala needs 8 bags of bolts and 3 bags of washers. Wally needs 1 bag of bolts and 6 bags of washers. Write the equation that represents this problem. Use the letter "b" to represent the number of bolts in a bag and the letter "w" to represent the number of washers in a bag.	Student writes/stamps/uses Velcro numbers/points to/eye gazes to write 8b.						
20. See above.	Wait for students to independently write plus or say "What do you write next?"	Student writes/stamps/uses Velcro numbers/points to/eye gazes the plus sign.						
21. See above.	Wait for students to independently write 3w or say "What do you write next?"	Student writes/stamps/uses Velcro numbers/points to/eye gazes to write 3w.						
22. See above.	Wait for students to independently write plus or say "What do you write next?"	Student writes/stamps/uses Velcro numbers/points to/eye gazes the plus sign.						
23. See above.	Wait for students to independently write 1b or say "What do you write next?"	Student writes/stamps/uses Velcro numbers/points to/eye gazes to write 1b.						
24. See above.	Wait for students to independently write plus or say "What do you write next?"	Student writes/stamps/uses Velcro numbers/points to/eye gazes the plus sign.						
25. See above.	Wait for students to independently write 6w or say "What do you write next?"	Student writes/stamps/uses Velcro numbers/points to/eye gazes to write 6w.						
26. Student worksheet 2.	Look at your worksheet. Let's read the problem together. Pierre needs 1 bag of washers and 3 bags of brackets. Adara needs 4 bags of washers and 5 bags of brackets. Write the equation that represents this problem. Use the letter w to represent the number of washers in a bag and the letter b to represent the number of brackets in a bag.	Student writes/stamps/uses Velcro numbers/points to/eye gazes to write 1w.						
27. See above.	Wait for students to independently write plus or say "What do you write next?"	Student writes/stamps/uses Velcro numbers/points to/eye gazes the plus sign.						

Student Name: _____

28. See above.	Wait for students to independently write 3b or say “What do you write next?”	Student writes/stamps/uses Velcro numbers/points to/eye gazes to write 3c.						
29. See above.	Wait for students to independently write plus or say “What do you write next?”	Student writes/stamps/uses Velcro numbers/points to/eye gazes the plus sign.						
30. See above.	Wait for students to independently write 4w or say “What do you write next?”	Student writes/stamps/uses Velcro numbers/points to/eye gazes to write 4b.						
31. See above.	Wait for students to independently write plus or say “What do you write next?”	Student writes/stamps/uses Velcro numbers/points to/eye gazes the plus sign.						
32. See above.	Wait for students to independently write 5b or say “What do you write next?”	Student writes/stamps/uses Velcro numbers/points to/eye gazes to write 5c.						
			NUMBER CORRECT:					

HS BUILD A GRADE ALIGNED COMPONENT (Part 2): Simplifying Expressions						
33. Student worksheet 3.	Look at your worksheet. It has the same problem from before. Let's read the problem together. Nala needs 8 bags of bolts and 3 bags of washers. Wally needs 1 bag of bolts and 6 bags of washers. We wrote that expression as: $8b + 3w + 1b + 6w$. Now, you need to simplify this expression. Start by looking at $8b$, which number represents the same item (bolts)?	Student points to, says, or otherwise identifies $1b$.				
34. See above.	Good, now add together $8b$ plus $1b$ and write your answer below.	Student adds $8b + 1b$ to equal $9b$ and writes $9b$ in the expression below.				
35. See above.	We can cross those numbers off the first expression.	Student crosses off the numbers $8b$ and $1b$ from the top expression.				
36. See above.	Now look at $3w$, which number represents the same item (washers)?	Student points to, says, or otherwise identifies $6w$.				
37. See above.	Now write the plus sign below.	Student writes/Velcro's/selects/stamps the plus sign.				
38. See above.	Good, now add together $3w$ plus $6w$ and write your answer below.	Student adds $3w + 6w$ to equal $9w$ and writes $9w$ in the expression below.				
39. See above.	You can cross those numbers off the first expression.	Student crosses off the numbers $3w$ and $6w$ from the top expression.				
40. See above.	Look at your worksheet. Let's do other problem from before. Let's read the problem together. Pierre needs 1 bag of washers and 3 bags of brackets. Adara needs 4 bags of washers and 5 bags of brackets. We wrote that expression as: $1w + 3b + 4w + 5b$. Now, you need to simplify this expression. Do not provide additional verbal instructions outside of prompting strategies.	Student adds $1w + 4w$ to equal $5w$ and writes $5w$ in the expression below.				
41. See above.	Wait for students to independently cross off the numbers or say " What's next? "	Student crosses off the numbers $1w$ and $4w$ from the top expression.				
42. See above.	Wait for students to independently write the plus sign next to $5w$ or say " What's next? "	Student writes/Velcro's/selects/stamps the plus sign.				

Student Name: _____

43. See above.	Wait for students to independently add $3b$ plus $5b$ or say “What’s next?”	Student adds $3b + 5b$ to equal $8b$ and writes $8b$ in the expression below.						
44. Student worksheet 3.	Wait for students to independently cross off the numbers or say “What’s next?”	Student crosses off the numbers $3b$ and $5b$ from the top expression.						
		NUMBER CORRECT:						

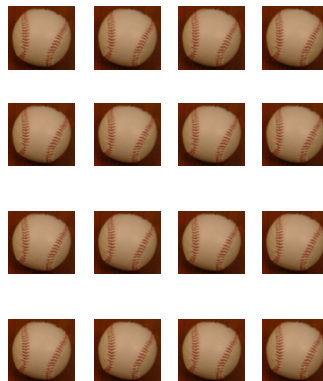
EQUATIONS SKILL TEST 1: CONCEPT AND SYMBOLS

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 beside problem.

___ This shows 3 sets of 4 baseballs.

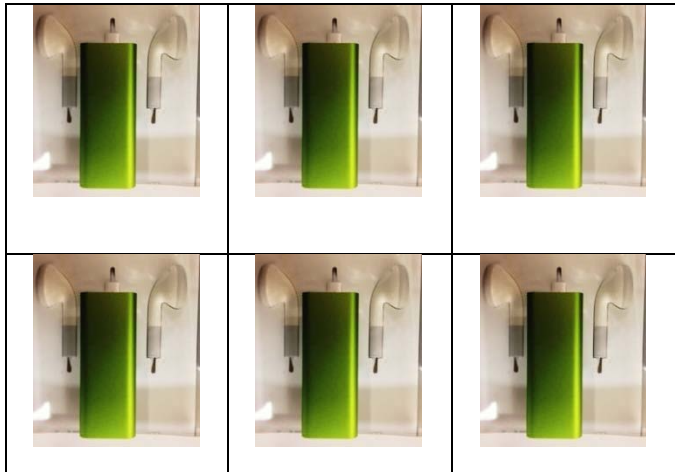


STUDENT PROBLEM: Which picture shows 4 sets of 4 baseballs?

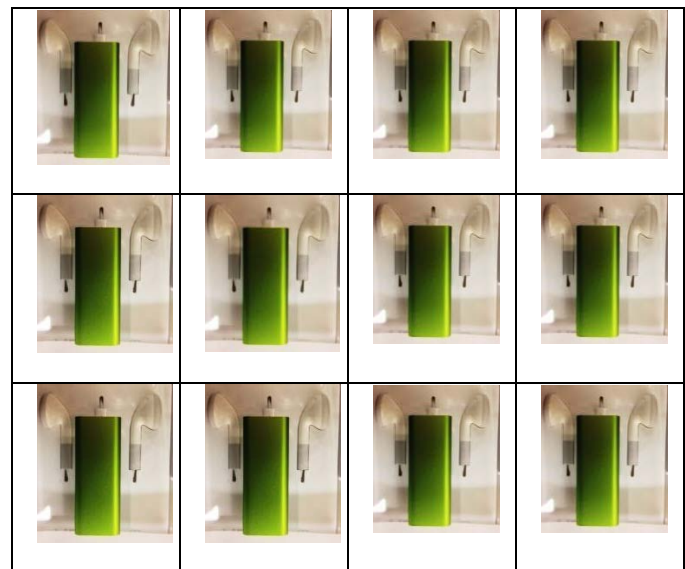
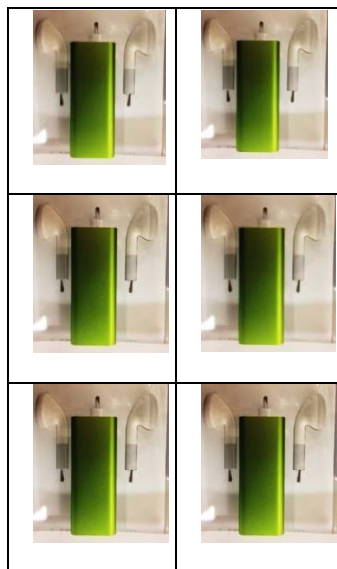
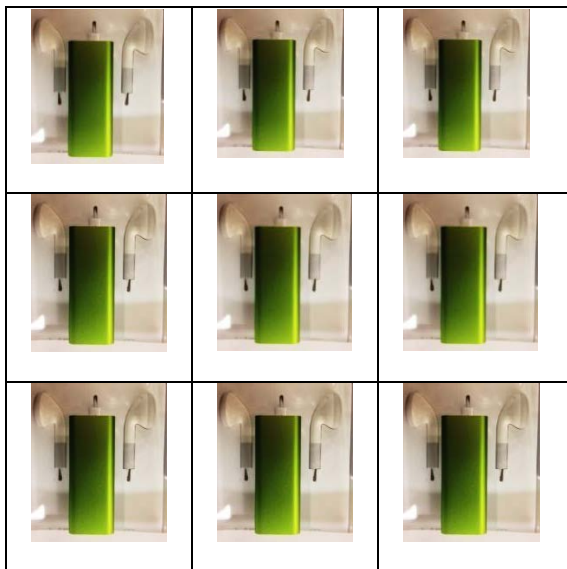


Student Name: _____

___ This shows 2 sets of 3 iPods.



STUDENT PROBLEM: Which picture shows 3 sets of 4 iPods?



Student Name: _____

___ This picture shows 2 sets of 5 backpacks.



STUDENT PROBLEM: Which picture shows 3 sets of 6 backpacks?



Student Name: _____

___ This picture shows 2 sets of 2 calculators.



STUDENT PROBLEM: Which picture shows 2 sets of 4?



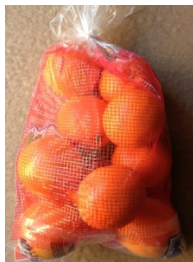
Student Name: _____

___ Sasha buys 3 bags of oranges. We don't know how many oranges are in each bag, but we know each bag has the same number of oranges. If we use the letter o to represent the unknown number, we would write the number of oranges as 3o.



3o

STUDENT PROBLEM: Ben bought 6 bags of oranges. If we use the letter o to represent the unknown number, how would we write the number of oranges that Ben bought? Students who cannot write can use Velcro numbers/letters, direct the teacher what to write, or use assistive technology to answer.



Student Name: _____

___ Mr. Thompson got 4 cups of pencils for his students. He doesn't know how many pencils are in each cup. If we use the letter p to represent an unknown number, we would write the number of pencils as $4p$.



$4p$

STUDENT PROBLEM: Mrs. Parker got 7 cups of pencils for her students. If we use the letter p to represent an unknown number, how would you write the number of pencils there are? Students who cannot write can use Velcro numbers/letters, direct the teacher what to write, or use assistive technology to answer.



EQUATIONS SKILLS TEST 2: Creating an Expression to Represent a Story Problem



Carlos works in an art supply store. The store sells charcoal pencils in packets. They also sell packets of paintbrushes. Carlos doesn't know how many pencils or paintbrushes are in each packet, but he knows it's the same amount in each packet. Ed comes into the store and orders 2 packets of pencils and 5 packets of paintbrushes. Then, Sue comes in and orders 6 packets of pencils and 3 packets of paintbrushes. Use the letter "p" to represent the number of pencils in each packet and the letter "b" to represent the number of paintbrushes in each packet. Write an expression to represent the customers' orders.



Stephanie needs 1 bag of bolts and 4 bags of washers. Burt needs 5 bags of bolts and 2 bags of washers. Write the expression that represents this problem. Use the letter "b" to represent the number of bolts in a bag and the letter "w" to represent the number of washers in a bag.

EQUATIONS SKILLS TEST 3: Simplifying Expressions



Boris needs 3 bags of washers and 5 bags of brackets. John needs 4 bags of washers and 7 bags of brackets. Write the expression that represents this problem. Use the letter “w” to represent the number of washers in a bag and the letter “b” to represent the number of brackets in a bag.

Now simplify that expression.

Student Name: _____



Carlos works in an art supply store. The store sells charcoal pencils in packets. They also sell packets of paintbrushes. Carlos doesn't know how many pencils or paintbrushes are in each packet, but he knows it's the same amount in each packet. Kenroy comes into the store and orders 4 packets of pencils and 5 packets of paintbrushes. Then, Joy comes in and orders 2 packet of pencils and 4 packets of paintbrushes. Use the letter "p" to represent the number of pencils in each packet and the letter "b" to represent the number of paintbrushes in each packet. Write an expression to represent the customers' orders.

Now simplify that expression.