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Alternate Assessment Design–Mathematics

Technical Report 6:

Assessment Task Library

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Assessment Task Library

This technical report contains a description of the library of assessment tasks created by the Alternate Assessment Design—Mathematics (AAD-M) project. Funded by an Enhanced Assessment Grant to the Utah State Office of Education, this project brought together SRI International and a consortium of states including Utah, Idaho, and Florida to design and develop assessment tasks for alternate assessments based on alternate achievement standards (AA-AAS). The project resulted in the creation of 30 *Design Patterns* and 30 *Development Specifications and Exemplar Task Templates* (Task Templates). This report includes examples of the created tasks.

Background

The AAD-M project combines current knowledge from multiple disciplines to advance the design of alternate assessment tasks for students with significant cognitive disabilities that can be applied to performance events, portfolio, or mixed approach assessments. The goals of the project were to (1) extend the conceptual framework of evidence-centered design (ECD) to alternate assessment using the Principled Assessment Designs for Inquiry (PADI) model, (2) integrate the principles of Universal Design for Learning with ECD to guide the development of tasks that are accessible to all learners, (3) use the National Council of Teachers of Mathematics (NCTM) *Principles and Standards for School Mathematics* to identify common expectations, (4) develop *Design Patterns* and *Development Specifications and Exemplar Task Templates* (which include assessment task specifications and exemplar tasks), (5) enhance the human capital of state departments of education staff, and (6) support state department of education staff and teachers in the development of additional tasks in mathematics to expand the task bank for each state.

Content Selection

The AAD-M project conducted a crosswalk to identify the content that would be the focus of the assessment tasks. The National Council of Teachers of Mathematics (NCTM) *Principles and Standards for School Mathematics* were crosswalked with the extended content standards of the three consortium states. The crosswalk identified 30 NCTM expectations represented in the extended content standards of all three states (for a detailed description of the procedures used to conduct the crosswalk, see *Alternate Assessment Design–Mathematics Technical Report 3: Crosswalk — Domain Analysis Aligning National Council of Teachers of Mathematics (NCTM) Expectations with State Extended Mathematics Standards)*. A *Design Pattern* and a *Task Template* were created for each of these 30 expectations. Table 1 contains a list of the selected expectations. The selected expectations from the elementary, middle, and high school grades. The full table of NCTM expectations with the thirty selected expectations highlighted can be found in Appendix A.

Content	Strand: Algebra
Grades	Expectation
3-5	A1. Describe, extend, and make generalizations about geometric and numeric patterns
3-5	B2. Represent the idea of a variable as an unknown quantity using a letter or a symbol
3-5	C1. Model problem situations with objects and use representations such as graphs, tables, and equations to draw conclusions
6-8	B1. Develop an initial conceptual understanding of different uses of variables
9-12	B3. Use symbolic algebra to represent and explain mathematical relationships
Content	Strand: Data Analysis and Probability
Grades	Expectation
3-5	A3. Represent data using tables and graphs such as line plots, bar graphs, and line graphs
3-5	B1. Describe the shape & important features of a set of data & compare related data sets, with an emphasis on how the data are distributed
6-8	A2. Select, create, and use appropriate graphical representations of data, including histograms, box plots, and scatterplots
9-12	B1. For univariate measurement data, be able to display the distribution, describe its shape, and select and calculate summary statistics
Content	Strand: Geometry
Grades	Expectation
3-5	A1. Identify, compare and analyze attributes of two- and three-dimensional shapes and develop vocabulary to describe the attributes
3-5	A4. Explore congruence and similarity
6-8	A1. Precisely describe, classify, and understand relationships among types of two- and three- dimensional objects using their defining properties
9-12	A1. Analyze properties and determine attributes of two- and three- dimensional objects
Content	Strand: Measurement
Grades	Expectation
3-5	B2. Select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature, and the size of angles
3-5	B3. Select and use benchmarks to estimate measurements
6-8	A2. Understand relationships among units and convert from one unit to another within the same system
6-8	B2. Select and apply techniques and tools to accurately find length, area, volume, and angle measures to appropriate levels of precision
9-12	A1. Make decisions about units and scales that are appropriate for problem situations involving measurement

Table 1. Expectations Addressed in AAD-M Project¹

¹ The NCTM does not label specific standards and expectations within or across domains using the naming conventions described above (i.e., A3). This naming convention was a creation of the AAD-M project to distinguish among various standards and expectations within an NCTM subdomain (e.g., Number and Operations).

Content Strand: Number and Operations			
Grades	Expectation		
3-5	A1. Understand the place-value structure of the base-ten number system and be able to represent and compare whole numbers and decimals		
3-5	A2. Recognize equivalent representations for the same number and generate them by decomposing and composing numbers		
3-5	A3. Develop understanding of fractions as parts of unit wholes, as parts of a collection, as locations on number lines, and as divisions of whole numbers		
3-5	A4. Use models, benchmarks, and equivalent forms to judge the size of fractions		
3-5	B1. Understand various meanings of multiplication and division		
3-5	B3. Identify and use relationships between operations, such as division as the inverse of multiplication, to solve problems		
3-5	C2. Develop fluency in adding, subtracting, multiplying, and dividing whole numbers		
6-8	A1. Work flexibly with fractions, decimals, and percents to solve problems		
6-8	A7. Develop meaning for integers and represent and compare quantities with them		
6-8	C4. Develop, analyze, and explain methods for solving problems involving proportions, such as scaling and finding equivalent ratios		
9-12	A1. Develop a deeper understanding of very large and very small numbers and of various representations of them		
9-12	C1. Develop fluency in operations with real numbers, vectors, and matrices, using mental computation or paper-and-pencil calculations for simple cases and technology for more-complicated cases		

Table 1. Expectations Addressed in AAD-M Project (concluded)

Products

In order to develop assessment tasks using ECD and the PADI model, the project created *Design Patterns* and *Development Specifications and Exemplar Task Templates*. These are schemas/structures developed to support assessment developers in implementing ECD approaches. Each of these documents is described briefly below. For a more detailed description of the process for creating these documents, see *Alternate Assessment Design—Mathematics Technical Report 9: Guidelines for Creating Design Patterns and Development Specifications and Exemplar Task Templates for Mathematics*.

Design Patterns describe the elements of an assessment argument, including the targeted or focal knowledge, skills, and abilities (KSAs), the student behaviors or actions that would provide evidence of these knowledge and skills, and the situations that are likely to evoke those observations (Mislevy & Haertel, 2006). *Design Patterns* play a key role in identifying additional KSAs that may be required for successful performance on a task, but are not targeted by assessment tasks. *Design Patterns* also provide a structure for considering ways to vary task features to support students in communicating what they understand and are able to do in relation to the focal KSAs.

Development Specifications and Exemplar Task Templates include two categories of information: design specifications for tasks based on a *Design Pattern* and detailed

descriptions of the assessment tasks themselves. Design specification information in the template includes (1) decisions regarding specific content to assess in a task, (2) variable features selected for attaining the appropriate amount of scaffolding, depth of knowledge, complexity, and scope for the task, and (3) variable features selected to support multiple means of representation, expression, and engagement of students (Rose & Meyer, 2006). The detailed description of the exemplar assessment task in the template includes (1) information that will be communicated to the student, (2) materials that will be presented to the student, (4) the correct response, and (5) materials that examiners will require to administer the task.

Exemplar Tasks

The *Development Specifications and Exemplar Task Template* includes fields for creating all elements of tasks. The *Template* is designed to facilitate the creation of 4 items which target the range of functional abilities within the population of students with significant cognitive disabilities. This approach allows items developed to be accessible to students with varying levels of cognitive functioning and communication capabilities.

Item 1 is the most sophisticated (in terms of complexity, DOK, scope of content covered, and level of scaffolding/supports), is closest to grade level, and targets the higher functioning students within the population. Item 1 targets the selected Focal KSA most comprehensively.

Item 2 also aims to assess the selected Focal KSA, but is less complex and is designed to address a lower DOK.

Item 3 is made up of two items: Items 3a and 3b. These are the least complex and target the lowest functioning students within the population. **Item 3a** targets the recall or memorize level of the 6-point DOK scale, and **Item 3b** targets the attention level. If a student does not respond or responds incorrectly to Item 3a, then Item 3b can be administered. Item 3b extends below the recall/memorize DOK level in an effort to ensure that every student eligible for an AA-AAS can participate in the task and experience success with content, age, and grade-appropriate stimulus materials. Because Items 3a and 3b are intended to address a less sophisticated DOK, an Additional KSA (i.e., a prerequisite or foundational skill) from the associated *Design Pattern* that is most closely related to the selected Focal KSA is used to develop these items.

In the appendices of this report, an exemplar task from each of the NCTM content strands is presented. First the *Development Specifications and Exemplar Task Template* is presented and then the *Materials and Instructions* document for each task set. The following expectations are included in the examples:

- Appendix B: Algebra Exemplar Task (grades 9-12): Use symbolic algebra to represent and explain mathematical relationships
- Appendix C: Data Analysis and Probability Exemplar Task (grades 3-5): Describe the shape and important features of a set of data and compare related data sets, with an emphasis on how the data are distributed
- Appendix D: Geometry Exemplar Task (grades 6-8): Precisely describe, classify, and understand relationships among types of two- and three-dimensional objects using their defining properties

- Appendix E: Measurement Exemplar Task (grades 3-5): Select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature, and the size of angles
- Appendix F: Number and Operations Exemplar Task (grades 3-5): Develop understanding of fractions as parts of unit wholes, as parts of a collection, as locations on number lines, and as divisions of whole numbers

References

- Mislevy, R. J., & Haertel, G. D. (2006). Implications of evidence-centered design for educational testing. *Educational Measurement: Issues and Practice*, 25(4), 6-20.
- Rose, D. H., & Meyer, A. (2006). *A practical reader in universal design for learning*. Cambridge, MA: Harvard Educational Press.

Appendix A: NCTM Expectations

Appendix A: NCTM Expectations

Content Strand: Algebra

NCTM Standards and Expectations¹²

	Expectations			
Standard	In grades 3-5 all students should-	In grades 6-8 all students should-	In grades 9-12 all students should-	
A. Understand patterns, relations, and functions	A1. Describe, extend, and make generalizations about geometric and numeric	A1. Represent, analyze, and generalize a variety of patterns with tables, graphs, words, and, when possible, symbolic rules	 A1. Generalize patterns using explicitly defined & recursively defined functions A2. Understand relations and functions and select, convert flexibly among, and use various representations for them 	
	A2. Represent and analyze patterns and functions, using	A2. Relate and compare different forms of representation for a relationship	A3. Analyze functions of one variable by investigation gates of change, intercepts, zeros, asymptotes, and local and global behavior	
		contrast their properties from tables, graphs, or equations	A4. Understand & perform transformations such as antimetically combining, composing, & inverting commonly used functions, using technology to perform such operations on more-complicated symbolic expressions	
			 A5. Understand & compare the properti8es of classes of functions, including exponential, polynomial, rational, logarithmic, and periodic functions A6. Interpret representations of functions of 2 variables 	
B. Represent and analyze	B1. Identify such properties as commutativity, associativity,	B1. Develop an initial conceptual understanding of different uses of variables	B1. Understand the meaning of equivalent forms of expressions, equations, inequalities, and relations	
situations and structures using algebraic symbols	and distributivity and use them to compute with whole numbers	B2. Explore relationships between symbolic expressions and graphs of lines, paying particular attention to the meaning of intercept and slope	B2. Write equivalent forms of equations, inequalities, and systems of equations and solve them with fluency-mentally or with paper and pencil in simple cases and using technology in all cases	
	B2. Represent the idea of a variable as an unknown quantity using a letter or a symbol	B3. Use symbolic algebra to represent situations and to solve problems, especially those that involve linear relationships	 B3. Use symbolic algebra to represent & explain mathematical relationships B4. Use a variety of symbolic representation, inc recursive & parametric equations, for functions & relations 	
	B3. Express mathematical relationships using equations	B4. Recognize and generate equivalent forms for simple algebraic expressions and solve linear equations	B5. Judge the meaning, utility, and reasonableness of the results of symbol manipulations, including those carried out by technology	
C. Use mathematical models to represent & understand quantitative relationships	C1. Model problem situations with objects & use repre- sentations such as graphs, tables, and equations to draw conclusions	C1. Model and solve contextualized problems using various representations, such as graphs, tables, and equations	 C1. Identify essential quantitative relationships in a situation and determine the class or classes of functions that might model the relationships C2. Use symbolic expressions, including iterative and recursive forms, to represent relationships arising from various contexts C3. Draw reasonable conclusions about a situation being modeled 	
D. Analyze change in various contexts	 D1. Investigate how a change in one variable relates to a change in a second variable D2. Identify and describe situations with constant or varying rates of change & compare them 	D1. Use graphs to analyze the nature of changes in quantities in linear relationships	D1. Approximate and interpret rates of change from graphical and numerical data	

¹

Expectations addressed in the AAD-M project are highlighted in green. The NCTM does not label specific standards and expectations within or across domains using the naming conventions described above (i.e., A3). This naming convention was a creation of the AAD-M project to distinguish among various standards and expectations within an NCTM subdomain (e.g., Number and Operations). 2

Appendix A: NCTM Expectations Content Strand: Data Analysis and Probability

	Expectations			
Standard	In grades 3-5 all students should-	In grades 6-8 all students should-	In grades 9-12 all students should-	
A. Formulate questions that can be addressed with data & collect, organize, & display relevant data to answer	 A1. Design investigations to address a question and consider how data-collection methods affect the nature of the data set A2. Collect data using observations, surveys, and experiments A3. Represent data using tables and graphs such as line plots, bar graphs, and line graphs A4. Recognize the differences in representing categorical and 	 A1. Formulate questions, design studies, and collect data about a characteristic shared by two populations or different characteristics within one population A2. Select, create, and use appropriate graphical representations of data, including histograms, box plots, and scatterplots 	 A1. Understand the differences among various kinds of studies and which types of inferences can legitimately be drawn from each A2. Know the characteristics of well-designed studies, including the role of randomization in surveys & experiments A3. Understand the meaning of measurement data and categorical data, of univariate and bivariate data, and of the term variable A4. Understand histograms, parallel box plots, and scatterplots and use them to display data A5. Compute basic statistics and understand the distinction between a 	
them	numerical data		statistic and a parameter	
B. Select and use appro- priate	B1. Describe the shape & important features of a set of data & compare related data sets, with an emphasis	B1. Find, use, and interpret measures of center and spread, including mean and interquartile range	B1. For univariate measurement data, be able to display the distribution, describe its shape, and select and calculate summary statistics	
statistical methods to analyze	on how the data are distributed B2. Use measures of center, focusing on the median, and understand what	B2. Discuss and understand the correspondence between data sets and their graphical representations, especially histograms, stem-	B2. For bivariate measurement data, be able to display a scatterplot, describe its shape, and determine regression coefficients, regression equations, and correlation coefficients using technological tools	
data	each does and does not indicate about the data set	and-leaf plots, box plots, and scatterplots	B3. Display and discuss bivariate data where at least one variable is categorical	
	B3. Compare different representations of the same data and evaluate how		B4. Recognize how linear transformations of univariate data affect shape, center, and spread	
	well each representation shows important aspects of the data		B5. Identify trends in bivariate data & find functions that model or transform the data so that they can be modeled	
C. Develop and	C1. Propose and justify conclusions and predictions that are based on data	C1. Use observations about differences between two or more samples to make conjectures	C1. Use simulations to explore the variability of sample statistics from a known population and to construct sampling distributions	
evaluate inferences and	and design studies to further investigate the conclusions or predictions	about the populations from which the samples were taken C2. Make conjectures about possible	C2. Understand how sample statistics reflect the values of population parameters & use sampling distributions as the basis for informal inference	
predictions that are based on		relationships between two characteristics of a sample on the basis of scatterplots of the data and approximate lines of fit	C3. Evaluate published reports that are based on data by examining the design of the study, the appropriateness of the data analyses, and the validity of conclusions	
data		C3. Use conjectures to formulate new questions and plan new studies to answer them	C4. Understand how basic statistical techniques are used to monitor process characteristics in the workplace	
D. Understan d and apply basic	D1. Describe events as likely or unlikely and discuss the degree of likelihood using such words as <i>certain</i> , <i>equally</i>	D1. Understand and use appropriate terminology to describe complementary and mutually exclusive events	D1. Understand the concepts of sample space & probability distribution & construct sample spaces & distributions in simple cases	
concepts	likely, and impossible	D2. Use proportionality and a basic	D2. Use simulations to construct empirical probability distributions	
of probability	D2. Predict the probability of outcomes of simple experiments and test the predictions	understanding of probability to make and test conjectures about the results of experiments and simulations	D3. Compute and interpret he expected value of random variables in simple cases	
	D3. Understand that the measure of the likelihood of an event can be	D3. Compute probabilities for simple compound events, using such methods as organized	D4. Understand the concepts of conditional probability and independent events	
	represented by a number from 0 to 1	lists, tree diagrams, and area models	D5. Understand how to compute the probability of a compound event	

Appendix A: NCTM Expectations Content Strand: Geometry

	Expectations				
Standard	In grades 3-5 all students should-	In grades 6-8 all students should-	In grades 9-12 all students should-		
A. Analyze characteristics and properties of	A1. Identify, compare and analyze attributes of two- and three-dimensional shapes and develop vocabulary to describe the attributes	A1. Precisely describe, classify, and understand relationships among types of two- and three- dimensional objects using their defining	A1. Analyze properties and determine attributes of two- and three- dimensional objects		
two- and three- dimensional geometric shapes and develop	A2. Classify two- and three-dimensional shapes according to their properties and develop definitions of classes of shapes such as triangles and pyramids	properties	A2. Explore relationships (including congruence and similarity) among classes of two- and three- dimensional geometric objects, make and test conjectures about them, and solve problems		
mathematical arguments about geometric relationships	A3. Investigate, describe, and reason about the results of subdividing, combining, and transforming shapes	A2. Understand relationships among the angles, side lengths, perimeters, areas, and volumes of similar objects	A3. Establish the validity of geometric conjectures using deduction, prove theorems, and critique arguments made by others		
	 A4. Explore congruence and similarity A5. Make and test conjectures about geometric properties and relationships and develop logical arguments to justify conclusions 	A3. Create and critique inductive and deductive arguments concerning geometric ideas and relationships, such as congruence, similarity, and the Pythagorean relationship	A4. Use trigonometric relationships to determine lengths and angle measures		
B. Specify locations & describe spatial relationships	B1. Describe location and movement using common language and geometric vocabulary	B1. Use coordinate geometry to represent and examine the properties of geometric shapes	B1. Use Cartesian coordinates and other coordinate systems, such as navigational, polar, or spherical systems, to analyze geometric situations		
using coordinate geometry and other representa- tional systems	B2. Make and use coordinate systems to specify locations and to describe pathsB3. Find the distance between points along horizontal and vertical lines of a coordinate system	B2. Use coordinate geometry to examine special geometric shapes, such as regular polygons or those with pairs of parallel or perpendicular sides	B2. Investigate conjectures and solve problems involving two- and three-dimensional objects represented with Cartesian coordinates		
C. Apply transformations and use symmetry to analyze	C1. Predict and describe the results of sliding, flipping, and turning two-dimensional shapesC2. Describe a motion or a series of motions that will show that two shapes are congruent	C1. Describe sizes, positions, and orientations of shapes under informal transformations such as flips, turns, slides, and scaling	C1. Understand and represent translations, reflections, rotations, and dilations of objects in the plane by using sketches, coordinates, vectors, function notation, and matrices		
mathematical situations	C3. Identify and describe line and rotational symmetry in two- and three-dimensional shapes and designs	C2. Examine the congruence, similarity, and line or rotational symmetry of objects using transformations	C2. Use various representations to help understand the effects of simple transformations and their compositions		
D.Use visualization, spatial reasoning, and geometric	D1. Build and draw geometric objectsD2. Create and describe mental images of objects, patterns, and paths	D1. Draw geometric objects with specified properties, such as side lengths or angle measures	D1. Draw and construct representations of two- and three-dimensional geometric objects using a variety of tools		
modeling to solve problems	D3. Identify and build a three-dimensional object from two-dimensional representations of that object	D2. Use 2-dimen. representations of 3-dimen. objects to visualize & solve problems such as those involving surface area & volume	D2. Visualize three-dimensional objects from different perspectives and analyze their cross sections		
	D4. Identify and draw a two-dimensional representation of a three-dimensional object	D3. Use visual tools such as networks to represent and solve problems	D3. Use vertex-edge graphs to model and solve problems		
	D5. Use geometric models to solve problems in other areas of mathematics, such as number and measurement	D4. Use geometric models to represent and explain numerical and algebraic relationships	D4. Use geometric models to gain insights into, and answer questions in, other areas of mathematics		
	D6. Recognize geometric ideas and relationships and apply them to other disciplines and to problems that arise in the classroom or in everyday life	D5. Recognize and apply geometric ideas and relationships in areas outside the mathematics classroom, such as art, science, and everyday life	D5. Use geometric ideas to solve problems in, and gain insights into, other disciplines and other areas of interest such as art and architecture		

Appendix A: NCTM Expectations Content Strand: Measurement

	Expectations				
Standard	In grades 3-5 all students should-	In grades 6-8 all students should-	In grades 9-12 all students should-		
A. Understand measurable attributes of objects and the	A1. Understand such attributes as length, area, weight, volume, and size of angle and select the appropriate type of unit for measuring each attribute	A1. Understand both metric and customary systems of measurement	A1. Make decisions about units and scales that are appropriate for problem situations involving measurement		
units, systems, and processes of measurement	A2. Understand the need for measuring with standard units and become familiar with standard units in the customary and metric systems	A2. Understand relationships among units and convert from one unit to another within the same system			
	A3. Carry out simple unit conversions, such as from centimeters to meters, within a system of measurement	A3. Understand, select, and use units of appropriate size and type to measure angles, perimeter, area, surface area, and			
	A4. Understand that measurements are approximations and understand how differences in units affect precision	volume			
	As. Explore what happens to measurements of a two-dimensional shape such as its perimeter and area when the shape is changed in some way				
B. Apply appropriate techniques, tools, and formulas to	B1. Develop strategies for estimating the perimeters, areas, and volumes of irregular shapes	B1. Use common benchmarks to select appropriate methods for estimating measurements	B1. Analyze precision, accuracy, and approximate error in measurement situations		
determine measurements	B2. Select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature, and the size of angles	B2. Select and apply techniques and tools to accurately find length, area, volume, and angle measures to appropriate levels of precision	B2. Understand and use formulas for the area, surface area, and volume of geometric figures, including cones, spheres, and cylinders		
	B3. Select and use benchmarks to estimate measurements	B3. Develop and use formulas to determine the circumference of circles and the area of triangles, parallelograms, trapezoids, and circles and develop strategies to find the area of more-complex shapes	B3. Apply informal concepts of successive approximation, upper and lower bounds, and limit in measurement situations		
	B4. Develop, understand, and use formulas to find the area of rectangles and related triangles and parallelograms	B4. Develop strategies to determine the surface area and volume of selected prisms, pyramids, and cylinders			
	B5. Develop strategies to determine the surface areas and volumes of rectangular solids	 B5. Solve problems involving scale factors, using ratio and proportion B6. Solve simple problems involving rates and derived measurements for such attributes as velocity and density 	B4. Use unit analysis to check measurement computations		

Appendix A: NCTM Expectations Content Strand: Number and Operations

	Expectations				
Standard	In grades 3-5 all students should-	In grades 6-8 all students should-	In grades 9-12 all students should-		
A. Understand numbers, ways of representing numbers,	A1. Understand the place-value structure of the base-ten number system and be able to represent and compare whole numbers and decimals	A1. Work flexibly with fractions, decimals, and percents to solve problems	A1. Develop a deeper understanding of very large and very small numbers and of various representations of them		
relationships among numbers, and number systems	 A2. Recognize equivalent representations for the same number and generate them by decomposing and composing numbers A3. Develop understanding of fractions as parts of unit wholes, as parts of a collection, as locations on number lines, and as divisions of whole numbers 	 A2. Compare and order fractions, decimals, and percents efficiently and find their approximate locations on a number line A3. Develop meaning for percents greater that 100 and less than 1 	A2. Compare and contrast the properties of numbers and number systems, including the rational and real numbers, and understand complex numbers as solutions to quadratic equations that do not have real solutions		
	 A4. Use models, benchmarks, and equivalent forms to judge the size of fractions A5. Recognize and generate equivalent forms of commonly used fractions, decimals, and percents 	 A4. Understand and use ratios and proportions to represent quantitative relationships A5. Develop an understanding of large numbers and recognize and appropriately use exponential, scientific, and calculator notation 	A3. Understand vectors and matrices as systems that have some of the properties of the real- number system		
	A6. Explore numbers less than 0 by extending the number line and through familiar applicationsA7. Describe classes of numbers according to characteristics such as the nature of their factors	A6. Use factors, multiples, prime factorization, and relatively prime numbers to solve problemsA7. Develop meaning for integers and represent and compare quantities with them	A4. Use number-theory arguments to justify relationships involving whole numbers		
B. Understand meanings of operations and	B1. Understand various meanings of multiplication and division	B1. Understand the meaning and effects of arithmetic operations with fractions, decimals, and integers	B1. Judge the effects of such operations as multiplication, division, and computing powers and roots on the magnitudes of quantities		
how they relate to one another.	B2. Understand the effects of multiplying and dividing whole numbers	B2. Use the associative and commutative properties of addition and multiplication and the distributive property of multiplication over addition to simplify computations with integers, fractions, and decimals	B2. Develop an understanding of properties of, and representations for, the addition and multiplication of vectors and matrices		
	 B3. Identify and use relationships between operations, such as division as the inverse of multiplication, to solve problems B4. Understand and use properties of operations, such as the distributivity of multiplication over addition 	B3. Understand and use the inverse relationships of addition and subtraction, multiplication and division, and squaring and finding square roots to simplify computations and solve problems	B3. Develop an understanding of permutations and combinations as counting techniques		

Appendix A: NCTM Expectations Content Strand: Number and Operations (continued)

C. Compute fluently and make reasonable estimates.	C1. Develop fluency with basic number combinations for multiplication and division and use these combinations to mentally compute related problems, such as 30 x 50	C1. Select appropriate methods and tools for computing with fractions and decimals from among mental computation, estimation, calculators or computers, and paper and pencil, depending on the situation, and apply the selected methods	C1. Develop fluency in operations with real numbers, vectors, and matrices, using mental computation or paper-and-pencil calculations for simple cases and technology for more-complicated cases
	C2. Develop fluency in adding, subtracting, multiplying, and dividing whole numbers	C2. Develop and analyze algorithms for computing with fractions, decimals, and integers and develop fluency in their use	C2. Judge the reasonableness of numerical computations and their results
	C3. Develop and use strategies to estimate the results of whole-number computations and to judge the reasonableness of such results	C3. Develop and use strategies to estimate the results of rational-number computations and judge the reasonableness of the results	
	C4. Develop and use strategies to estimate computations involving fractions and decimals in situations relevant to students' experience	C4. Develop, analyze, and explain methods for solving problems involving proportions, such as scaling and finding equivalent ratios	
	C5. Use visual models, benchmarks, and equivalent forms to add and subtract commonly used fractions and decimals		
	C6. Select appropriate methods and tools for computing with whole numbers from among mental computation, estimation, calculators, and paper and pencil according to the context and		
	nature of the computation and use the selected method or tool		

Appendix B: Algebra Exemplar Task¹

¹ In the Task Template, the most difficult item is named item 1, the easier item is named item 2, and the easiest items are named item 3a and item 3b. The Materials and Instructions document, which was created for pilot testing the items, instructs administrators to administer the easiest items first (item 3a/b). To reduce administrator error, the items were renamed. In the Materials and Instructions document, the easiest items are named A1 and A2, then next most difficult item is named item B, and the most difficult item is named item C.

Task/Item Development Algebra B3 (grades 9-12)

Attributes	General Information					
Title	Algebra B3 (Grades 9-12)					
Summary	Use symbolic algebra	a to represent and explain mathematical relation	onships			
Rationale	Fluency with symboli	c algebra helps students represent and explai	n problems in advanced areas of math			
Grade level	Fluency with algebrai	ic symbolism helps students represent and so	lve problems in many areas of the curricu	ılum.		
standards	Being able to operate	e with algebraic symbols is also important beca	ause the ability to rewrite algebraic expre	ssions enables students to re		
(from NCTM)	express functions in	n ways that reveal different types of informatic	on about them. For example, given the qu	adratic function $f(x) = x2 - 2x - 3$,		
	some of whose gra	phical properties were discussed earlier, stud	ents should be able to re express it as f(x	x = (x - 1)2 - 4, a form from which		
	they can easily ider	ntify the vertex of the parabola. And they shou	Ild also be able to express the function in	the form $f(x) = (x - 3)(x + 1)$ and		
	thus identify its roo	ts as $x = 3$ and $x = -1$		1		
		Item 1	Item 2	Item 3		
Attributes	Definition	Application/Comprehension/ Performance	Performance/Recall	Recall/Attention		
Focal KSA	Focal KSA from DP	 Ability to explain mathematical relationship 	os that are represented using symbolic	 Knowledge that letters or 		
	for Items 1 & 2;	algebra		symbols can be used as		
	Add'I KSA from DP			variables		
	for Item 3					
Potential	Observed	 Student presented with a word problem ar 	nd an equation that represents the	Not addressed in DP		
Observations	behaviors of	mathematical relationship in the word prot	plem. Student correctly explains the			
from DP	students that can	mathematical relationship (e.g., Student is	given two columns of numbers: 1, 2, 3			
	the Feed KCA	(cups of unpopped popcorn) and 2, 4, 6 (cups of popped popcorn) and the				
	the Focal KSA	equation, y = 2x. Student is told, "1 cup of unpopped popcorn makes 2 cups of				
		popped popcorn. Student explains what $y = 2x$ tens them about the two columns of data; that the number of curs of popped popcorp in the right hand column is				
		or data; that the number of cups of popped	b popcorn in the right hand column is			
		Student is given an equation and a table that represents a mathematical				
		• Student is given an equation and a table that represents a mathematical relationship, student correctly explains the mathematical relationship (e.g., given				
		relationship, student correctly explains the mathematical relationship (e.g., given				
		two columns of numbers: 1, 2, 3 and 2, 4, 6 and the equation, $y = 2x$, student				
		explains what $y = 2x$ tells them about the two columns of data; that each number				
		in the right hand column is twice its corresponding number in the left hand				
Dotontial Work	What students say	Column)				
Polenilar Work	do or make that	• Explanation of a mathematical relationship	o that is represented using symbolic	Not addressed in DP		
FIUUUCIS		algebra				
	about the Eocal					
	KSA					
Characteristic	Aspects of	Limit mathematical relationships to linear	or quadratic in which $y - x^2$	Not addressed in DP		
Features	assessment	All assessment tasks must be designed as	ich that mathematical relationships can			
1 Cataloo	situations likely to	 All assessment tasks must be designed st be expressed using symbolic algebra 				
	evoke the desired	be expressed using symbolic algebra				
	evidence					

Potential Variable Features/ Scaffolding	Features that could be changed to impact item difficulty	 DOK level Complexity of the algebraic relationship e Number of variables to be included in the Presentation of a table 	•	
Selected Variable Features/ Scaffolding for the Item	From Item 1 to Item 3: Reduce DOK Reduce scope Increase scaffolding	 DOK level: Comprehension (Explain) Complexity of the algebraic relationship expressed in data: More complex (multiplication) Number of mathematical variables: 2 Multiple representation of the equation: yes table Mapping of relationship between equation and response options: Less direct mapping Number of response options: 3 Item format: Select response Complexity of scenario: Measuring quantities in a real life situation 	 DOK: Comprehension (Explain) Complexity of the algebraic relationship expressed in data: Less complex (addition) Number of mathematical variables: 2 Multiple representation of the equation: no Mapping of relationship between equation and response options: More direct mapping Number of response options: 2 Item format: Select response Complexity of the scenario: Counting elements in a real life situation 	 DOK: Recall (Identify, Recognize) Complexity of the algebraic relationship expressed in data: N/A (Note. The additional KSA does not deal with algebraic relationship so N/A). Number of mathematical variables: 1 Multiple representation of the equation: no Mapping of relationship between equation and response options: N/A (see reasons above) Number of response options; 2 in 3a and 1 in 3b Item format: Select response Complexity of the scenario: N/A
Item Directive	The stem or question (includes description and number of distractors if applicable)	 Examiner presents equation, w=2r and says, "You need to make rice. This equation shows you the relationship between the amount of water and the amount of rice you will need. 'W' stands for water and 'R' stands for rice." Examiner then presents student with a table with two columns. Examiner says, This table also shows the same information. "Which of the following statements is true?" There is two times as much water for every cup of rice There is two times as much rice for every cup of water The number of cups of rice is equal to the number of cups of water 	 Examiner presents a worksheet with the equation K = 3 + T, and says, "This equation represents the number of songs that Kelly [Jada] has in relation to the number of songs that Tom [Imran] has. K = 3 + T. Does this mean that: Tom [Imran] has three more songs than Kelly [Jada] Kelly [Jada] has three more songs than Tom [Imran] Tom [Imran] and Kelly [Jada] have the same number of songs? 	 3a. Examiner presents student with an equation, 3+x=5, and asks, "Which is a variable?" Examiner shows students 2 cards, one with "3" printed on it and another with "X" and says, "Is 3 a variable or is X a variable? 3b. If student cannot respond, the examiner removes the card with "3" so that only the card with "3" so that only the card with "X" remains and says, "Look at/touch/show me the variable."

		6	3			
		8	4			
		10	5			
Correct Answer	Correct answer for the item	Student choos	es "There is tw for every cup o	o times as	Student chooses "Kelly [Jada] has three more songs than Tom [Imran]"	3a. Student chooses card with "x" 3b. Student indicates the "X"
Description of Stimulus Items	Description of the graphics or objects used in administration of the task	 All information (revealed se equation, the options) 	quentially i.e., en table, then r	ksheet first response	 All information on one worksheet (revealed sequentially i.e., first equation, then response options) 	• Two note cards, one with, "3" and the other with the "X."
Materials for Examiner	Materials required to administer, document, and score the task (e.g., worksheet, camera to take picture of product, manipulatives)	Task workshee and delivery Task sheet or student resp	et that describe instructions fo other method t onse for scorir	es the item r examiner. o record ng.	Task worksheet that describes the item and delivery instructions for examiner. Task sheet or other method to record student response for scoring.	Task worksheet that describes the item and delivery instructions for examiner. Task sheet or other method to record student response for scoring.
Variable Features for Administra- tion to Individual Students	Features that could be changed to impact item accessibility for individual student needs (e.g., as specified in the student's IEP)	 Question pre (e.g., related) Response for on student c Verbal/gestu 	esentation indiv l in sign langua ormat individua ommunication Iral prompts ind	<i>v</i> idualized age) lized based system dividualized	 Question presentation individualized (e.g., related in sign language) Response format individualized based on student communication system Verbal/gestural prompts individualized 	 Question presentation individualized (e.g., related in sign language) Response format individualized based on student communication system Verbal/gestural prompts individualized

Updated Flowers/Browder Math DOK¹:

- 1. Attention: touch, look, listen, repeat what the teacher said, vocalize, respond, attend, recognize
- 2. Memorize/recall: list, describe (facts), state math facts, identify, state, define, match, recognize, label, follow a pattern
- 3. **Performance:** answer, follow 1 step directions, find answer, present, read, separate, spell, tell time, map, model demonstration, perform, demonstrate, follow, choose, count, locate, group by given attributes, solve simple (one computation skill) problems, measure
- 4. **Comprehension:** understand, extend a pattern, sketch, ask and answer questions, categorize/group by unknown attributes, explain, conclude, group, restate, review, translate, classify/sort with understanding, simplify (equivalent forms)
- 5. **Application:** compute, organize, collect (such as data), apply, revise, construct, solve complex (multiple computation skills) problems, use given formulas in novel situations (formula may or may not be identified), explain a process, conduct research
- 6. **Analysis, Synthesis, Evaluation:** create a complex pattern, analyze, compare, contrast, compose, predict, plan, judge, evaluate, interpret data, generalize findings, create hypotheses

¹ Bechard, S., Almond, P., Karvonen, M., Wakeman, S., Turner, C., Bowen, T., & Turner, L. (2009). *Hitting a moving target: A discussion of ten alignment studies for AA-AAS.* Paper presented at the National Conference on Student Assessment. Los Angeles, CA June 23, 2009.

Alternate Assessment Design—Mathematics Task Tryouts

Algebra B3 Grades 9-12 Materials and Instructions

UT, ID, FL October 2010

SRI International Center for Education and Human Services Center for Technology in Learning

For more information contact Kathryn Morrison, (650) 859-3922, kathryn.morrison@sri.com

Overview and Purpose of Task Tryouts

Over the past 12 months, researchers from SRI International and personnel from your state office of education have collaborated closely to develop assessment tasks in mathematics designed for students with significant cognitive disabilities. These tasks have been crosswalked with the National Council of Teachers of Mathematics' Principles and Standards for School Mathematics but have been reduced in depth, breadth, and complexity. The tasks were developed using principles of Universal Design for Learning and are intended to be appropriate for students with significant cognitive disabilities who participate in your state's alternate assessment based on alternate achievement standards.

Each task will be administered to six students: two students who are at a high communication level, two who are at a medium communication level, and two who are at a low communication level. This document provides step-by-step scripts, instructions, and materials for each item. We ask that you follow these instructions very carefully to ensure that the data collected are of the highest quality so that we can gather reliable information about the tasks and determine whether any revisions to them are needed.

This document is divided into four sections:

- Background information on a task
- General instructions for administering items
- Detailed instructions for administering items
- Task materials for each item.

Section 1: Background Information on Task

This table describes the basic attributes and general information for Algebra B3 grades 9-12 (AlgB3 g9-12).

Attributes	General Information	
Math Strand	Algebra	
Grade Band	Grades 9-12	
Task Code	AlgB3 g9-12	
Assessment Target	Use symbolic algebra to represent and explain mathematical relationships	
Rationale: Why is this important to learn?	Fluency with symbolic algebra helps students represent and explain problems in	
	advanced areas of math	

Section 2: General Instructions for Administering Items

This section first describes an overview of item administration and then provides detailed scripts, materials, and instructions for administering, scoring, and reporting each item within a task.

General Administration Guidelines

Highlights for administering tasks are provided below; more detailed instructions for task administration are provided in the following section, Task Presentation.

- Choose a location with few, if any, distractions and appropriate furniture.
- Choose a time of day when the student will be alert and able to pay attention and respond.
- On the day of the Task Tryout, **do not** instruct the student on the content of the task.
- Before presenting the item directions and student materials, make sure the student is attending or gain the student's attention.
- While administering the task, maintain a neutral demeanor.
- Do not provide prompts or hints that might "give away" the correct answer.
- Use familiar gestures and prompts to refocus the student if necessary.
- You may provide a break if the student requires one.
- If the student DOES NOT RESPOND to an item the first time you read it, you may repeat the item **one** time after refocusing the student's attention.
- Remember, this is an assessment task rather than an instructional activity. Although a task might be changed to meet needs presented by the student's disability, each item should be presented so that the student responds independently.

Task Presentation

- Each task contains three items, which must be administered in a specific order (see Figure 1 on page 6):
 - o All students are administered Item A1.
 - Students who respond incorrectly or do not respond to Item A1 are administered Item A2. This completes the Task Tryout for these students.
 - Students who refuse to answer Item A1 are not administered any additional items. This completes the Task Tryout for these students.
 - All students who respond correctly to Item A1 are administered Item B and then Item C. This completes the Task Tryout for these students.
- Each task and its three items have specific administration instructions and a script for teachers to use (these are included in Section 3). Follow the instructions and script for the specific task you are administering. Instructions include:
 - Item Directions: The directions for each item describe what the teacher says and what the teacher does to administer each item. Follow the detailed directions in Section 3, saying the words (in bold) in the script and presenting the item materials as directed (unbolded text). When portions of the detailed directions are in brackets (e.g., [Look at/touch/point to]), this indicates that you should chose the directions most appropriate for the student participating in the Task Tryout.
 - **Materials:** The materials to be presented with a particular item are described in Section 3. Some materials are printed pages with graphics or illustrations to which the student responds. These graphics and illustrations are provided in Section 4. You may need to print and cut out the graphics or illustrations.
 - Student Responses: The correct student response is also described in Section 3. Student responses may vary so that one student points to a selection, another names his/her selection verbally or in sign language, and another presses a switch. Each student will communicate his/her selection in a manner consistent with typical responding in the classroom.

Figure 1: Flowchart of Task Administration



Section 3: Detailed Instructions for Administering Items

Item A1

Steps	Scripts, materials, and student responses	Directions for scoring, reporting, and moving to the next item	
Directions: What	Teacher/administrator presents student with an equation, $3 + x$	If you change the directions to meet individual	
the teacher says	= 5 (Item A Illustration 1), and asks, Which is a variable?	needs of the student, indicate the changes in	
(bold script) and	Teacher/administrator shows students 2 note cards, one with	Section 1 and answer the questions about	
does (regular text)	"3" printed on it and another with "X" (Item A Illustrations 2	accommodations in Section 2 of the Data Collection	
	and 3) and says, Is 3 a variable or is X a variable ?	Booklet.	
Materials: What	Cut out illustrations:	If you change materials, indicate the changes in	
the student	 Item A Illustration 1: a note card with "3 + x = 5" 	Section 1 and answer the questions about	
perceives	 Item A Illustration 2: a note card with "3" 	accommodations in Section 2 of the Data Collection	
	 Item A Illustration 3: a note card with "X" 	BOOKIET.	
Student Correct	Student chooses the note card with "X"	Mark "Correct" in Section 1 of the Data Collection	
response		Booklet if the response was independent and	
		consistent with the student's typical response	
		mode. MOVE TO ITEM B.	
Student	 Student indicates the "3" 	Mark "Incorrect" and record how the student	
Incorrect	 Student says "I don't know" 	responded in the appropriate field in Section 1 of the Data Collection Booklet. MOVE TO ITEM A2.	
response	Student echoes "variable"		
Student No	Student claps hands	a) Obtain the student's attention and repeat the	
Response—	 Student stares at wall 	directions.	
doesn't respond	 Student hums with eyes closed 	b) If the student still doesn't respond, record the	
to question'		student's lack of response in Section 1 of the	
		Data Collection Booklet. MOVE TO ITEM A2.	
Student Refused	 Student says (signs or gestures) "No" or "I don't want to" 	Mark "Refused" and record how the student	
to Respond [®]	 Student pushes task materials away 	responded in the appropriate field in Section 1 of	
		the Data Collection Booklet. STOP TASK	

Steps	Scripts, materials, and student responses	Directions for scoring, reporting, and moving to the next item
Directions: What	If student does not respond to Item A1 or responds incorrectly,	If you change the directions to meet individual
the teacher says	the teacher/administrator removes the note card with "3" so	needs of the student, indicate the changes in
(DOID SCIIPL) and doos (regular text)	at/touch/show mol the variable	accommodations in Section 2 of the Data
	autouchishow hiej the variable.	Collection Booklet.
Materials: What	 Item A Illustration 3: a note card with "X" 	If you change materials, indicate the changes in
the student		Section 1 and answer the questions about
perceives		accommodations in Section 2 of the Data
		Collection Booklet.
Student Correct	Student indicates the "X"	Mark "Correct" in Section 1 of the Data Collection
response		Booklet if the response was independent and
		consistent with the student's typical response
		mode.
Otersterrt		STOP TASK •
Student	Student says "I don't know"	Mark "Incorrect" and record now the student
	 Student echoes "variable" 	the Date Collection Reaklet. STOR TASK
Student No	 Student clone bando 	a) Obtain the student's attention and repeat the
		directions
doesn't respond	• Student stares at wall	directions.
to question [†]	 Student hums with eyes closed 	b) If the student still doesn't respond, record the
		student's lack of response in Section 1 of the
		Data Collection Booklet. STOP TASK •
Student	• Student says (signs or gestures) "No" or " I don't want to"	Mark "Refused" and record how the student
Refused to	 Student pushes task materials away 	responded in the appropriate field in Section 1 of
Respond [†]		the Data Collection Booklet. STOP TASK •

Steps	Scripts, materials, and student responses	Directions for scoring, reporting, and moving to the next item
Directions: What the teacher says (bold script) and does (regular text)	 Teacher/administrator presents a worksheet with the equation K = 3 + T (Item B Illustration 1) and says, This equation represents the number of songs that Kelly has in relation to the number of songs that Tom has. K = 3 + T. Does this mean that: Tom has three more songs than Kelly Kelly has three more songs than Tom Tom and Kelly have the same number of songs? 	If you change the directions to meet individual needs of the student, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
<i>Materials:</i> What the student perceives	Item B Illustration 1: All information on a sheet of paper (revealed sequentially i.e., first equation, then response options)	If you change materials, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
Student Correct response	Student chooses "Kelly has three more songs than Tom"	Mark "Correct" in Section 1 of the Data Collection Booklet if the response was independent and consistent with the student's typical response mode. MOVE TO ITEM C.
Student Incorrect response [†]	 Student indicates an incorrect response Student says "I don't know" Student echoes "Kelly" 	Mark "Incorrect" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. MOVE TO ITEM C.
Student No Response doesn't respond to question [†]	 Student claps hands Student stares at wall Student hums with eyes closed 	 a) Obtain the student's attention and repeat the directions. b) If the student still doesn't respond, record the student's lack of response in Section 1 of the Data Collection Booklet. MOVE TO ITEM C.
Student <i>Refused to</i> <i>Respond</i> [†]	 Student says (signs or gestures) "No" or "I don't want to" Student pushes task materials away 	Mark "Refused" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. STOP TASK ●

Steps	Scripts, materials, and student responses	Directions for scoring, reporting, and moving to the next item
<i>Directions:</i> What the teacher says (bold script) and does (regular text)	 Teacher/administrator presents equation, w = 2r (Item C Illustration 1) and says, You need to make rice. This equation shows you the relationship between the amount of water and the amount of rice you will need. 'W' stands for water and 'R' stands for rice." Teacher/administrator then displays to student a table with two columns (Item C Illustration 1). Teacher/administrator says, This table also shows the same information. Which of the following statements is true? There is two times as much water for every cup of rice There is two times as much rice for every cup of water The number of cups of rice is equal to the number of cups of water 	If you change the directions to meet individual needs of the student, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
<i>Materials:</i> What the student perceives	Item C Illustration 1: All information on a sheet of paper (revealed sequentially, i.e., first equation, then table, then response options)	If you change materials, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
Student Correct response	Student chooses "There is two times as much water for every cup of rice"	Mark "Correct" in Section 1 of the Data Collection Booklet if the response was independent and consistent with the student's typical response mode. STOP TASK ●
Student <i>Incorrect</i> response [†]	 Student indicates the incorrect response Student says "I don't know" Student echoes "cups of rice" 	Mark "Incorrect" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. STOP TASK ●
Student No Response doesn't respond to question [†]	 Student claps hands Student stares at wall Student hums with eyes closed 	 a) Obtain the student's attention and repeat the directions. b) If the student still doesn't respond, record the student's lack of response in Section 1 of the Data Collection Booklet. STOP TASK ●
Student Refused to Respond [†]	 Student says (signs or gestures) "No" or "I don't want to" Student pushes task materials away 	Mark "Refused" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. STOP TASK ●

Appendix B: Algebra Exemplar Task Section 4: Task Materials for Each Item Appendix B: Algebra Exemplar Task Algebra B3, grades 9-12 Item A Illustration 1

3 + X = 5



Algebra B3, grades 9-12 Item B Illustration 1

$\mathsf{K} = \mathsf{3} + \mathsf{T}$

- 1. Tom has three more songs than Kelly
- 2. Kelly has three more songs than Tom
- 3. Tom and Kelly have the same number of songs

Appendix B: Algebra Exemplar Task Algebra B3, grades 9-12 Item C Illustration 1

W = 2R

W	R
4	2
6	3
8	4
10	5

1. There is two times as much water for every cup of rice

2. There is two times as much rice for every cup of water

3. The number of cups of rice is equal to the number of cups of water

Appendix C: Data Analysis and Probability Exemplar Task

Appendix C: Data Analysis and Probability Exemplar Task¹

¹ In the Task Template, the most difficult item is named item 1, the easier item is named item 2, and the easiest items are named item 3a and item 3b. The Materials and Instructions document, which was created for pilot testing the items, instructs administrators to administer the easiest items first (item 3a/b). To reduce administrator error, the items were renamed. In the Materials and Instructions document, the easiest items are named A1 and A2, then next most difficult item is named item B, and the most difficult item is named item C.

Appendix C: Data Analysis and Probability Exemplar Task Task/Item Development Data Analysis and Probability B1 (grades 3-5)

Attributes	General Information						
Title	Data Analysis and Probability B1 (grades 3-5)						
Summary	Describe the shape and important features of a set of data and compare related data sets, with an emphasis on how the data are distributed						
Rationale	In grades 3-5, studen	ts make an important transition from e	examining individual pieces of data to ur	nderstanding that data come in sets and data			
	are distributed over	r some range. This leads to more sopl	histicated ideas in data analysis in math				
Grade level	A reasonable objectiv	ve for upper elementary and middle-gr	ades students is that they begin to rega	rd a set of data as a whole that can be			
standards	described as a set	and compared to other data sets (Kor	old forthcoming). As students examine	a set of ordered numerical. As students			
	examine a set of or	dered numerical data, teachers should teacher a should be the second and the second states of the second states and the second state	a neip them learn to pay attention to imp	to have upueuel values			
	Much of students' wo	rk with data in grades 3-5 should invo	blye comparing related data sets. Noting	the similarities and differences between two			
	data sets requires s	students to become more precise in th	peir descriptions of the data. In this conte	ext students gradually develop the idea of a			
	"typical." or average	e, value. Building on their informal und	derstanding of "the most" and "the middl	le." students can learn about three measures			
	of center-mode, n	nedian, and, informally, the mean. Stu	idents need to learn more than simply he	ow to identify the mode or median in a data			
	set. They need to b	ouild an understanding of what, for exa	ample, the median tells them about the c	data, and they need to see this value in the			
	context of other cha	aracteristics of the data.		F			
		Item 1	Item 2	Item 3a/3b			
.		Application/Comprehension/	Performance/Recall	Recall/Attention			
Attributes	Definition	Performance					
FOCAL KSA	Focal KSA from DP	Ability to describe the shape and i	mportant features of a data set	Ability to read graphs, e.g., line graphs			
	Add'I KSA from DP	snowing understanding without ne	icessarily using technical terminology	and bar graphs			
	for Item 3	(e.g., now many are in the set, which item/value is most frequent, which values are missing)					
Potential	Observed	Student accurately describes one	Student accurately describes one feature of a data set (e.g. which Not addressed in DP				
Observations	behaviors of	quantity occurs most frequently. th	he average quantity, the maximum and				
from DP	students that can	minimum values)					
	provide evidence of	NOTE: There was some discussion that this PO is more towards reading					
	the Focal KSA	and interpreting the graph and this can serve as an Item 2 in the Item					
		Template					
Potential Work	What students say,	Selection from a list of phrases that	at describe the data	Not addressed in DP			
Products	do, or make that	 Description of data set 					
	about the Focal						
	KSA						
Characteristic	Aspects of	All tasks will include graph(s)		1			
Features	assessment	Graphs are accompanied by contextual information (a scenario)					
	situations likely to	Information presented in graph has to be complete (i.e., axis have to be labeled, title, sufficient number of data points are					
	evoke the desired	plotted)					
	evidence						

Appendix C: Data Analysis and Probability Exemplar Task

Potential Variable Features/ Scaffolding	Features that could be changed to impact item difficulty	 DOK level Type of item response format (Constructed response vs. selected response) Use of technical terminology Number of data points represented in graph Number of digits represented in data points (single vs. multiple digits) Number of categories on x-axis in graph Number of data features (an item can ask for more than one important feature of the data) Type of data features targeted (e.g., spread, outlier, clumps) Type of data representation Number of data features in the graph 			
Selected Variable Features/ Scaffolding for the Item	From Item 1 to Item 3: • Reduce DOK • Reduce scope • Increase scaffolding	 DOK level: Comprehension (Understand; Group) Type of item response format: Constructed response Use of technical terminology: No Number of data points represented in graph: 34 Number of digits represented in data points: N/A Number of categories on x-axis in graph: 12 months Number of data features in the graph: 1 (clump) Number of data features targeted: 1 Type of data representation: line graph 	 DOK level: Performance (Read) Type of item response format: Constructed response Use of technical terminology: No Number of data points represented in graph: 10 Number of digits represented in data points: Single Number of categories on x-axis in graph: 3 hair colors Number of data features in the graph: 1 (frequency) Number of data features targeted: 1 Type of data features targeted: Frequency Type of data representation: bar graph 	 DOK level: Recall (Match, Recognize, Identify) Type of item response format: Selected response Use of technical terminology: No Number of data points represented in graph: 4 Number of digits represented in data points: Single Number of categories in graph: 2 Number of data features in the graph: 1 (frequency) Number of data features targeted: 1 Types of data representation: pictograph 	
Item Directive	The stem or question (includes description and number of distractors if applicable)	Examiner presents a line plot about the inches of rain that fell each month during the year and says, "Rainy season occurs during months of the year that have the most rain. Which month do you think the rainy season starts? Which month do you think the rainy season ends?"	Examiner presents a bar graph about the number of students in a class with different color hair. The examiner points to the graph and says, "In this graph, we see the number of students that have each hair color. What is the hair color of most students?"	 3a. Examiner presents a pictograph about the number of dogs and cats that students have as pets. Examiner says, "Here is a pictograph that shows the number of students who have dogs and the number of students who have cats. How many students have dogs? Examiner presents each response on its own card and says, "Do three students have dogs [presents card with three students] or does one student have a dog [presents card 	
				with one student]?"	
----------------	-----------------------	---	---	---	
				3b. Examiner covers column that shows	
				number of students who has a cat,	
				and says, "Look at/touch the	
				students who have dogs."	
Correct	Correct answer for	Students indicates June through	Students indicates blonde hair	3a. Student indicates 3	
Answer	the item	October		3b. Student looks/touches pictograph	
Description of	Description of the	A line plot about the inches of rain	 Bar graph about the number of 	• Pictograph about the number of dogs	
Stimulus Items	graphics or objects	that fell each month during the year	students in a class with different	and cats that students have as pets	
	used in		color hair.		
	administration of		8		
	the task		¥ 6	Dog Cat	
		January February March Agril May June July August September October November December Months			
			E Black Blonde Red		
			Z Hair color		
				Two pictures cards, each response	
				on its own card	
				3	
Materials for	Materials required	Task worksheet that describes the	Task worksheet that describes the	Task worksheet that describes the item	
Examiner	to administer,	item and delivery instructions for	item and delivery instructions for	and delivery instructions for examiner.	
	document, and	examiner.	examiner.	Task sheet or other method to record	
	score the task (e.g.,	Task sheet or other method to record	Task sheet or other method to record	student response for scoring.	
	worksheet, camera	student response for scoring.	student response for scoring.		
	to take picture of				
	product,				
	manipulatives)				
Variable	Features that could	Question presentation	Question presentation	Question presentation individualized	
Features for	be changed to	individualized (e.g., related in sign	individualized (e.g., related in sign	(e.g., related in sign language;	

Administra-	impact item	language; verbal/gestural prompts	language; verbal/gestural prompts	verbal/gestural prompts
tion to	accessibility for	individualized)	individualized)	individualized)
Individual	individual student	 Response format individualized 	Response format individualized	 Response format individualized
Students	needs (e.g., as	based on student communication	based on student communication	based on student communication
	specified in the	system	system	system
	student's IEP)			

Updated Flowers/Browder Math DOK¹:

- 1. Attention: touch, look, listen, repeat what the teacher said, vocalize, respond, attend, recognize
- 2. Memorize/recall: list, describe (facts), state math facts, identify, state, define, match, recognize, label, follow a pattern
- 3. **Performance:** answer, follow 1 step directions, find answer, present, read, separate, spell, tell time, map, model demonstration, perform, demonstrate, follow, choose, count, locate, group by given attributes, solve simple (one computation skill) problems, measure
- 4. **Comprehension:** understand, extend a pattern, sketch, ask and answer questions, categorize/group by unknown attributes, explain, conclude, group, restate, review, translate, classify/sort with understanding, simplify (equivalent forms)
- 5. **Application:** compute, organize, collect (such as data), apply, revise, construct, solve complex (multiple computation skills) problems, use given formulas in novel situations (formula may or may not be identified), explain a process, conduct research
- 6. Analysis, Synthesis, Evaluation: create a complex pattern, analyze, compare, contrast, compose, predict, plan, judge, evaluate, interpret data, generalize findings, create hypotheses

¹ Bechard, S., Almond, P., Karvonen, M., Wakeman, S., Turner, C., Bowen, T., & Turner, L. (2009). *Hitting a moving target: A discussion of ten alignment studies for AA-AAS.* Paper presented at the National Conference on Student Assessment. Los Angeles, CA June 23, 2009.

Alternate Assessment Design—Mathematics Task Tryouts

Data Analysis & Probability B1 Grades 3-5: Materials and Instructions

November 2010

SRI International Center for Education and Human Services Center for Technology in Learning

Overview and Purpose of Task Tryouts

Over the past 12 months, researchers from SRI International and personnel from your state office of education have collaborated closely to develop assessment tasks in mathematics designed for students with significant cognitive disabilities. These tasks have been crosswalked with the National Council of Teachers of Mathematics' Principles and Standards for School Mathematics but have been reduced in depth, breadth, and complexity. The tasks were developed using principles of Universal Design for Learning and are intended to be appropriate for students with significant cognitive disabilities who participate in your state's alternate assessment based on alternate achievement standards.

Each task will be administered to six students: two students who are at a high communication level, two who are at a medium communication level, and two who are at a low communication level. This document provides step-by-step scripts, instructions, and materials for each item. We ask that you follow these instructions very carefully to ensure that the data collected are of the highest quality so that we can gather reliable information about the tasks and determine whether any revisions to them are needed.

This document is divided into four sections:

- Background information on a task
- General instructions for administering items
- Detailed instructions for administering items
- Task materials for each item.

Section 1: Background Information on Task

This table describes the basic attributes and general information for Data Analysis & Probability B1 grades 3-5 (DataB1 g3-5).

Attributes	General Information
Math Strand	Data Analysis & Probability
Grade Band	Grades 3-5
Task Code	DataB1 g3-5
Assessment Target	Describe the shape and important features of a set of data and compare related data sets, with an emphasis on how the data are distributed
Rationale: Why is this important to learn?	In grades 3-5, students make an important transition from examining individual pieces of data to understanding that data come in sets and data are distributed over some range. This leads to more sophisticated ideas in data analysis in math.

Section 2: General Instructions for Administering Items

This section first describes an overview of item administration and then provides detailed scripts, materials, and instructions for administering, scoring, and reporting each item within a task.

General Administration Guidelines

Highlights for administering tasks are provided below; more detailed instructions for task administration are provided in the following section, Task Presentation.

- Choose a location with few, if any, distractions and appropriate furniture.
- Choose a time of day when the student will be alert and able to pay attention and respond.
- On the day of the Task Tryout, **do not** instruct the student on the content of the task.
- Before presenting the item directions and student materials, make sure the student is attending or gain the student's attention.
- While administering the task, maintain a neutral demeanor.
- Do not provide prompts or hints that might "give away" the correct answer.
- Use familiar gestures and prompts to refocus the student if necessary.
- You may provide a break if the student requires one.
- If the student DOES NOT RESPOND to an item the first time you read it, you may repeat the item **one** time after refocusing the student's attention.
- Remember, this is an assessment task rather than an instructional activity. Although a task might be changed to meet needs presented by the student's disability, each item should be presented so that the student responds independently.

Task Presentation

- Each task contains three items, which must be administered in a specific order (see Figure 1 on page 6):
 - o All students are administered Item A1.
 - Students who respond incorrectly or do not respond to Item A1 are administered Item A2. This completes the Task Tryout for these students.
 - Students who refuse to answer Item A1 are not administered any additional items. This completes the Task Tryout for these students.
 - All students who respond correctly to Item A1 are administered Item B and then Item C. This completes the Task Tryout for these students.
- Each task and its three items have specific administration instructions and a script for teachers to use (these are included in Section 3). Follow the instructions and script for the specific task you are administering. Instructions include:
 - Item Directions: The directions for each item describe what the teacher says and what the teacher does to administer each item. Follow the detailed directions in Section 3, saying the words (in bold) in the script and presenting the item materials as directed (unbolded text). When portions of the detailed directions are in brackets (e.g., [Look at/touch/point to]), this indicates that you should chose the directions most appropriate for the student participating in the Task Tryout.
 - **Materials:** The materials to be presented with a particular item are described in Section 3. Some materials are printed pages with graphics or illustrations to which the student responds. These graphics and illustrations are provided in Section 4. You may need to print and cut out the graphics or illustrations.
 - Student Responses: The correct student response is also described in Section 3. Student responses may vary so that one student points to a selection, another names his/her selection verbally or in sign language, and another presses a switch. Each student will communicate his/her selection in a manner consistent with typical responding in the classroom.

Figure 1: Flowchart of Task Administration



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Appendix C: Data Analysis and Probability Exemplar Task Section 3: Detailed Instructions for Administering Items

Item A1

Steps	Scripts, materials, and student responses	Directions for scoring, reporting, and moving to the next item
Directions: What the teacher says (bold script) and does (regular text)	 Examiner presents a pictograph about the number of dogs and cats that students have as pets. Examiner says, "Here is a pictograph that shows the number of students who have dogs & the number of students who have cats. How many students have dogs? Examiner presents each response on its own card and says, "Do three students have dogs [presents card with three students] or does one student have a dog [presents card with one student]?" 	If you change the directions to meet individual needs of the student, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
Materials: What	Pictograph showing the number of dogs and cats that	If you change materials, indicate the changes in
the student perceives	students have as pets: Dog Cat Dog Cat V	Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.

Steps	Scripts, materials, and student responses	Directions for scoring, reporting, and moving to the next item
Student <i>Correct</i> response	Student indicates 3.	Mark "Correct" in Section 1 of the Data Collection Booklet if the response was independent and consistent with the student's typical response mode. MOVE TO ITEM B.
Student Incorrect response [†]	 Student indicates 1. Student repeats, "Cats and dogs." Student says, "I don't know." 	Mark "Incorrect" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. MOVE TO ITEM A2.
Student No Response doesn't respond to question [†]	 Student claps hands Student stares at wall Student hums with eyes closed 	 c) Obtain the student's attention and repeat the directions. d) If the student still doesn't respond, record the student's lack of response in Section 1 of the Data Collection Booklet. MOVE TO ITEM A2.
Student Refused to Respond [†]	 Student says (signs or gestures) "No" or "I don't want to" Student pushes task materials away 	Mark "Refused" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. STOP TASK ●

Appendix C: Data Analysis and Probability Exemplar Task <u>Item A2</u>

Steps	Scripts, materials, and student responses	Directions for scoring, reporting, and moving to the next item
<i>Directions:</i> What the teacher says (bold script) and does (regular text)	If the student cannot respond, the examiner covers column that shows number of students who has a cat, and says, "Look at/touch the students who have dogs."	If you change the directions to meet individual needs of the student, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
<i>Materials:</i> What the student perceives	Dog Cat	If you change materials, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
Student Correct response	Student looks/touch the students who have dogs.	Mark "Correct" in Section 1 of the Data Collection Booklet if the response was independent and consistent with the student's typical response mode. STOP TASK ●
Student Incorrect response [†]	Student echoes, "dogs."Student says, "I don't know."	Mark "Incorrect" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. STOP TASK ●
Student No Response doesn't respond to question [†]	 Student claps hands. Student stares at wall. Student hums with eyes closed. 	 c) Obtain the student's attention and repeat the directions. d) If the student still doesn't respond, record the student's lack of response in Section 1 of the Data Collection Booklet. STOP TASK ●
Student Refused to Respond†	 Student says (signs or gestures) "No" or "I don't want to." Student pushes task materials away. 	Mark "Refused" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. STOP TASK ●

Steps	Scripts, materials, and student responses	Directions for scoring, reporting, and moving to the next item
<i>Directions:</i> What the teacher says (bold script) and does (regular text)	The student is presented with a bar graph about the number of students in a class with different color hair, and the examiner points to the graph and says, "In this graph, we see the number of students that have each hair color. What is the hair color of most students?"	If you change the directions to meet individual needs of the student, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
<i>Materials:</i> What the student perceives	 Bar graph about the number of students in a class with different color hair. store store a Black Blonde Red Hair color 	If you change materials, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
Student Correct response	Student indicates blonde hair.	Mark "Correct" in Section 1 of the Data Collection Booklet if the response was independent and consistent with the student's typical response mode. MOVE TO ITEM C.
Student <i>Incorrect</i> response [†]	Student indicates black or red hair.Student says, "I don't know."	Mark "Incorrect" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. MOVE TO ITEM C.
Student No Response doesn't respond to question [†]	 Student claps hands. Student stares at wall. Student hums with eyes closed. 	 c) Obtain the student's attention and repeat the directions. d) If the student still doesn't respond, record the student's lack of response in Section 1 of the Data Collection Booklet. MOVE TO ITEM C.
Student <i>Refused to</i> <i>Respond</i> [†]	 Student says (signs or gestures) "No" or "I don't want to." Student pushes task materials away. 	Mark "Refused" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. STOP TASK ●

Appendix C: Data Analysis and Probability Exemplar Task <u>Item C</u>

Steps	Scripts, materials, and student responses	Directions for scoring, reporting, and moving to the next item
<i>Directions:</i> What the teacher says (bold script) and does (regular text)	The student is presented with a line plot about the inches of rain that fell each month during the year, and the examiner says, "Rainy season occurs during months of the year that have the most rain. Which month do you think the rainy season starts? Which month do you think the rainy season ends?"	If you change the directions to meet individual needs of the student, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
<i>Materials:</i> What the student perceives	 A line plot about the inches of rain that fell each month during the year: 	If you change materials, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
Student Correct response	Student indicates June through October.	Mark "Correct" in Section 1 of the Data Collection Booklet if the response was independent and consistent with the student's typical response mode. STOP TASK ●
Student Incorrect response [†]	 Student indicates a range of months besides June through October. Student echoes the question or says, "I don't know." 	Mark "Incorrect" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. STOP TASK ●
Student No Response doesn't respond to question [†]	 Student claps hands. Student stares at wall. Student hums with eyes closed. 	 c) Obtain the student's attention and repeat the directions. d) If the student still doesn't respond, record the student's lack of response in Section 1 of the Data Collection Booklet. STOP TASK ●
Student Refused to Respond†	 Student says (signs or gestures) "No" or "I don't want to." Student pushes task materials away. 	Mark "Refused" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. STOP TASK ●

Appendix C: Data Analysis and Probability Exemplar Task Section 4: Task Materials for Each Item

Appendix C: Data Analysis and Probability Exemplar Task Data Analysis & Probability B1, grades 3-5 Item A1







Data Analysis & Probability B1, grades 3-5 Item A2



Data Analysis & Probability B1, grades 3-5 Item B



Appendix C: Data Analysis and Probability Exemplar Task Data Analysis & Probability B1, grades 3-5 Item C



Appendix D: Geometry Exemplar Task¹

¹ In the Task Template, the most difficult item is named item 1, the easier item is named item 2, and the easiest items are named item 3a and item 3b. The Materials and Instructions document, which was created for pilot testing the items, instructs administrators to administer the easiest items first (item 3a/b). To reduce administrator error, the items were renamed. In the Materials and Instructions document, the easiest items are named A1 and A2, then next most difficult item is named item B, and the most difficult item is named item C.

Task/Item Development Geometry A1 (grades 6-8)

Attributes	General Information			
Title	Geometry A1 (grades 6-8)			
Summary	Precisely describe, cl	Precisely describe, classify, and understand relationships among types of two- and three-dimensional objects using their defining properties		
Rationale	Analyzing defining pr	Analyzing defining properties of geometric shapes leads directly to high school geometry and other kinds of deductive reasoning		
Grade level	Explore a variety of g	eometric shapes and examine their charact	eristics.	
standards	Explore using materia	als such as geoboards, dot paper, multiple-l	ength cardboard strips with hinges, and	I dynamic geometry software to create
(from NCTM)	two-dimensional sh	lapes.		
	Students must carefu	Illy examine the features of shapes in order	to precisely define and describe fundar	nental shapes, such as special types of
	quadrilaterals, and	to identify relationships among the types of	shapes.	
		Item 1	Item 2	Item 3a/3b
		Application/Comprehension/	Performance/Recall	Recall/Attention
Attributes	Definition	Performance		
Focal KSA	Focal KSA from DP	 Ability to classify two- and three-dimens 	ional geometric shapes using their	 Ability to identify properties of two-
	for Items 1 & 2;	defining properties (e.g., determine which	ch of a set of quadrilaterals are	and three-dimensional geometric
	Add I KSA from DP	parallelograms based on a definition of	parallelograms)	shapes
Detential	Observed	Otividant compatible containte internetione		Not oddrogood in DD
Observations	behaviora of	 Student correctly sorts into groups two- shapes based on their defining properties 	and/or three-dimensional geometric	Not addressed in DP
from DP	students that can	Shapes based on their defining propertie	to a financiation alternation that have	
	provide evidence of	 Student correctly identifies from a group a specified defining property (e.g., show 	o of geometric shapes those that have	
	the Focal KSA	a specified defining property (e.g., show show me all the shapes with four right a	show me all the shapes with four right angles)	
Potential Work	What students say	Demonstration of sorting geometric share	ngies)	Not addressed in DP
Products	do or make that	Selection from a group of geometric shapes in the selection from a group of geometric shape	bes based on their defining properties	
1100000	provides evidence	property	pes mose with a specified defining	
	about the Focal	 Selection of shapes with a specified defining property on a worksheet 		
	KSA	containing nictorial representations of two- or three-dimensional geometric		
		shapes		
Characteristic	Aspects of	All tasks will include two- or three-dimensional geometric shapes (shapes taught in each state)		
Features	assessment	All tasks will involve technical mathematics vocabulary		
	situations likely to	All tasks will include representations of geometric shapes		
	evoke the desired	 Individual student responses, not group 	responses	
	evidence	Tasks are individually administered by a teacher or trained administrator		
		Accommodations allowed		
		 Test administrator knows student and hi 	is/her comprehension/response abilities	3
		 Periodic collection of work samples (for 	portfolios)	
		Word problems	F	
Potential	Features that could	 The number of representations to be us 	ed	
Variable	be changed to	Use of concrete or pictorial representation	ons	
Features/	impact item	Use of 2- or 3-dimensional shapes		

Scaffolding	difficulty	 Type of shapes DOK level (Application/Comprehension/ Performance/Recall) Number of attributes to be identified Amount and type of scaffolding Embedded support for vocabulary and symbols (e.g., technical and non-technical glossary—names of two- and three- dimensional shapes and their defining characteristics, hyperlinks/ footnotes to definitions, illustrations, background knowledge) Use of multiple representations (e.g., physical models, demonstrations, acting out scenarios) Depth of knowledge of the content (e.g., use of two- or three-dimensional geometric shapes or a combination of the two- the number of objects included in a problem number of defining attributes for a group of chipter) 		
Selected Variable Features/ Scaffolding for the Item	From Item 1 to Item 3: • Reduce DOK • Reduce scope • Increase scaffolding	 DOK level: Performance (group by given attributes attributes) 4 representations Pictorial representations 2-dimensional objects Type of shapes: a trapezoid, a trapezoid with a right angle, a parallelogram, and a pentagon with one pair of parallel sides Two attributes to be identified (parallel sides and number of sides) Scaffolding (attributes identified, shapes on graph paper) 	 DOK level: Performance (group by given attributes) 3 representations Pictorial representations 2-dimensional objects Type of shapes: square, rhombus, and trapezoid One attribute to be identified (sides of equal length) Scaffolding (attribute identified) 	 DOK level: Recall (identify, recognize)/Attention 2 representations Pictorial representations 2-dimensional objects Type of shapes: a trapezoid and an irregular quadrilateral One attribute to be identified (parallel sides) Scaffolding (attribute identified, shapes on grid paper, gestural prompts)
Item Directive	The stem or question (includes description and number of distractors if applicable)	Examiner says, "Here is a shape with 4 sides. Only one pair of the sides is parallel (examiner indicates the 4 sides and the parallel sides on a trapezoid then puts the trapezoid aside). Here are 4 more shapes (examiner indicates the handout). Show me the shapes that also have 4 sides and only one pair of parallel sides."	Examiner says, "All the sides of this shape are the same length. Each side is three inches long (examiner indicates four sides of rhombus). Here are 3 more shapes. Show me which of these shapes also have sides that are all the same length."	 3a. Examiner says, "These lines are parallel (examiner indicates drawing of 2 parallel lines on a grid). Which of these shapes has sides that are parallel (examiner indicates handout with 2 shapes)?" 3b. If student cannot answer, examiner removes the irregular shape and says, "Show me/touch/indicate the shape with parallel sides."
Correct Answer Description of Stimulus Items	Correct answer for the item Description of the graphics or objects used in administration of the task	 Student identifies the 2 trapezoids Illustration 1: handout with a typical trapezoid (symmetric and a little wider that it is tall) Illustration 2: handout with 4 shapes: a trapezoid, a trapezoid with a right angle, a parallelogram, and a pentagon with one pair of parallel 	 Student identifies the square and the rhombus Illustration 1: Handout with a rhombus with the side lengths labeled Illustration 2: Handout with 3 quadrilaterals: a square, a rhombus, and a trapezoid, all with the side lengths labeled 	 3a. Student indicates the trapezoid 3b. Student indicates the trapezoid Handout with 2 parallel lines drawn on a grid. Handout with 2 quadrilaterals (a trapezoid and an irregular 4-sided figure) drawn on a grid. Option 1: figures printed portrait Option 2: figures printed landscape

		sides		
Materials for Examiner	Materials required to administer, document, and score the task (e.g., worksheet, camera to take picture of product, manipulatives)	 Task worksheet that describes item and delivery instructions Task data sheet or other method to record student's response 	 Task worksheet that describes item and delivery instructions Task data sheet or other method to record student's response 	 Task worksheet that describes item and delivery instructions Task data sheet or other method to record student's response
Variable Features for Administra- tion to Individual Students	Features that could be changed to impact item accessibility for individual student needs (e.g., as specified in the student's IEP)	 Question presentation individualized (e.g., related in sign language, use concrete objects, geoboard, shapes outlined in glue so that they are raised) Response format individualized based on student communication system Remind student of prior experiences Verbal/gestural prompts individualized 	 Question presentation individualized (e.g., related in sign language, use concrete objects, geoboard, shapes outlined in glue so that they are raised) Response format individualized based on student communication system Remind student of prior experiences Verbal/gestural prompts individualized 	 Question presentation individualized (e.g., related in sign language, use concrete objects, geoboard, shapes outlined in glue so that they are raised) Response format individualized based on student communication system Remind student of prior experiences Verbal/gestural prompts individualized

Updated Flowers/Browder Math DOK²:

- 1. Attention: touch, look, listen, repeat what the teacher said, vocalize, respond, attend, recognize
- 2. Memorize/recall: list, describe (facts), state math facts, identify, state, define, match, recognize, label, follow a pattern
- 3. **Performance:** answer, follow 1 step directions, find answer, present, read, separate, spell, tell time, map, model demonstration, perform, demonstrate, follow, choose, count, locate, group by given attributes, solve simple (one computation skill) problems, measure
- 4. **Comprehension:** understand, extend a pattern, sketch, ask and answer questions, categorize/group by unknown attributes, explain, conclude, group, restate, review, translate, classify/sort with understanding, simplify (equivalent forms)
- 5. **Application:** compute, organize, collect (such as data), apply, revise, construct, solve complex (multiple computation skills) problems, use given formulas in novel situations (formula may or may not be identified), explain a process, conduct research
- 6. Analysis, Synthesis, Evaluation: create a complex pattern, analyze, compare, contrast, compose, predict, plan, judge, evaluate, interpret data, generalize findings, create hypotheses

² Bechard, S., Almond, P., Karvonen, M., Wakeman, S., Turner, C., Bowen, T., & Turner, L. (2009). *Hitting a moving target: A discussion of ten alignment studies for AA-AAS.* Paper presented at the National Conference on Student Assessment. Los Angeles, CA June 23, 2009.

Alternate Assessment Design—Mathematics Task Tryouts

Geometry A1 Grades 6-8: Materials and Instructions

UT, ID, FL October 2010

SRI International Center for Education and Human Services Center for Technology in Learning

For more information contact Kathryn Morrison, (650) 859-3922, <u>kathryn.morrison@sri.com</u>

Overview and Purpose of Task Tryouts

Over the past 12 months, researchers from SRI International and personnel from your state office of education have collaborated closely to develop assessment tasks in mathematics designed for students with significant cognitive disabilities. These tasks have been crosswalked with the National Council of Teachers of Mathematics' Principles and Standards for School Mathematics but have been reduced in depth, breadth, and complexity. The tasks were developed using principles of Universal Design for Learning and are intended to be appropriate for students with significant cognitive disabilities who participate in your state's alternate assessment based on alternate achievement standards.

Each task will be administered to six students: two students who are at a high communication level, two who are at a medium communication level, and two who are at a low communication level. This document provides step-by-step scripts, instructions, and materials for each item. We ask that you follow these instructions very carefully to ensure that the data collected are of the highest quality so that we can gather reliable information about the tasks and determine whether any revisions to them are needed.

This document is divided into four sections:

- Background information on a task
- General instructions for administering items
- Detailed instructions for administering items
- Task materials for each item.

Section 1: Background Information on Task

This table describes the basic attributes and general information for Geometry A1 grades 6-8 (GeoA1 g6-8).

Attributes	General Information
Math Strand	Geometry
Grade Band	Grades 6-8
Task Code	GeoA1 g6-8
Assessment Target	Precisely describe, classify, and understand relationships among types of two- and three-dimensional objects using their defining properties.
Rationale: Why is this important to learn?	Analyzing defining properties of geometric shapes leads directly to high school geometry and other kinds of deductive reasoning.

Section 2: General Instructions for Administering Items

This section first describes an overview of item administration and then provides detailed scripts, materials, and instructions for administering, scoring, and reporting each item within a task.

General Administration Guidelines

Highlights for administering tasks are provided below; more detailed instructions for task administration are provided in the following section, Task Presentation.

- Choose a location with few, if any, distractions and appropriate furniture.
- Choose a time of day when the student will be alert and able to pay attention and respond.
- On the day of the Task Tryout, **do not** instruct the student on the content of the task.
- Before presenting the item directions and student materials, make sure the student is attending or gain the student's attention.
- While administering the task, maintain a neutral demeanor.
- Do not provide prompts or hints that might "give away" the correct answer.
- Use familiar gestures and prompts to refocus the student if necessary.
- You may provide a break if the student requires one.
- If the student DOES NOT RESPOND to an item the first time you read it, you may repeat the item **one** time after refocusing the student's attention.
- Remember, this is an assessment task rather than an instructional activity. Although a task might be changed to meet needs presented by the student's disability, each item should be presented so that the student responds independently.

Task Presentation

- Each task contains three items, which must be administered in a specific order (see Figure 1 on page 6):
 - o All students are administered Item A1.
 - Students who respond incorrectly or do not respond to Item A1 are administered Item A2. This completes the Task Tryout for these students.
 - Students who refuse to answer Item A1 are not administered any additional items. This completes the Task Tryout for these students.
 - All students who respond correctly to Item A1 are administered Item B and then Item C. This completes the Task Tryout for these students.
- Each task and its three items have specific administration instructions and a script for teachers to use (these are included in Section 3). Follow the instructions and script for the specific task you are administering. Instructions include:
 - Item Directions: The directions for each item describe what the teacher says and what the teacher does to administer each item. Follow the detailed directions in Section 3, saying the words (in bold) in the script and presenting the item materials as directed (unbolded text). When portions of the detailed directions are in brackets (e.g., [Look at/touch/point to]), this indicates that you should chose the directions most appropriate for the student participating in the Task Tryout.
 - **Materials:** The materials to be presented with a particular item are described in Section 3. Some materials are printed pages with graphics or illustrations to which the student responds. These graphics and illustrations are provided in Section 4. You may need to print and cut out the graphics or illustrations.
 - Student Responses: The correct student response is also described in Section 3. Student responses may vary so that one student points to a selection, another names his/her selection verbally or in sign language, and another presses a switch. Each student will communicate his/her selection in a manner consistent with typical responding in the classroom.

Figure 1: Flowchart of Task Administration



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Section 3: Detailed Instructions for Administering Items

Item A1

Steps	Scripts, materials, and student responses	Directions for scoring, reporting, and moving to the next item
<i>Directions:</i> What the teacher says (bold script) and does (regular text)	Teacher/administrator says, These lines are parallel (teacher indicates drawing of two parallel lines on a grid, Item A Illustration 1). Which of these shapes has sides that are parallel (teacher/administrator indicates handout with two shapes, Item A Illustration 2)?	If you change the directions to meet individual needs of the student, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
<i>Materials:</i> What the student perceives	 Item A Illustration 1: Handout with two parallel lines drawn on a grid. Item A Illustration 2: Handout with two quadrilaterals (a trapezoid and an irregular four-sided figure) drawn on a grid. 	If you change materials, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
Student <i>Correct</i> response	Student indicates the trapezoid (e.g., student points, student marks with an X, student says "the red one")	Mark "Correct" in Section 1 of the Data Collection Booklet if the response was independent and consistent with the student's typical response mode. MOVE TO ITEM B.
Student <i>Incorrect</i> response [†]	 Student indicates the irregular quadrilateral Student points to the parallel lines on the grid Student says "I don't know" Student echoes "parallel" 	Mark "Incorrect" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. MOVE TO ITEM A2.
Student No Response doesn't respond to question [†]	 Student claps hands Student stares at wall Student hums with eyes closed 	 e) Obtain the student's attention and repeat the directions. f) If the student still doesn't respond, record the student's lack of response in Section 1 of the Data Collection Booklet. MOVE TO ITEM A2.
Student Refused to Respond [†]	 Student says (signs or gestures) "No" or "I don't want to" Student pushes task materials away 	Mark "Refused" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. STOP TASK ●

Steps	Scripts, materials, and student responses	Directions for scoring, reporting, and moving to the next item
<i>Directions:</i> What the teacher says (bold script) and does (regular text)	If student does not respond to Item A1 or responds incorrectly, teacher/administrator covers the irregular shape so that only the trapezoid is showing and says, [Show me/touch/look at] the shape with parallel sides.	If you change the directions to meet individual needs of the student, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
<i>Materials:</i> What the student perceives	 Item A Illustration 2: Handout with two quadrilaterals (a trapezoid and an irregular four-sided figure) drawn on a grid with the irregular shape covered. 	If you change materials, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
Student Correct response	Student indicates the trapezoid	Mark "Correct" in Section 1 of the Data Collection Booklet if the response was independent and consistent with the student's typical response mode. STOP TASK ●
Student Incorrect response [†]	Student says "I don't know"Student echoes "sides"	Mark "Incorrect" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. STOP TASK ●
Student No Response doesn't respond to question [†]	 Student claps hands Student stares at wall Student hums with eyes closed 	 e) Obtain the student's attention and repeat the directions. f) If the student still doesn't respond, record the student's lack of response in Section 1 of the Data Collection Booklet. STOP TASK ●
Student Refused to Respond ^t	 Student says (signs or gestures) "No" or "I don't want to" Student pushes task materials away 	Mark "Refused" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. STOP TASK ●

Steps	Scripts, materials, and student responses	Directions for scoring, reporting, and moving to the next item
<i>Directions:</i> What the teacher says (bold script) and does (regular text)	Teacher/administrator shows student Item B Illustration 1 and says, All the sides of this shape are the same length. Each side is three inches long (indicates four sides of rhombus). Teacher/ administrator shows student Item B Illustration 2 and says, Here are three more shapes. Show me which of these shapes also have sides that are all the same length.	If you change the directions to meet individual needs of the student, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
<i>Materials:</i> What the student perceives	 Item B Illustration 1: a rhombus with the side lengths labeled Item B Illustration 2: three quadrilaterals: a square, a rhombus, and a trapezoid, all with the side lengths labeled 	If you change materials, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
Student Correct response	Student identifies the square and the rhombus	Mark "Correct" in Section 1 of the Data Collection Booklet if the response was independent and consistent with the student's typical response mode. MOVE TO ITEM C.
Student <i>Incorrect</i> response [†]	 Student indicates only the square Student indicates only the rhombus Student says "I don't know" Student echoes "sides the same" 	Mark "Incorrect" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. MOVE TO ITEM C.
Student No Response doesn't respond to question [†]	 Student claps hands Student stares at wall Student hums with eyes closed 	 g) Obtain the student's attention and repeat the directions. h) If the student still doesn't respond, record the student's lack of response in Section 1 of the Data Collection Booklet. MOVE TO ITEM C.
Student Refused to Respond [†]	 Student says (signs or gestures) "No" or "I don't want to" Student pushes task materials away 	Mark "Refused" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. STOP TASK ●

Steps	Scripts, materials, and student responses	Directions for scoring, reporting, and moving to the next item
<i>Directions:</i> What the teacher says (bold script) and does (regular text)	Teacher/administrator shows student Item C Illustration 1 and says, Here is a shape with four sides. Only one pair of the sides is parallel (indicates the four sides and the parallel sides on the trapezoid, then puts the trapezoid aside). Teacher/administrator shows student Item C Illustration 2 and says, Here are four more shapes. Show me the shapes that also have four sides and only one pair of parallel sides.	If you change the directions to meet individual needs of the student, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
<i>Materials:</i> What the student perceives	 Item C Illustration 1: a typical trapezoid (symmetric and a little wider than it is tall) Item C Illustration 2: four shapes: trapezoid, trapezoid with right angle, parallelogram, and pentagon with one pair of parallel sides 	If you change materials, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
Student Correct response	Student identifies the two trapezoids	Mark "Correct" in Section 1 of the Data Collection Booklet if the response was independent and consistent with the student's typical response mode. STOP TASK ●
Student <i>Incorrect</i> response [†]	 Student indicates one trapezoid Student says "I don't know" Student echoes "four sides" 	Mark "Incorrect" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. STOP TASK ●
Student No Response doesn't respond to question [†]	 Student claps hands Student stares at wall Student hums with eyes closed 	 e) Obtain the student's attention and repeat the directions. f) If the student still doesn't respond, record the student's lack of response in Section 1 of the Data Collection Booklet. STOP TASK ●
Student Refused to Respond [†]	 Student says (signs or gestures) "No" or "I don't want to" Student pushes task materials away 	Mark "Refused" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. STOP TASK ●

Section 4: Task Materials for Each Item

Appendix D: Geometry Exemplar Task Geometry A1, grades 6-8 Item A Illustration 1



Appendix D: Geometry Exemplar Task Geometry A1, grades 6-8 Item A Illustration 2



Appendix D: Geometry Exemplar Task Geometry A1, grades 6-8 Item B Illustration 1



Appendix D: Geometry Exemplar Task Geometry A1, grades 6-8 Item B Illustration 2



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Appendix D: Geometry Exemplar Task Geometry A1, grades 6-8 Item C Illustration 1


Appendix D: Geometry Exemplar Task Geometry A1 grades 6-8 Item C Illustration 2



Appendix E: Measurement Exemplar Task¹

¹ In the Task Template, the most difficult item is named item 1, the easier item is named item 2, and the easiest items are named item 3a and item 3b. The Materials and Instructions document, which was created for pilot testing the items, instructs administrators to administer the easiest items first (item 3a/b). To reduce administrator error, the items were renamed. In the Materials and Instructions document, the easiest items are named A1 and A2, then next most difficult item is named item B, and the most difficult item is named item C.

Task/Item Development Measurement B2 (grades 3-5)

Attributes	General Information					
Title	Measurement B2 (grades 3-5)					
Summary	Select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature, and the size of angles					
Rationale	Length is fundamental	to calculating and understanding formulas for	measurements of area and volume. Ler	igth is also a very common component		
	or real world proble	Ins. Also, when creating graphs to represent o	quantities, many quantities such as time,	weight and volume are represented		
Grada loval	Expand number of tool	iony an axis.				
standards	Develop strategies to e	stimate measurements				
(from NCTM)	Begin work with formula	as (e.g. length x width = area)				
	Develop strategies for (determining surface area and volume on the b	pasis of concrete experiences			
	When using convention	hal tools such as rulers and tape measures for	r measuring length, students will need in	struction to learn to use these tools		
	properly. For example	e, they will need to recognize and understand	I the markings on a ruler, including where	e the "0," or beginning point, is located.		
	When standard measu	rement tools are difficult to use in a particular	situation, students must learn to adapt th	neir tools or invent techniques that will		
	work. For example, n	neasuring the circumference of a clock face w	vith a rigid ruler presents a particular cha	llenge. Using string or some other		
	flexible object to outli	ne the clock face and then measuring the stri	ng would be a good strategy.			
	Students should be cha	allenged to develop measurement techniques	as needed in order to measure complex	figures or objects. For example, they		
	might measure the a	rea of an irregular polygon or a leaf by coverir	ng it with transparent grid paper and cou	might measure the area of an irregular polygon or a leaf by covering it with transparent grid paper and counting units or by breaking it apart into		
	regular shapes that they can measure.					
	regular shapes that the	ney can measure.	ltarra 0	K		
Attributes	regular shapes that the	ney can measure. Item 1	Item 2	Item 3a/3b		
Attributes	Definition	hey can measure. Item 1 Application/Comprehension/ Performance	Item 2 Performance/Recall	Item 3a/3b Recall/Attention		
Attributes Focal KSA	Definition	Item 1 Application/Comprehension/ Performance • Ability to use tools to measure	Item 2 Performance/Recall	Item 3a/3b Recall/Attention • Knowledge of tools for		
Attributes Focal KSA	regular shapes that the second secon	Application/Comprehension/ Performance Ability to use tools to measure	Item 2 Performance/Recall	Item 3a/3b Recall/Attention • Knowledge of tools for measurement		
Attributes Focal KSA	regular shapes that the shapes th	hey can measure. Item 1 Application/Comprehension/ Performance Ability to use tools to measure Student correctly demonstrates understance	Item 2 Performance/Recall	Item 3a/3b Recall/Attention • Knowledge of tools for measurement		
Attributes Focal KSA Potential	Focal KSA from DP for Items 1 & 2; Add'I KSA for Item 3 Observed behaviors of students that can	Item 1 Application/Comprehension/ Performance Ability to use tools to measure Student correctly demonstrates understan	Item 2 Performance/Recall	Item 3a/3b Recall/Attention • Knowledge of tools for measurement • Student correctly identifies measurement tools (e.g., which is		
Attributes Focal KSA Potential Observations from DP	regular shapes that the provide shapes the provide shapes that the provide shapes that the provide shapes that the provide shapes that the provide shapes the provide sha	Item 1 Application/Comprehension/ Performance Ability to use tools to measure Student correctly demonstrates understan selecting the appropriate tool, using the to measurement with the correct notation (e)	Item 2 Performance/Recall noting of measurement concepts by pool correctly, and expressing the correct q_if asked for the length of a	Item 3a/3b Recall/Attention • Knowledge of tools for measurement • Student correctly identifies measurement tools (e.g., which is a ruler? which is a measuring		
Attributes Focal KSA Potential Observations from DP	regular shapes that the provide shapes the provide shapes that the provide shapes the provid	Item 1 Application/Comprehension/ Performance Ability to use tools to measure Student correctly demonstrates understant selecting the appropriate tool, using the to measurement with the correct notation (e. rectangle, measures the distance between the distance betw	Item 2 Performance/Recall noting of measurement concepts by pol correctly, and expressing the correct .g., if asked for the length of a n 2 sides with a ruler, and expresses	Item 3a/3b Recall/Attention • Knowledge of tools for measurement • Student correctly identifies measurement tools (e.g., which is a ruler? which is a measuring cup?) ¹		
Attributes Focal KSA Potential Observations from DP	regular shapes that theDefinitionFocal KSA from DPfor Items 1 & 2; Add'IKSA for Item 3Observed behaviorsof students that canprovide evidence ofthe Focal KSA	Item 1 Application/Comprehension/ Performance Ability to use tools to measure Student correctly demonstrates understan selecting the appropriate tool, using the to measurement with the correct notation (e. rectangle, measures the distance between measurement correctly in inches/cm)	Item 2 Performance/Recall nding of measurement concepts by pol correctly, and expressing the correct .g., if asked for the length of a n 2 sides with a ruler, and expresses	Item 3a/3b Recall/Attention • Knowledge of tools for measurement • Student correctly identifies measurement tools (e.g., which is a ruler? which is a measuring cup?) ¹		
Attributes Focal KSA Potential Observations from DP Potential	regular shapes that the provide shapes that the provide shapes that the provide shapes that can provide evidence of the Focal KSA What students say,	Item 1 Application/Comprehension/ Performance Ability to use tools to measure Student correctly demonstrates understan selecting the appropriate tool, using the to measurement with the correct notation (e. rectangle, measures the distance between measurement correctly in inches/cm) Student measures an object and reports to	Item 2 Performance/Recall nding of measurement concepts by pol correctly, and expressing the correct .g., if asked for the length of a n 2 sides with a ruler, and expresses he measurement (e.g., the length of a	Item 3a/3b Recall/Attention • Knowledge of tools for measurement • Student correctly identifies measurement tools (e.g., which is a ruler? which is a measuring cup?) ¹ • Student selects measurement tool		
Attributes Focal KSA Potential Observations from DP Potential Work	regular shapes that theDefinitionFocal KSA from DPfor Items 1 & 2; Add'IKSA for Item 3Observed behaviorsof students that canprovide evidence ofthe Focal KSAWhat students say,do, or make that	Item 1 Application/Comprehension/ Performance Ability to use tools to measure Student correctly demonstrates understan selecting the appropriate tool, using the to measurement with the correct notation (e. rectangle, measures the distance between measurement correctly in inches/cm) Student measures an object and reports t line using a ruler)	Item 2 Performance/Recall noting of measurement concepts by pool correctly, and expressing the correct .g., if asked for the length of a n 2 sides with a ruler, and expresses he measurement (e.g., the length of a	Item 3a/3b Recall/Attention • Knowledge of tools for measurement • Student correctly identifies measurement tools (e.g., which is a ruler? which is a measuring cup?) ¹ • Student selects measurement tool from a group of actual		
Attributes Focal KSA Potential Observations from DP Potential Work Products	regular shapes that theDefinitionFocal KSA from DPfor Items 1 & 2; Add'IKSA for Item 3Observed behaviorsof students that canprovide evidence ofthe Focal KSAWhat students say,do, or make thatprovides evidence	Item 1 Application/Comprehension/ Performance • Ability to use tools to measure • Student correctly demonstrates understant selecting the appropriate tool, using the to measurement with the correct notation (e. rectangle, measures the distance between measurement correctly in inches/cm) • Student measures an object and reports the line using a ruler) • Student demonstrates measurement skills	Item 2 Performance/Recall noting of measurement concepts by pol correctly, and expressing the correct .g., if asked for the length of a n 2 sides with a ruler, and expresses the measurement (e.g., the length of a s through authentic tasks (e.g.,	Item 3a/3b Recall/Attention • Knowledge of tools for measurement • Student correctly identifies measurement tools (e.g., which is a ruler? which is a measuring cup?) ¹ • Student selects measurement tool from a group of actual measurement tools or images of		
Attributes Focal KSA Potential Observations from DP Potential Work Products	regular shapes that theDefinitionFocal KSA from DPfor Items 1 & 2; Add'IKSA for Item 3Observed behaviorsof students that canprovide evidence ofthe Focal KSAWhat students say,do, or make thatprovides evidenceabout the Focal KSA	Item 1 Application/Comprehension/ Performance • Ability to use tools to measure • Student correctly demonstrates understant selecting the appropriate tool, using the to measurement with the correct notation (e. rectangle, measures the distance between measurement correctly in inches/cm) • Student measures an object and reports the line using a ruler) • Student demonstrates measurement skills students measure their height using a tape	Item 2 Performance/Recall noting of measurement concepts by pool correctly, and expressing the correct .g., if asked for the length of a n 2 sides with a ruler, and expresses he measurement (e.g., the length of a s through authentic tasks (e.g., e measure)	Item 3a/3b Recall/Attention • Knowledge of tools for measurement • Student correctly identifies measurement tools (e.g., which is a ruler? which is a measuring cup?) ¹ • Student selects measurement tool from a group of actual measurement tools or images of measurement tools ²		
Attributes Focal KSA Potential Observations from DP Potential Work Products Characteristic	regular shapes that theDefinitionFocal KSA from DPfor Items 1 & 2; Add'IKSA for Item 3Observed behaviorsof students that canprovide evidence ofthe Focal KSAWhat students say,do, or make thatprovides evidenceabout the Focal KSAAspects of	Item 1 Application/Comprehension/ Performance • Ability to use tools to measure • Student correctly demonstrates understant selecting the appropriate tool, using the tomeasurement with the correct notation (e. rectangle, measures the distance between measurement correctly in inches/cm) • Student measures an object and reports the line using a ruler) • Student demonstrates measurement skills students measure their height using a tape • All items will reference tools	Item 2 Performance/Recall nding of measurement concepts by pol correctly, and expressing the correct .g., if asked for the length of a n 2 sides with a ruler, and expresses he measurement (e.g., the length of a s through authentic tasks (e.g., e measure)	Item 3a/3b Recall/Attention • Knowledge of tools for measurement • Student correctly identifies measurement tools (e.g., which is a ruler? which is a measuring cup?) ¹ • Student selects measurement tool from a group of actual measurement tools or images of measurement tools ²		
Attributes Focal KSA Potential Observations from DP Potential Work Products Characteristic Features	regular shapes that theDefinitionFocal KSA from DPfor Items 1 & 2; Add'IKSA for Item 3Observed behaviorsof students that canprovide evidence ofthe Focal KSAWhat students say,do, or make thatprovides evidenceabout the Focal KSAAspects ofassessment	Item 1 Application/Comprehension/ Performance • Ability to use tools to measure • Student correctly demonstrates understan selecting the appropriate tool, using the to measurement with the correct notation (e. rectangle, measures the distance betweer measurement correctly in inches/cm) • Student measures an object and reports the line using a ruler) • Student demonstrates measurement skills students measure their height using a tape • All items will involve the measurement of a student of a st	Item 2 Performance/Recall noting of measurement concepts by bol correctly, and expressing the correct .g., if asked for the length of a in 2 sides with a ruler, and expresses the measurement (e.g., the length of a is through authentic tasks (e.g., e measure) an attribute	Item 3a/3b Recall/Attention • Knowledge of tools for measurement • Student correctly identifies measurement tools (e.g., which is a ruler? which is a measuring cup?) ¹ • Student selects measurement tool from a group of actual measurement tools or images of measurement tools ²		

¹ This Potential Observations was originally developed as part of the Design Pattern but is more appropriately applied to foundational knowledge as specified in the KSA for item 3. DP has been revised.

² This Potential Work Product was originally developed as part of the Design Pattern but is more appropriately applied to foundational knowledge as specified in the KSA for item 3. DP has been revised.

	evoke the desired evidence			
Potential Variable Features/ Scaffolding	Features that could be changed to impact item difficulty	 Symbol use (symbols used, only simple Type of measurement (e.g., 1-dimensior Complexity of representation (shape) us Complexity of numbers (e.g., single digit DOK of the task: Item 1: Application, Comprehension, or I Item 2: Performance or Recall Item 3a: Recall Item 3b: Attention Number of measurement tools Use of concrete objects vs. use of image Multi-step vs. single step activity 	symbols used, no symbols used) nal [linear], 2-dimensional [area], 3-dimens ed for measurement purposes (e.g., recta t whole numbers, multi-digit whole number Performance (possibly also Analysis, Synt	sional [volume]) ngle vs. square) s, fractions/decimals) hesis, Evaluation level) (tools)
Selected Variable Features/ Scaffolding for the Item	From Item 1 to Item 3: • Reduce DOK • Reduce scope • Increase scaffolding	 Symbols used (numbers) 1 representation (rectangle) Type of shape measured: rectangle (2- dimensional) Type of measurement: length (1- dimensional) Complexity of numbers: whole numbers 3 measurement tools Concrete objects (tools) DOK level: Performance (Demonstrate) 4 part task: selection of tool, identification of the longest side (the length), use of tool, and expression of measurement units Scaffolding: o Use of concrete objects (tools) Use of familiar shapes and tools 	 Symbols used (numbers) 1 representations (rectangle with the longest side highlighted) Type of shape measured: rectangle (2-dimensional) Type of measurement: length (1-dimensional) Complexity of numbers: only whole numbers 1 measurement tools Concrete objects (tools) DOK level: Performance (Demonstrate) 2 part task: use ruler and indicate length Scaffolding: Use of concrete objects (tools) Use of familiar shapes and tools 	 Either simple symbols (picture of tools) or no symbols (actual tools) 0 representations 2 measurement tools Concrete objects (tools) DOK level: Recall (Identify) 1 part task: identifying tool Scaffolding: Use of concrete objects (tools) Name of tools provided Use of familiar/grade level appropriate measurement tools
Item Directive	I he stem or question (includes description and number of distractors if applicable)	Examiner says, "Measure the length of the longest side of this rectangle."	Examiner says, "Measure the length of the highlighted side of this rectangle."	 3a. Examiner says, "Show me the ruler." 3b. If student cannot respond, examiner removes measuring cup and says, "Look at/touch the ruler."
Correct Answer	Correct answer for the item	Student (1) selects the ruler, (2) identifies the longest side, (3) measures the longest side, and (4) expresses the measurement as 8	Student (1) measures the highlighted side of the rectangle and (2) expresses the measurement as 8 inches.	Student indicates the ruler.

A. A				
		inches.		
Description of Stimulus Items	Description of the graphics or objects used in administration of the task	Student provided with a drawing of a rectangle that is 4 inches by 8 inches and the following measurement tools: a 12 inch ruler, measuring cup, stop watch.	Student provided with a drawing of a rectangle that is 4 inches by 8 inches with the longest side highlighted in some way and with a 12 inch ruler.	Student provided with 2 measuring tools: a ruler and measuring cup.
Materials for Examiner	Materials required to administer, document, and score the task (e.g., worksheet, camera to take picture of product, manipulatives)	Task worksheet that describes item and delivery instructions Task data sheet or other method to record student's response	Task worksheet that describes item and delivery instructions Task data sheet or other method to record student's response	Task worksheet that describes item and delivery instructions Task data sheet or other method to record student's response
Variable Features for Administra- tion to Individual Students	Features that could be changed to impact item accessibility for individual student needs (e.g., as specified in the student's IEP)	 Question presentation individualized (e.g., related in sign language) Response format individualized based on student communication system Verbal/gestural prompts individualized 	 Question presentation individualized (e.g., related in sign language) Response format individualized based on student communication system Verbal/gestural prompts individualized 	 Question presentation individualized (e.g., related in sign language) Response format individualized based on student communication system Verbal/gestural prompts individualized

Updated Flowers/Browder Math DOK³:

- 1. Attention: touch, look, listen, repeat what the teacher said, vocalize, respond, attend, recognize
- 2. Memorize/recall: list, describe (facts), state math facts, identify, state, define, match, recognize, label, follow a pattern
- 3. **Performance:** answer, follow 1 step directions, find answer, present, read, separate, spell, tell time, map, model demonstration, perform, demonstrate, follow, choose, count, locate, group by given attributes, solve simple (one computation skill) problems, measure
- 4. **Comprehension:** understand, extend a pattern, sketch, ask and answer questions, categorize/group by unknown attributes, explain, conclude, group, restate, review, translate, classify/sort with understanding, simplify (equivalent forms)
- 5. **Application:** compute, organize, collect (such as data), apply, revise, construct, solve complex (multiple computation skills) problems, use given formulas in novel situations (formula may or may not be identified), explain a process, conduct research
- 6. Analysis, Synthesis, Evaluation: create a complex pattern, analyze, compare, contrast, compose, predict, plan, judge, evaluate, interpret data, generalize findings, create hypotheses

³ Bechard, S., Almond, P., Karvonen, M., Wakeman, S., Turner, C., Bowen, T., & Turner, L. (2009). *Hitting a moving target: A discussion of ten alignment studies for AA-AAS.* Paper presented at the National Conference on Student Assessment. Los Angeles, CA June 23, 2009.

Alternate Assessment Design—Mathematics Task Tryouts

Measurement B2 Grades 3-5: Materials and Instructions

UT, ID, FL October 2010

SRI International Center for Education and Human Services Center for Technology in Learning

For more information contact Kathryn Morrison, (650) 859-3922, kathryn.morrison@sri.com

Overview and Purpose of Task Tryouts

Over the past 12 months, researchers from SRI International and personnel from your state office of education have collaborated closely to develop assessment tasks in mathematics designed for students with significant cognitive disabilities. These tasks have been crosswalked with the National Council of Teachers of Mathematics' Principles and Standards for School Mathematics but have been reduced in depth, breadth, and complexity. The tasks were developed using principles of Universal Design for Learning and are intended to be appropriate for students with significant cognitive disabilities who participate in your state's alternate assessment based on alternate achievement standards.

Each task will be administered to six students: two students who are at a high communication level, two who are at a medium communication level, and two who are at a low communication level. This document provides step-by-step scripts, instructions, and materials for each item. We ask that you follow these instructions very carefully to ensure that the data collected are of the highest quality so that we can gather reliable information about the tasks and determine whether any revisions to them are needed.

This document is divided into four sections:

- Background information on a task
- General instructions for administering items
- Detailed instructions for administering items
- Task materials for each item.

Section 1: Background Information on Task

This table describes the basic attributes and general information for Measurement B2 grades 3-5 (MeasB2 g3-5).

Attributes	General Information
Math Strand	Measurement
Grade Band	Grades 3-5
Task Code	MeasB2 g3-5
Assessment Target	Select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature, and the size of angles
Rationale: Why is this important to learn?	Length is fundamental to calculating and understanding formulas for measurements of area and volume. Length is also a very common component of "real world" problems. Also, when creating graphs to represent quantities, many quantities such as time, weight and volume are represented with scaled lengths along an axis.

Section 2: General Instructions for Administering Items

This section first describes an overview of item administration and then provides detailed scripts, materials, and instructions for administering, scoring, and reporting each item within a task.

General Administration Guidelines

Highlights for administering tasks are provided below; more detailed instructions for task administration are provided in the following section, Task Presentation.

- Choose a location with few, if any, distractions and appropriate furniture.
- Choose a time of day when the student will be alert and able to pay attention and respond.
- On the day of the Task Tryout, **do not** instruct the student on the content of the task.
- Before presenting the item directions and student materials, make sure the student is attending or gain the student's attention.
- While administering the task, maintain a neutral demeanor.
- Do not provide prompts or hints that might "give away" the correct answer.
- Use familiar gestures and prompts to refocus the student if necessary.
- You may provide a break if the student requires one.
- If the student DOES NOT RESPOND to an item the first time you read it, you may repeat the item **one** time after refocusing the student's attention.

• Remember, this is an assessment task rather than an instructional activity. Although a task might be changed to meet needs presented by the student's disability, each item should be presented so that the student responds independently.

Task Presentation

- Each task contains three items, which must be administered in a specific order (see Figure 1 on page 6):
 - o All students are administered Item A1.
 - Students who respond incorrectly or do not respond to Item A1 are administered Item A2. This completes the Task Tryout for these students.
 - Students who refuse to answer Item A1 are not administered any additional items. This completes the Task Tryout for these students.
 - All students who respond correctly to Item A1 are administered Item B and then Item C. This completes the Task Tryout for these students.
- Each task and its three items have specific administration instructions and a script for teachers to use (these are included in Section 3). Follow the instructions and script for the specific task you are administering. Instructions include:
 - Item Directions: The directions for each item describe what the teacher says and what the teacher does to administer each item. Follow the detailed directions in Section 3, saying the words (in bold) in the script and presenting the item materials as directed (unbolded text). When portions of the detailed directions are in brackets (e.g., [Look at/touch/point to]), this indicates that you should chose the directions most appropriate for the student participating in the Task Tryout.
 - **Materials:** The materials to be presented with a particular item are described in Section 3. Some materials are printed pages with graphics or illustrations to which the student responds. These graphics and illustrations are provided in Section 4. You may need to print and cut out the graphics or illustrations.
 - Student Responses: The correct student response is also described in Section 3. Student responses may vary so that one student points to a selection, another names his/her selection verbally or in sign language, and another presses a switch. Each student will communicate his/her selection in a manner consistent with typical responding in the classroom.

Figure 1: Flowchart of Task Administration



Section 3: Detailed Instructions for Administering Items

Item A1

Steps	Scripts, materials, and student responses	Directions for scoring, reporting, and moving to the next item
<i>Directions:</i> What the teacher says	Teacher/administrator shows student two measurement tools, a ruler and a measuring cup, and says, Show me the ruler .	If you change the directions to meet individual needs of the student, indicate the changes in
(bold script) and does (regular text)		Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
Materials: What	1-cup measuring cup	If you change materials, indicate the changes in
the student	12-inch ruler	Section 1 and answer the questions about
perceives		accommodations in Section 2 of the Data Collection Booklet.
Student Correct	Student indicates the ruler.	Mark "Correct" in Section 1 of the Data Collection
response		Booklet if the response was independent and
		mode. MOVE TO ITEM B.
Student	 Student indicates the measuring cup 	Mark "Incorrect" and record how the student
Incorrect	 Student says "I don't know" 	responded in the appropriate field in Section 1 of
response	 Student echoes "ruler" 	the Data Collection Booklet. MOVE TOTTEM A2.
Student No	 Student claps hands 	g) Obtain the student's attention and repeat the
Response—	 Student stares at wall 	directions.
doesn't respond	 Student hums with eyes closed 	h) If the student still doesn't respond, record the
		student's lack of response in Section 1 of the
		Data Collection Booklet. MOVE TO ITEM A2.
Student Refused	 Student says (signs or gestures) "No" or "I don't want to" 	Mark "Refused" and record how the student
to Respond	 Student pushes task materials away 	responded in the appropriate field in Section 1 of
		the Data Collection Booklet. STOP TASK

Steps	Scripts, materials, and student responses	Directions for scoring, reporting, and moving to the next item
<i>Directions:</i> What the teacher says (bold script) and does (regular text)	If student does not respond to Item A1 or responds incorrectly, teacher/administrator removes measuring cup and says, [Look at/touch] the ruler.	If you change the directions to meet individual needs of the student, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
<i>Materials:</i> What the student perceives	• 12-inch ruler	If you change materials, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
Student Correct response	Student indicates the ruler.	Mark "Correct" in Section 1 of the Data Collection Booklet if the response was independent and consistent with the student's typical response mode. STOP TASK ●
Student Incorrect response [†]	Student says "I don't know"Student echoes "ruler"	Mark "Incorrect" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. STOP TASK ●
Student No Response doesn't respond to question [†]	 Student claps hands Student stares at wall Student hums with eyes closed 	 i) Obtain the student's attention and repeat the directions. j) If the student still doesn't respond, record the student's lack of response in Section 1 of the Data Collection Booklet. STOP TASK ●
Student Refused to Respond [†]	 Student says (signs or gestures) "No" or "I don't want to" Student pushes task materials away 	Mark "Refused" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. STOP TASK ●

Steps	Scripts, materials, and student responses	Directions for scoring, reporting, and moving to the next item
<i>Directions:</i> What the teacher says (bold script) and does (regular text)	Teacher/administrator gives student a drawing of a rectangle that is 4 inches by 8 inches with the longest side highlighted (Item B Illustration 1) and a 12-inch ruler. Teacher/administrator says, Measure the length of the highlighted side of this rectangle.	If you change the directions to meet individual needs of the student, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
<i>Materials:</i> What the student perceives	 Item B Illustration 1: a drawing of a rectangle that is 4 inches by 8 inches with the longest side highlighted 12-inch ruler 	If you change materials, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
Student Correct response	Student (1) measures the highlighted side of the rectangle and (2) expresses the measurement as 8 inches	Mark "Correct" in Section 1 of the Data Collection Booklet if the response was independent and consistent with the student's typical response mode. MOVE TO ITEM C.
Student Incorrect response [†]	 Student measures the 4-inch side of the rectangle. Student says "I don't know" Student expresses a measurement other than 8 inches 	Mark "Incorrect" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. MOVE TO ITEM C.
Student No Response doesn't respond to question [†]	 Student claps hands Student stares at wall Student hums with eyes closed 	 e) Obtain the student's attention and repeat the directions. f) If the student still doesn't respond, record the student's lack of response in Section 1 of the Data Collection Booklet. MOVE TO ITEM C.
Student Refused to Respond [†]	 Student says (signs or gestures) "No" or "I don't want to" Student pushes task materials away 	Mark "Refused" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. STOP TASK ●

Steps	Scripts, materials, and student responses	Directions for scoring, reporting, and moving to the next item
<i>Directions:</i> What the teacher says (bold script) and does (regular text)	Teacher/administrator gives student a drawing of a rectangle that is 4 inches by 8 inches (Item C Illustration 1) and the following measurement tools: a 12-inch ruler, a 1-cup measuring cup, and a stop watch. Teacher/administrator says, Measure the length of the longest side of this rectangle.	If you change the directions to meet individual needs of the student, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
<i>Materials:</i> What the student perceives	 Item C Illustration 1: a drawing of a rectangle that is 4 inches by 8 inches 12-inch ruler 1-cup measuring cup Stop watch 	If you change materials, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
Student Correct response	Student: (1) selects the ruler (2) identifies the longest side of the rectangle (3) measures the longest side of the rectangle (4) expresses the measurement as 8 inches	Mark "Correct" in Section 1 of the Data Collection Booklet if the response was independent and consistent with the student's typical response mode. STOP TASK ●
Student <i>Incorrect</i> response [†]	 Student measures the 4-inch side of the rectangle Student says "I don't know" Student expresses a measurement other than 8 inches 	Mark "Incorrect" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. STOP TASK •
Student No Response doesn't respond to question [†] Student Refused to	 Student claps hands Student stares at wall Student hums with eyes closed Student says (signs or gestures) "No" or " I don't want to" Student pushes task materials away 	 g) Obtain the student's attention and repeat the directions. h) If the student still doesn't respond, record the student's lack of response in Section 1 of the Data Collection Booklet. STOP TASK ● Mark "Refused" and record how the student responded in the appropriate field in Section 1 of
Respond [†]		the Data Collection Booklet. STOP TASK

Appendix E: Measurement Exemplar Task Section 4: Task Materials for Each Item Appendix E: Measurement Exemplar Task Measurement B2, grades 3-5 Item B Illustration 1



Appendix E: Measurement Exemplar Task Measurement B2, grades 3-5 Item C Illustration 1

Appendix F: Number and Operations Exemplar Task¹

¹ In the Task Template, the most difficult item is named item 1, the easier item is named item 2, and the easiest items are named item 3a and item 3b. The Materials and Instructions document, which was created for pilot testing the items, instructs administrators to administer the easiest items first (item 3a/b). To reduce administrator error, the items were renamed. In the Materials and Instructions document, the easiest items are named A1 and A2, then next most difficult item is named item B, and the most difficult item is named item C.

Task/Item Development Number & Operations A3 (grades 3-5)

Attributes	General Information			
Title	Number & Operations A3 (grades 3-5)			
Summary	Develop understanding of fractions as parts of unit wholes, as parts of a collection, as locations on number lines, and as divisions of whole numbers			
Rationale	Fractions represent a they can use this kn	significant extension of children's knowledge a owledge to describe real world phenomena an	bout numbers. When children possess d apply it to problems involving measu	a sound understanding of fractions, irement, probability, and statistics.
Grade level standards	Understand the structure Explore a variety of m	ure of numbers and the relationships among nu odels of fractions focused on familiar fractions:	ımbers. halves, thirds, fourths, fifths, sixths, ei	ighths, and tenths.
(from NCTM)	Develop strategies for	ordering and comparing fractions using bench	mark fractions such as $\frac{1}{2}$ and 1.	
		Item 1	Item 2	Item 3a/3b
Attributes	Definition	Application/Comprehension/ Performance	Performance/Recall	Recall/Attention
Focal KSA	Focal KSA from DP for Items 1 & 2; Add'I KSA from DP for Item 3	 Ability to identify fractions by the number of fractional amount. (This focal KSA deals wi denominator) 	parts in the whole and in the the both the numerator and the	• Knowledge that a whole number can be divided into fractions of the whole.
Potential Observations from DP	Observed behaviors of students that can provide evidence of the Focal KSA	 Student correctly matches fraction to pictorial or object representation of that amount Student correctly names the fraction represented by a picture or object 		Not addressed in DP
Potential Work Products	What students say, do, or make that provides evidence about the Focal KSA	 Student worksheet that depicts one half, one quarter, and three quarters of a pizza and student indicates which picture represents ³/₄ Student worksheet with one picture of a portion of a pizza in slices and student indicates fraction represented 		
Characteristic Features	Aspects of assessment situations likely to evoke the desired evidence	 All problems will involve the use of fractions 	5	
Potential Variable Features/ Scaffolding	Features that could be changed to impact item difficulty and scope	 The number of representations presented to the student. Models (fraction circles, card board representations, other manipulatives) pictures. Types of representation: Presents fractions or wholes. Presentation of fraction: Verbal, symbolic Size of the denominator (2, 3, or 4) Depth of knowledge of the content (e.g., 	 The number of representations presented to the student. Models (fraction circles, card board representations, other manipulatives) pictures. Types of representation: Presents fractions or wholes. Presentation of fraction: Verbal, symbolic Size of the denominator (2, 3, or 	 The number of representations presented to the student. Models (fraction circles, card board representations, other manipulatives) pictures Types of representation: Presents fractions or wholes. Presentation of fraction: Verbal, symbolic Size of the denominator (2, 3, or 4)

		fractions used (halves, thirds, quarters, etc.)	 4) Depth of knowledge of the content (e.g., fractions used (halves, thirds, quarters, etc.) 	• Depth of knowledge of the content (e.g., fractions used (halves, thirds, quarters, etc.)
Selected Variable Features/ Scaffolding for the Item	From Item 1 to Item 3: • Reduce DOK • Reduce scope • Increase scaffolding	 3 representations presented Model: Drawing of fraction circles Presents 3 models each of which is a fraction Presents verbal and symbolic representations of numeric fractions DOK math content: ¼, 2/4, ¾ DOK level: Comprehension (Translate) Scaffolding: Use of a diagram Multiple representations of fractions 	 2 representations presented Model: Photograph of pizza/pie Presents 2 models one of which one is a fraction and one is a whole Presents verbal and symbolic representations of numeric fractions DOK math content: ½ and 1 whole DOK level: Performance (Locate) Scaffolding: Use of photograph of familiar stimuli Multiple representations of fractions 	 2 representations presented Model: Photograph of pizza/pie Does not present verbal and symbolic representations of numeric fractions Presents verbal and symbolic representation of part versus whole DOK math content: 1 whole versus part of a whole (1/4, ½, ¾) DOK level: Recall (Identify "not a whole") Scaffolding: Use of photograph of familiar stimuli Multiple representation of part vs. whole
Item Directive	The stem or question (includes description and number of distractors if applicable)	 Examiner presents student with three drawings of pizzas/pies and says, "Here are three drawings of parts of a pizza/pie." Examiner then presents a card with the numeric fraction "¾" down on the table in front of the student and says, "Which drawing shows three fourths of a pizza/pie?" 	 Examiner presents students with two photos, one with a whole pizza/pie and the other with a half of a pizza/pie. Examiner says, "Here are two photos of pizzas/pies." Examiner then presents a card with the numeric fraction "½"down on the table in front of the student and says, "Show me which photo shows half of a pizza/pie." 	 3a) Examiner presents two unlabeled pizza/pies in a row to student and says, "Here are two photos of pizza/pie (a whole pizza/pie and part of a pizza/pie). Show me the photo that is a part of a pizza/pie." 3b) If student cannot respond, remove all stimuli but the photo of part of a pizza/pie. Teacher says, "Look at/touch the photo of part of the pizza/pie."
Correct Answers	Correct answer for the item	Student indicates ¾ of a pizza/pie picture on the worksheet	Student indicates ½ pizza/pie picture	3a) Student indicates the picture that is not a whole pizza/pie.3b) Student looks/touch the picture of a half of pizza/pie
Description of Stimulus Items	Description of the graphics or objects used in administration of the task	Three unlabeled drawings of three pizzas/pies presented in a row (these are bird's eye view of the pizza/pie, not a side view with perspective). Each pizza/pie is divided into four slices. One has 2 of the four remaining, one has one of the four	Two unlabeled photos of two pizzas/pies presented in a row (these are bird's eye view of the pizza/pie, not a side view with perspective). Teacher has card with ½ on it. One photo is of a	Two unlabeled photos of two pizza/pies presented in a row (these are bird's eye view of the pizza/pie, not a side view with perspective). One photo is of a whole pizza/pie. The second photo

		remaining, and the third has three of the four remaining. Every pizza/pie shows the quarters outlined with a dotted line. Every pizza/pie has four sections outlines even if they are missing. The teacher has a card with ³ / ₄ on it.	whole pizza/pie and the other photo is of a half of pizza/pie.	is of half of pizza/pie.
Materials for Examiner	Materials required to administer, document, and score the task (e.g., worksheet, camera to take picture of product, manipulatives)	3 pictures of pizzas/pies 1 card with numeric ³ / ₄ Recording sheet for teacher to complete	2 photographs of pizzas/pies 1 card with numeric ½ Recording sheet for teacher to complete	2 photographs of pizzas/pies Recording sheet for teacher to complete
Variable Features for Administra- tion to Individual Students	Features that could be changed to impact item accessibility for individual student needs (e.g., as specified in the student's IEP)	 Question presentation individualized (e.g., related in sign language) Response format individualized based on student communication system Remind student of prior experiences Verbal/gestural prompts individualized Use of tactile graphics 	 Question presentation individualized (e.g., related in sign language) Response format individualized based on student communication system Remind student of prior experiences Verbal/gestural prompts individualized Use of tactile graphics 	 Question presentation individualized (e.g., related in sign language) Response format individualized based on student communication system Remind student of prior experiences Verbal/gestural prompts individualized Use of tactile graphics

Updated Flowers/Browder Math DOK²:

- 1. Attention: touch, look, listen, repeat what the teacher said, vocalize, respond, attend, recognize
- 2. Memorize/recall: list, describe (facts), state math facts, identify, state, define, match, recognize, label, follow a pattern
- 3. **Performance:** answer, follow 1 step directions, find answer, present, read, separate, spell, tell time, map, model demonstration, perform, demonstrate, follow, choose, count, locate, group by given attributes, solve simple (one computation skill) problems, measure
- 4. **Comprehension:** understand, extend a pattern, sketch, ask and answer questions, categorize/group by unknown attributes, explain, conclude, group, restate, review, translate, classify/sort with understanding, simplify (equivalent forms)
- 5. **Application:** compute, organize, collect (such as data), apply, revise, construct, solve complex (multiple computation skills) problems, use given formulas in novel situations (formula may or may not be identified), explain a process, conduct research
- 6. Analysis, Synthesis, Evaluation: create a complex pattern, analyze, compare, contrast, compose, predict, plan, judge, evaluate, interpret data, generalize findings, create hypotheses

² Bechard, S., Almond, P., Karvonen, M., Wakeman, S., Turner, C., Bowen, T., & Turner, L. (2009). *Hitting a moving target: A discussion of ten alignment studies for AA-AAS*. Paper presented at the National Conference on Student Assessment. Los Angeles, CA June 23, 2009.

Alternate Assessment Design—Mathematics Task Tryouts

Number and Operations A3 Grades 3-5: Materials and Instructions

UT, ID, FL October 2010

SRI International Center for Education and Human Services Center for Technology in Learning

For more information contact Kathryn Morrison, (650) 859-3922, kathryn.morrison@sri.com

Overview and Purpose of Task Tryouts

Over the past 12 months, researchers from SRI International and personnel from your state office of education have collaborated closely to develop assessment tasks in mathematics designed for students with significant cognitive disabilities. These tasks have been crosswalked with the National Council of Teachers of Mathematics' Principles and Standards for School Mathematics but have been reduced in depth, breadth, and complexity. The tasks were developed using principles of Universal Design for Learning and are intended to be appropriate for students with significant cognitive disabilities who participate in your state's alternate assessment based on alternate achievement standards.

Each task will be administered to six students: two students who are at a high communication level, two who are at a medium communication level, and two who are at a low communication level. This document provides step-by-step scripts, instructions, and materials for each item. We ask that you follow these instructions very carefully to ensure that the data collected are of the highest quality so that we can gather reliable information about the tasks and determine whether any revisions to them are needed.

This document is divided into four sections:

- Background information on a task
- General instructions for administering items
- Detailed instructions for administering items
- Task materials for each item.

Section 1: Background Information on Task

This table describes the basic attributes and general information for Number and Operations (NumOpA3 g3-5).

Attributes	General Information
Math Strand	Number and Operations
Grade Band	Grades 3-5
Task Code	NumOpA3 g3-5
Assessment Target	Develop understanding of fractions as parts of unit wholes, as parts of a collection, as locations on number lines, and as divisions of whole numbers
Rationale: Why is this important to learn?	Fractions represent a significant extension of children's knowledge about numbers. When children possess a sound understanding of fractions, they can use this knowledge to describe real world phenomena and apply it to problems involving measurement, probability, and statistics.

Section 2: General Instructions for Administering Items

This section first describes an overview of item administration and then provides detailed scripts, materials, and instructions for administering, scoring, and reporting each item within a task.

General Administration Guidelines

Highlights for administering tasks are provided below; more detailed instructions for task administration are provided in the following section, Task Presentation.

- Choose a location with few, if any, distractions and appropriate furniture.
- Choose a time of day when the student will be alert and able to pay attention and respond.
- On the day of the Task Tryout, **do not** instruct the student on the content of the task.
- Before presenting the item directions and student materials, make sure the student is attending or gain the student's attention.
- While administering the task, maintain a neutral demeanor.
- Do not provide prompts or hints that might "give away" the correct answer.
- Use familiar gestures and prompts to refocus the student if necessary.
- You may provide a break if the student requires one.
- If the student DOES NOT RESPOND to an item the first time you read it, you may repeat the item **one** time after refocusing the student's attention.

• Remember, this is an assessment task rather than an instructional activity. Although a task might be changed to meet needs presented by the student's disability, each item should be presented so that the student responds independently.

Task Presentation

- Each task contains three items, which must be administered in a specific order (see Figure 1 on page 6):
 - o All students are administered Item A1.
 - Students who respond incorrectly or do not respond to Item A1 are administered Item A2. This completes the Task Tryout for these students.
 - Students who refuse to answer Item A1 are not administered any additional items. This completes the Task Tryout for these students.
 - All students who respond correctly to Item A1 are administered Item B and then Item C. This completes the Task Tryout for these students.
- Each task and its three items have specific administration instructions and a script for teachers to use (these are included in Section 3). Follow the instructions and script for the specific task you are administering. Instructions include:
 - Item Directions: The directions for each item describe what the teacher says and what the teacher does to administer each item. Follow the detailed directions in Section 3, saying the words (in bold) in the script and presenting the item materials as directed (unbolded text). When portions of the detailed directions are in brackets (e.g., [Look at/touch/point to]), this indicates that you should chose the directions most appropriate for the student participating in the Task Tryout.
 - **Materials:** The materials to be presented with a particular item are described in Section 3. Some materials are printed pages with graphics or illustrations to which the student responds. These graphics and illustrations are provided in Section 4. You may need to print and cut out the graphics or illustrations.
 - Student Responses: The correct student response is also described in Section 3. Student responses may vary so that one student points to a selection, another names his/her selection verbally or in sign language, and another presses a switch. Each student will communicate his/her selection in a manner consistent with typical responding in the classroom.

Figure 1: Flowchart of Task Administration



Section 3: Detailed Instructions for Administering Items

Item A1

Steps	Scripts, materials, and student responses	Directions for scoring, reporting, and moving to the next item
<i>Directions:</i> What the teacher says (bold script) and does (regular text)	Teacher/administrator presents to student an illustration of two unlabeled pizzas (Item A Illustration 1) and says, Here are two photos of pizza (a whole pizza and part of a pizza). Show me the photo that is a part of a pizza.	If you change the directions to meet individual needs of the student, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
<i>Materials:</i> What the student perceives	 Item A Illustration 1: illustration with one photo of a whole pizza and anther photo of half of a pizza 	If you change materials, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
Student Correct response	Student indicates the picture that is not a whole pizza	Mark "Correct" in Section 1 of the Data Collection Booklet if the response was independent and consistent with the student's typical response mode. MOVE TO ITEM B.
Student <i>Incorrect</i> response [†]	 Student indicates the photo of a whole pizza Student says "I don't know" Student echoes "pizza" 	Mark "Incorrect" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. MOVE TO ITEM A2.
Student No Response doesn't respond to question [†]	 Student claps hands Student stares at wall Student hums with eyes closed 	 i) Obtain the student's attention and repeat the directions. j) If the student still doesn't respond, record the student's lack of response in Section 1 of the Data Collection Booklet. MOVE TO ITEM A2.
Student Refused to Respond [†]	 Student says (signs or gestures) "No" or "I don't want to" Student pushes task materials away 	Mark "Refused" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. STOP TASK ●

Steps	Scripts, materials, and student responses	Directions for scoring, reporting, and moving to the next item
Directions: What	If student does not respond to Item A1 or responds incorrectly,	If you change the directions to meet individual
the teacher says	teacher/administrator removes first illustration and shows	needs of the student, indicate the changes in
(bold script) and	student Item A Illustration 2. Teacher/administrator says,	Section 1 and answer the questions about
does (regular text)	[Look at/touch] the photo of part of the pizza.	accommodations in Section 2 of the Data
		Collection Booklet.
Materials: What	 Item A Illustration 2: photo of half of a pizza 	If you change materials, indicate the changes in
the student		Section 1 and answer the questions about
perceives		accommodations in Section 2 of the Data
Ctudant Carrot	Chudent looks at/touches the pisture of a holf of a pizza	Collection Booklet.
Student Correct	Student looks at/touches the picture of a half of a pizza	Mark Correct in Section 1 of the Data Collection
response		bookiet in the response was independent and
		mode
Student	 Student says "I don't know" 	Mark "Incorrect" and record how the student
Incorrect	Student echoes "pizza"	responded in the appropriate field in Section 1 of
response [†]		the Data Collection Booklet. STOP TASK
Student No	 Student claps hands 	k) Obtain the student's attention and repeat the
Response—	Student stares at wall	directions.
doesn't respond	Student hums with eyes closed	I) If the student still doesn't respond, record the
to question'		student's lack of response in Section 1 of the
		Data Collection Booklet. STOP TASK
Student	• Student says (signs or gestures) "No" or " I don't want to"	Mark "Refused" and record how the student
Refused to	 Student pushes task materials away 	responded in the appropriate field in Section 1 of
Respond [†]		the Data Collection Booklet. STOP TASK •

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Steps	Scripts, materials, and student responses	Directions for scoring, reporting, and moving to the next item
<i>Directions:</i> What the teacher says (bold script) and does (regular text)	Teacher/administrator presents students with two photos, one with a whole pizza and the other with a half of a pizza (Item B Illustration 1) and says, Here are two photos of pizzas . Teacher/ administrator then presents student with a note card with the numeric fraction "½" (Item B Illustration 2) and says, Show me which photo shows half of a pizza .	If you change the directions to meet individual needs of the student, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
<i>Materials:</i> What the student perceives	 Item B Illustration 1: illustration with one photo of a whole pizza and another photo of a half of a pizza Item B Illustration 2: A note card with the numeric fraction "1/2" 	If you change materials, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
Student Correct response	Student indicates photo of 1/2 of a pizza	Mark "Correct" in Section 1 of the Data Collection Booklet if the response was independent and consistent with the student's typical response mode. MOVE TO ITEM C.
Student <i>Incorrect</i> response [†]	 Student indicates the photo of a whole pizza Student says "I don't know" Student echoes "1/2 pizza" 	Mark "Incorrect" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. MOVE TO ITEM C.
Student No Response doesn't respond to question [†]	 Student claps hands Student stares at wall Student hums with eyes closed 	 g) Obtain the student's attention and repeat the directions. h) If the student still doesn't respond, record the student's lack of response in Section 1 of the Data Collection Booklet. MOVE TO ITEM C.
Student Refused to Respond [†]	 Student says (signs or gestures) "No" or "I don't want to" Student pushes task materials away 	Mark "Refused" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. STOP TASK ●

Steps	Scripts, materials, and student responses	Directions for scoring, reporting, and moving to the next item
<i>Directions:</i> What the teacher says (bold script) and does (regular text)	Teacher/administrator shows student Item C Illustration 1 and says, Here are three pictures of parts of a pizza . Teacher/administrator then presents student with a note card with the numeric fraction "¾" (Item C Illustration 2) and says, Which picture shows three fourths of a pizza ?	If you change the directions to meet individual needs of the student, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
<i>Materials:</i> What the student perceives	 Item C Illustration 1: illustration of 3 pizzas divided into quarters; one has 2 quarters remaining, one has one quarter remaining, and the third has three quarters remaining Item C Illustration 2: A note card with the numeric fraction 3/4 	If you change materials, indicate the changes in Section 1 and answer the questions about accommodations in Section 2 of the Data Collection Booklet.
Student Correct response	Student indicates the picture of ³ / ₄ of a pizza	Mark "Correct" in Section 1 of the Data Collection Booklet if the response was independent and consistent with the student's typical response mode. STOP TASK ●
Student <i>Incorrect</i> response [†]	 Student indicates an incorrect picture Student says "I don't know" Student echoes "3/4" 	Mark "Incorrect" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. STOP TASK ●
Student No Response doesn't respond to question [†]	 Student claps hands Student stares at wall Student hums with eyes closed 	 i) Obtain the student's attention and repeat the directions. j) If the student still doesn't respond, record the student's lack of response in Section 1 of the Data Collection Booklet. STOP TASK ●
Student Refused to Respond [†]	 Student says (signs or gestures) "No" or "I don't want to" Student pushes task materials away 	Mark "Refused" and record how the student responded in the appropriate field in Section 1 of the Data Collection Booklet. STOP TASK ●

Section 4: Task Materials for Each Item

Appendix D: Algebra Exemplar Task Number and Operations A3, grades 3-5 Item A Illustration 1





Appendix D: Algebra Exemplar Task Number and Operations A3, grades 3-5 Item A Illustration 2



Appendix D: Algebra Exemplar Task Number and Operations A3, grades 3-5 Item B Illustration 1





Appendix D: Algebra Exemplar Task Number and Operations A3, grades 3-5 Item B Illustration 2



Appendix D: Algebra Exemplar Task Number and Operations A3, grades 3-5 Item C Illustration 1


Appendix D: Algebra Exemplar Task Number and Operations A3, grades 3-5 Item C Illustration 2



NumOpA3 g3-5 Item C Illustration 2