

# National Center and State Collaborative (NCSC)

# Technical Directory

December 2016

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Development of this report was supported by a grant from the U.S. Department of Education, Office of Special Education Programs (H373X100002, Project Officer: Susan.Weigert@ed.gov). The contents do not necessarily represent the policy of the U.S. Department of Education, and no assumption of endorsement by the Federal government should be made.



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December, 2016

## Purpose

The purpose of this document is to provide a directory of technical information produced in support of the National Center and State Collaborative (NCSC) assessment, culminating in the spring 2015 administration.

Because a vast amount of technical information has been assembled by multiple organizations over several years, it can be challenging to identify what information is available and where this information is located. For this reason, this directory has been created to briefly summarize key assessment information and to direct readers to the appropriate resource for details.

The information addressed in this document pertains primarily to the technical properties of the NCSC assessment related to the development, administration, and scoring of the assessment. There are other important resources developed by the project that are outside the scope of this document such as content guides, accessibility information, and instructional resources.

## Format

This directory is organized around six topic areas: development, administration, specifications, scoring and reporting, performance standards, and evidence of validity, fairness, and reliability. For each topic, key questions are listed followed by a summary response that gives an overview of the information in support of the question. The reference column provides one or more citations indicating where one can find additional information.

## Directory

### Development

#### What are the purposes and uses of NCSC?

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| Summary | References |
| The long-term goal of NCSC is to ensure that students with significant cognitive disabilities achieve increasingly higher academic outcomes and leave high school ready for post‐secondary options. NCSC has developed a comprehensive theory of action that describes how the elements of the NCSC system are meant to work to support this long-term goal. The NCSC AA-AAS serves three main purposes: (1) to measure student achievement; (2) to provide defensible scores for state accountability systems; and (3) to provide reporting structures that support appropriate interpretation and use of data.  | NCSC Brief, January 2016*NCSC’s Theory of Action and Validity Evaluation Approach**National Center and State Collaborative* *2015 Operational Assessment* *Technical Manual* (p.11) |

#### What content is assessed and how was this determined?

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| Summary | References |
| NCSC developed summative assessments in mathematics and English language arts in each of grades 3-8 and 11. NCSC established overarching content definitions by examining (a) existing content definitions in general education; (b) the content, concepts, terminology, and tools of each domain; (c) a body of extant research; and (d) the Common Core State Standards (CCSS). NCSC’s path into the content was to define the graduated understandings of depth, breadth, or complexity of the grade-level content to define alternate achievement at multiple levels. Core Content Connectors (CCC) were developed to help define the target content. CCCs bridge the state content standards and learning progression pathways through the curriculum and in some cases break down complex standards into smaller segments. Using an iterative review process, NCSC state and organizational partners evaluated the ELA and mathematics academic grade-level content to determine a challenging but achievable number of grade-level KSAs that would reflect how these students move from grade to grade content with their peers without disabilities in meaningful, naturally occurring pathways. | NCSC Brief (7), December 2015*NCSC’s Content Model for Grade-**Aligned Instruction and Assessment:“The Same Curriculum for All Students”**National Center and State Collaborative* *2015 Operational Assessment* *Technical Manual* (pp.11,17-22) |

#### What process was used to develop NCSC test items?

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| Summary | References |
| NCSC used a principled design approach that incorporated components of Evidence-Centered Design (ECD) and principles of Universal Design for Learning (UDL) to develop assessment content. Chapter 2 of the 2015 Operational Technical Manual details the full development and review process.Central to principal design approach was the development of design patterns and task templates for the prioritized content. Design patterns incorporated a variety of approaches to obtaining evidence of targeted knowledge or skills and supported development of task templates that provided plans for evidence, task models, and item specifications. Task templates distinguish among four levels or tiers for the items that provide differentiation with respect content complexity and the degree of scaffolding.  | *National Center and State Collaborative* *2015 Operational Assessment* *Technical Manual* (Chapter 2: pp.9-28)*National Center and State Collaborative* *2015 Operational Assessment* *Technical Manual* (Appendix 2-A: Item Specifications Reflected in Example Annotated Design Pattern and Task Template)  |

#### What item types were developed for NCSC?

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| Summary | References |
| NCSC ELA and math assessments include the following item types:* Selected response (SR)
* Multiple-part Selected Response
* Constructed Response (CR)
* Open Response (OR)
 | Item and Response Formats and Scoring Table 2-9*National Center and State Collaborative* *2015 Operational Assessment* *Technical Manual* (pp. 29-30)Summary description of interaction for each item type in the *2015 NCSC AA-AAS**Test Administration Manual* (pp. 12-13) |

### Administration

#### What is the overall assessment experience?

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| Summary | References |
| Administration of NCSC is characterized by ongoing one-on-one interaction between a well-trained test administrator and the student. The assessment is delivered and submitted on the online test platform. Test administrators follow an administration script, which is also provided on the assessment platform. The system allows for the administration directions and/or the test content to be printed out for paper-based administration as needed.  | *2015 NCSC AA-AAS**Test Administration Manual**National Center and State Collaborative* *2015 Operational Assessment* *Technical Manual* (pp.86-89)*Parent Overview of the NCSC Assessment System Grades 3-8 and 11* |

#### Where can one find the administration procedures and requirements for the 2015 ELA and math assessments?

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| Summary | References |
| There are a number of resources that detail the procedures and requirements for test coordinators and test administrators. The primary documents are:* Test Administration Manual (TAM)
* Directions for Test Administration (DTA). DTA are specific to each grade/content test and contain secure content. The references provided include an overview and sample items.
* Training modules for test administrators and test coordinators
* System user guides for test administrators and test coordinators.
* Procedures for assessing students are blind, deaf, or deaf-blind

These documents address: the training requirements, all procedures and responsibilities before, during, and after administration, accessibility supports, and handling administration irregularities.  | *2015 NCSC AA-AAS**Test Administration Manual**NCSC AA-AAS Directions for Test Administration of Mathematics Sample Items Grades 3, 6, 11**Directions for Test Administration**of English Language Arts – Reading Sample Items Grades 4, 8, 11**NCSC Online Test Administration Training for Test Administrators**NCSC Online Test Administration Training for Test Coordinators**NCSC Assessment System User Guide for Test Administrators**NCSC Assessment System User Guide for Test Coordinators* |

#### What is the NCSC assessment system technology platform and where can one learn about its characteristics and features?

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| Summary | References |
| The NCSC Assessment System is an open-source technology platform that supports a range of functions that include test creation and management, registration and administration, evidence collection and scoring, score reporting, and access to ancillary content, such as training modules. The NCSC *Architecture Documentation* describes the functions and specifications for each system component. User guides for test administers and test coordinators were developed, which provide the assessment system features and step-by-step directions with screen shots to perform all system functions before, during, and after administration. | *National Center and State Collaborative**Software Architecture Documentation* (June 2015) available at: http://www.ncscpartners.org/Media/Default/PDFs/Resources/NCSC\_Solutions\_Architecture\_06082015.pdf*NCSC Assessment System User Guide for Test Administrators**NCSC Assessment System User Guide for Test Coordinators* |

#### What are the system requirements and specifications for NCSC’s Assessment System technology platform?

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| Summary | References |
| The requirements for the NCSC technical platform (aka NCSC Assessment System) were designed to align with the State Educational Technology Directors Association (SETDA) recommendations and are detailed in the document, *NCSC Workstation and Bandwidth Technology Requirements*. Details about the architecture and components of the NCSC technical platform are provided in the solutions architecture document. This document describes each component of the platform, which centrally features the open-source TAO® system and a test administrator portal based on the open-source Drupal CMS technology. | *NCSC Workstation and Bandwidth Technology Requirements**Spring 2015 Administrationavailable at:* http://www.ncscpartners.org/Media/Default/PDFs/NCSC-Workstation-Bandwidth-Technology-Requirements-Spring-2015-final.pdf*National Center and State Collaborative Software Architecture Documentation* (June 2015) available at: http://www.ncscpartners.org/Media/Default/PDFs/Resources/NCSC\_Solutions\_Architecture\_06082015.pdf |

#### What does it mean that the NCSC technical platform is “open source” and how does one access these resources?

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| Summary | References |
| Most of the NCSC assessment system is built with source code that is licensed in a way that allows the software to be used, studied, modified, extended, and/or distributed. This is in contrast to a proprietary commercial system which does not make code publicly available and typically requires users to pay reoccurring licensing or usage fees for the software. The two primary open source components of the NCSC Assessment System are TAO and Drupal. Development of TAO began in 2002 and it is currently used in many assessment applications worldwide, including PISA. TAO is used for assessment creation, delivery, evidence collection, and management. Drupal is a flexible content management platform used to support the system’s administration and registration functions as well as ancillary content. edCount Management, LLC, has been authorized to act as the agent to protect the Intellectual Property (IP) of the grant project and to respond to inquiries regarding the system and items. Several licensing options are available for entities who want to make use of the NCSC system and/or test content.  | *National Center and State Collaborative Software Architecture Documentation* (June 2015) available at: http://www.ncscpartners.org/Media/Default/PDFs/Resources/NCSC\_Solutions\_Architecture\_06082015.pdfFor more information, about licensing options contact edCount Management, LLC |

### Test Specifications

#### What were the design and specifications of the 2015 ELA and math tests?

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| Summary | References |
| The spring 2015 ELA test was administered in four sections: * Session 1: Literary and informational reading passages and associated selected response items as well as open response foundational items in grades 3 and 4.
* Session 2: Literary and informational reading passages and associated selected response items.
* Session 3: Selected response writing items
* Session 4: One constructed response writing item

Session 1 and 2 each comprised about 20 reading items. Within each of the 4 forms, four of the passage/item sets were intended to be used as core, and one passage/item set was intended to be used as embedded field-test slots. Session 3 included four SR writing items, and the tier 1 writing prompt item was made up of four to six SR items. The number of SR items varied depending on the grade level. Session 3 was the same across all forms of the test at each grade. Session 4 was an embedded field test and comprised a tier 2 passage and a CR writing prompt. The spring 2015 mathematics test was administered in two sections:* Session 1: selected response mathematics items and constructed response mathematics completion items in selected grades
* Session 2: selected response mathematics items and constructed response mathematics completion items in selected grades

Mathematics forms consisted of two sessions with 20 items per session. Of the 40 items, 35 were intended to be used as core and 5 were intended to be used as embedded field test slots. Session 1 was a common (anchor) session across all forms. Four forms of the mathematics test were created at each grade level. | *2015 NCSC AA-AAS**Test Administration Manual* (p.10)*National Center and State Collaborative 2015 Operational Assessment Technical Manual* (pp.67-69) |

#### What were the blueprints for the 2015 ELA and math tests?

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| Summary | References |
| Guidelines for distribution of content by category and domain and the actual distribution of content on the 2015 forms are provided in Tables 2-14a to 12-15b in the NCSC Technical Manual. The operational test blueprints that reference the weight of each content category, CCCs assessed, item types, score point ranges, and passages (for ELA) are available as appendix 2-K for ELA and appendix 2-L for math in the NCSC Technical Manual.  | *National Center and State Collaborative 2015 Operational Assessment Technical Manual* (pp.63-64) |

### Scoring and Reporting

#### How were selected response items scored in the 2015 administration?

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| Summary | References |
| Students selected a response from the options in a variety of ways (e.g., using the computer mouse, verbalizing, gesturing, using eye gaze or communication devices, assistive technology, etc.). Many students entered responses directly into the NCSC Assessment System. If the student had the scribe accommodation, the scribe entered the student-selected response on behalf of the student. The SR items were scored according to the answer keys provided.  | *National Center and State Collaborative 2015 Operational Assessment Technical Manual* (p. 100) |

#### How were mathematics constructed response items scored in the 2015 administration?

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| Summary | References |
| CR items require students to develop an answer instead of selecting an answer from response options. Each item was presented to the student in a standardized, scripted sequence of steps culminating in the TA scoring the student performance using the mathematics scoring rubrics provided for the item. Directions and materials needed for administering mathematics CR items were included in the secure DTA that accompanied each form. The TA entered the student CR score into the NCSC Assessment System as either correct or incorrect.  | *National Center and State Collaborative 2015 Operational Assessment Technical Manual* (p. 101 and appendix 6-D) |

#### How were open-response foundational reading items scored in the 2015 administration?

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| Summary | References |
| OR items were included on the reading test in grades 3 and 4 only. The items were word identification tasks. Students identified either three or five words depending on the tier level of the items presented. Directions and materials needed for administering reading OR items were included in the secure DTA. The TA entered the student’s scores into the NCSC Assessment System. Students with clear and consistent oral speech were administered the OR Foundational Reading items. Students using communication other than oral speech, such as Augmentative and Alternative Communication (AAC) devices, American Sign Language, braille or eye gaze were administered the SR Foundational Reading items included in the Reading Test. | *National Center and State Collaborative 2015 Operational Assessment Technical Manual* (p. 101 and appendix 6-D) |

#### How were writing constructed response items scored in the 2015 administration?

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| Summary | References |
| The writing CR items were field tested and required students to produce a permanent product in response to a writing prompt. The student, or a qualified scribe, recorded the response to the writing prompt on either the response template that was in the NCSC Assessment System or on the paper response template that was included in the writing DTA. Responses were centrally scored by trained and qualified scorers under the direction of the contractor. The scoring process included training, calibration sets, qualifying, read-behinds, and an established resolution process. A detailed description of the process, quality control procedures, and outcomes are available in the *Technical Manual*.  | *National Center and State Collaborative 2015 Operational Assessment Technical Manual* (pp. 104-114 and Appendix 6-D) |

#### What measurement model was used and how was it implemented?

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| Summary | References |
| The two-parameter logistic (2PL) model was used for dichotomous (multiple-choice) items. PARSCALE 4.1 was used for all analyses with default priors for all parameter estimates. Full specifications and details are available in the *Technical Manual*.  | *National Center and State Collaborative 2015 Operational Assessment Technical Manual* (pp. 121-128) |

#### What was the process for establishing the NCSC reporting scale?

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| Summary | References |
| The reporting scales are a linear transformation of the underlying theta metric. The reporting scales were developed such that they range from 1200 through 1290 for all grade/content combinations. The second cut is fixed at 1240 for each grade level. Scales were set to a have a standard deviation of 15 with a highest obtainable scale score (HOSS) of 1290. Details regarding the scaling process and the final score tables are available in the *Technical Manual*.  | *National Center and State Collaborative 2015 Operational Assessment Technical Manual* (pp. 128-131; score tables provided in appendix 6-H) |

#### What reports were produced and what decision rules were used in reporting?

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| Summary | References |
| The following reports were produced for the spring 2015 NCSC administration: * Individual student report
* District summary report
* School summary report
* School roster report

Report samples are available in the *Guide for Score Report Interpretation,* which isAppendix 9-B of the Technical ManualAll reporting specifications and rules (e.g. variables and values for the report file, QC process, inclusion rules) are in appendices 9-A, 9-C, and 9-D of the *Technical Manual*.  | *National Center and State Collaborative 2015 Operational Assessment Technical Manual* (Appendix 9A-D) |

### Performance Standards

#### What are the NCSC Performance Levels?

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| Summary | References |
| NCSC assessment results are described in four performance categories. Performance Level Descriptors (PLD) were developed for each category by a team of experts to describe how well a student has learned the content and skills assessed. The PLDs are provided as appendix 7-B in the Technical Manual.  | *National Center and State Collaborative 2015 Operational Assessment Technical Manual* (Appendix 7-B) |

#### What process was used for standard setting and what were the outcomes?

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| Summary | References |
| The standard setting process used was the bookmark procedure. The standard setting process was conducted over three rating rounds in August of 2015 followed by a cross-grade articulation committee. The full standard setting report, including process, results, and all materials used, are provided in chapter 7 and in the associated appendices of the *Technical Manual*.   | *National Center and State Collaborative 2015 Operational Assessment Technical Manual* (Chapter 7 and appendices 7-A to 7-N) |

### Evidence of Validity, Fairness, and Reliability

#### What are the sources of evidence to support validity based on test content?

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| Summary | References |
| Evidence in support of validity for the NCSC assessment is strongly tied to the systematic, principled design approach for defining the construct, prioritizing content, developing specifications, developing items and forms, piloting and evaluating results, and refining specifications and procedures. This process documented in chapter two of the *Technical Manual* and addressed in the Development section of this document.A series of studies were implemented to gauge the degree of alignment between the CCCs and the grade-level CCSS. Results indicate the sample of CCCs are an adequate representation of the CCSS. Other studies focused on assessment items used on NCSC assessments and the extent to which inferences about student knowledge and skills reflected in the standards and PLDs are supported by the test items. Results reveal items are appropriately aligned to the standards and reflect the knowledge and skills in the PLDs.  | *National Center and State Collaborative 2015 Operational Assessment Technical Manual* (Chapter 2 and appendices 7-A to 7-N)*National Center and State Collaborative 2015 Operational Assessment Technical Manual* (Chapter 3; Appendix 3)* *Study of the Relationship Between the NCSC Mathematics Prioritized Core Content Connectors and the Mathematics Common Core State Standards*
* *Study of the Relationship Between the NCSC Reading Prioritized Core Content Connectors and the English Language Arts Common Core State Standards*
* *Study of the Relationship Between the NCSC Writing Prioritized Core Content Connectors and the English/Language Arts Common Core State Standards*
* *Alignment of NCSC English Language Arts and Mathematics Operational Items to Academic Grade-Level Content Targets*
* *ELA and Mathematics Item Mapping Study: Performance Level Descriptions and Items*
 |

#### What are the sources of evidence to support validity based on response processes?

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| Summary | References |
| The principled design approach for developing assessment content reflected in the design patterns and task templates document how items were designed to elicit the target knowledge and skills.  Student interaction studies were conducted during the development phase, which employed cognitive laboratory procedures to elicit feedback from teachers and students about the extent to which the items elicit the intended knowledge and skills. | *National Center and State Collaborative* *2015 Operational Assessment* *Technical Manual* * Item Specifications Reflected in Example Annotated Design Pattern and Task Template (Appendix 2-A)
* Student and teacher interaction with task templates pp. 57-58
* Student interaction with and teacher perception of mathematics and reading items pp. 58-59
 |

#### What are the sources of evidence to support validity based on internal structure?

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| Summary | References |
| The tier structure was developed for NCSC as a device to produce items that span a range of increasing cognitive complexity from tier 1 to 4, respectively. Patterns of performance by tier support the intended structure, as evidenced by the increasing difficulty associated with advanced tiers.Differential item functioning (DIF) provides evidence that the internal structure is consistent for groups of examinees. NCSC conducted DIF analyses for all grades and content areas across six subgroups of examinees and found very little evidence of high- DIF. Moreover, score variance and alpha coefficients were consistent for examinee groups by demographic factors and disability categories for all grades and content areas.Dimensionality studies were implemented using DIMTEST and DETECT for all grades and content areas following the spring 2015 administration. Moreover, a separate study, which included additional exploratory factor analytic approaches as well as qualitative reviews of the factor structure, was implemented to attempt to quantify and define the hypothesized factor structure.  | *National Center and State Collaborative* *2015 Operational Assessment* *Technical Manual* * Chapter 6 Psychometric Analyses Classical statistics; pp. 120-121, and IRT parameters; pp. 136-127)
* Chapter 8 Studies of Reliability and construct-Related Validity; summarized pp. 177-179 and detailed in appendix 8-C

*An Examination of Item Difficulty by Tier, Domain, and Distribution: NCSC 2015 Administration* (December, 2016)*Exploring Dimensionality within the 2015 NCSC Operational Administration Data* (December, 2016) |

#### What are the sources of evidence to support validity based on relationship to other variables?

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| Summary | References |
| An investigation was conducted to explore the alignment between KSAs reflected in the assessment and the learning expectations central to instruction. Results affirmed that the targets for measurement provide information useful for tracking student progress in the CCSS and to teachers for providing instruction focused on academic expectations.Another investigation addressed the extent to which assessment claims align with grade-level content and are useful for tracking progress. Results indicate measurement targets are appropriate and useful for these purposes. | *National Center and State Collaborative* *2015 Operational Assessment* *Technical Manual* * *Study of Coherence* Appendix 3-B, Study 2
* *Vertical Coherence Study* Appendix 3-B, Study 5.
 |

#### What are the sources of evidence to support claims of fairness and accessibility?

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| Summary | References |
| The NCSC model for item and task development incorporates best practices in universal design for learning principles and an explicit focus on accessibility of item features by design. Moreover, NCSC used a systemic evidenced-based process to identify and document item features that would maximize accessibility for examinees reflected in the design patterns and task templates. Items were reviewed upon initial development and following pilot testing with data by broad-based expert committees. Reviews included scrutiny of items for bias, sensitivity, accessibility, including the needs of low-incidence special populations. Detailed documentation is provided in chapter 2 of the *Technical Manual*. The ongoing work of the experts on the accommodations committee to define a wide-range of strategies and supports to bolster accessibility in keeping with the principled design approach of NCSC is documented in Appendix 2-B of the technical manual. Differential item functioning (DIF) provides further evidence that item performance was not systematically disparate for the subgroups examined. NCSC conducted DIF analyses for all grades and content areas across six subgroups of examinees and found very little evidence of high- DIF. | *National Center and State Collaborative* *2015 Operational Assessment* *Technical Manual* * Chapter 2: Test Development
* Appendix 2-A: Item Specifications Reflected in Example Annotated Design Pattern and Task Template
* Appendix 2-B: Accessibility by Design – Accommodations Committee Work
* Chapter 8 Studies of Reliability and construct-Related Validity; summarized pp. 177-179 and detailed in appendix 8-C
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#### What are the sources of evidence to support reliability of test scores?

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| Summary | References |
| Chapter 8 of the Technical Manual and the associated appendices address reliability and standard error for the 2015 administration by grade/content test, form, and subgroup. Chapter 8 also includes results from decision consistency analyses for all cut score thresholds. Test Information Functions (TIF) and Conditional Standard Error of Measurement (CSEM) are provided in chapter 6 of the *Technical Manual* and appendix 6-F. An additional study of the precision of the 2015 administration was conducted to explore the CSEM at the performance level cuts. This study also examines difficulty and discrimination by tier to provide information about the items that may be available to bolster the precision of the scale.  | *National Center and State Collaborative* *2015 Operational Assessment* *Technical Manual* * Chapter 8; Appendix 8-A and 8-B
* Chapter 6 and Appendix 6-F
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**Glossary of Acronyms**

|  |  |
| --- | --- |
| 2PL | Two Parameter Logistic (Item Response Theory Model) |
| AA-AAS | Alternate Assessment Based on Alternate Achievement Standards |
| AAC | Augmentative and Alternative Communication |
| CCC | Core Content Connectors |
| CCSS | Common Core State Standards |
| CMS | Content Management System  |
| CR | Constructed Response  |
| CSEM | Conditional Standard Error of Measurement |
| DFA | Directions for Test Administration  |
| DIF | Differential Item Functioning |
| ECD | Evidence Centered Design |
| HOSS | Highest Obtainable Scale Score |
| IEP | Individualized Education Program |
| IP | Intellectual Property |
| IRT | Item Response Theory  |
| KSA | Knowledge, Skills, and Abilities |
| LOSS | Lowest Obtainable Scale Score |
| NCSC | National Center and State Collaborative |
| OR | Open Response |
| PLD | Performance Level Descriptor |
| SEM | Standard Error of Measurement |
| SR | Selected Response  |
| TA | Test Administrator |
| TAM | Test Administration Manual |
| TC | Test Coordinator |
| UDL | Universal Design for Learning  |