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|  | Test Results Data Dictionary and Logical Data Model – Updated 28 October 2015 |

# Introduction

Smarter Balanced has agreed to accept test results from its member states in multiple binary formats. To ensure that each format meets baseline requirements Smarter Balanced is publishing this Data Dictionary and Logical Data Model. Since it is a logical, not binary, specification it applies to all formats for transmitting test results data within the SmarterApp assessment infrastructure.

The [Four-Layer Framework for Data Standards](http://x.ofthat.com/papers/fourlayer.pdf) offers context for how this specification relates to other SmarterApp specifications. The four layers are:

1. Data Dictionary: Definition of data elements including name and interpretation.
2. Logical Data Model: Logical definition of entities as groups of elements and inter-entity relationships.
3. Serialization: Concrete digital format for storage or transmission of entities.
4. Protocol: Transport layer and message formats for exchanging serialized entities.

This specification describes test results at the Data Dictionary and Logical Data Model layers (layers 1 and 2). Other specifications address serialization and transmission protocols (layers 3 and 4). Field names and descriptions are mostly drawn from the [Common Education Data Standards](https://ceds.ed.gov) (CEDS) which also operates at layers 1 and 2.

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC 2119](http://www.ietf.org/rfc/rfc2119.txt).

## Extensibility

Nearly every test result format we have encountered includes additional information beyond the fields defined here. Data serialization formats should not be constrained to just these fields. Certain serialization formats like XML and JSON include standard extension mechanisms. Accordingly, extensions should be made at the serialization level. Future updates to the data dictionary and logical data model may incorporate fields from the various serialization formats.

# Logical Data Model

The entity-relationship diagram in Figure 1 represents the logical data model for test results.

Figure 1: Logical Data Model ERD for Test Results



The data follows a strict hierarchy. Each test result has one **Test** record which contains information about the test itself; about the student and the institution to which the student belongs; about test delivery including date, time, and environment; and the overall test score information.

Each Test has one or more **segments**. In current Smarter Balanced tests there is always only one segment but the test delivery system and associated data formats support multiple segments and Smarter Balanced or other organizations may make use of this feature in the future.

Each segment is composed of multiple assessment **items**. For fixed-form segments, all students are presented the same set of items in the same order. For computer-adaptive segments, the items presented and the order varies according to performance and other factors managed by the adaptive assessment engine. Each item record contains information about the assessment item and the full student response to the item.

An item has one or more **response scores** most items have a single score. However, certain items are scored on multiple dimensions each representing a different skill family. For multidimensional items there is one response score record per scoring dimension.

The hierarchical data organization is well-suited to certain serialization formats like XML and JSON. However, CSV is a more popular format for transmitting test results and it is not well-suited to hierarchical data. When rendering test results in tabular formats like CSV a common approach is to use two tables. One table represents the test information. The second table (usually in a different CSV file) collapses the segment, item, and response score information into a single table. Segment and item information is repeated for each score. Since most items have only one score and there is very little segment information in the data model, this approach can be quite efficient.

# Data Dictionaries

The following tables are the data dictionaries for each of the four entities: Test, Segment, Item, and ResponseScore.

## Cross References

The rightmost column has cross-references to the following layer 3 formats:

* **TRT:** The [SmarterApp Test Results Transmission format](http://www.smarterapp.org/specs/TestResultsTransmissionFormat.html).
* **DWSA:** The [SmarterApp Data Warehouse Student Assessment format](http://www.smarterapp.org/specs/DataWarehouse-DataSpec-StudentAssessments.html)
* **DWIL:** [The SmarterApp Data Warehouse Item Level format](http://www.smarterapp.org/specs/DataWarehouse-DataSpec-ItemLevel.html)
* **AIR:** The AIR CSV format for certain states.

When a cross reference includes “(opt)” it means the field is designated as optional in the referenced format.

Entity: Test

**Description:** All fields that appear once per test report.

**Includes:**

* Test Information
* Student Information
* Institution Information
* Test Delivery Information
* Score Information

**Relationships** 1:n Test to Segment

**Occurrence** One per test report.

Table 1: Test Entity Fields

| **Test Field Name**  **(TRT Field Name)** | **Data Type** | **Width (chars)** | **Description** | **Acceptable Values** | **Required** | **Reference** | **Cross Reference** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Test Information** |  |  |  |  |  |  |  |
| AssessmentId | xsd:token | 40 | A unique number or alphanumeric code assigned to an assessment by its publisher. | One or more printable characters | Always | <https://ceds.ed.gov/element/001067> | **TRT:**testId  **DWSA:**AssessmentGuid  **AIR:**TstNm\_ID |
| AssessmentName | xsd:token | 250 | The name given to an assessment event. | One or more printable characters | Always | <https://ceds.ed.gov/element/000977> | **TRT:**name  **AIR:**Test\_Name |
| Subject | xsd:token | 10 | The subject of the test | Math, ELA, etc. | Always | See[[1]](#footnote-1) <https://ceds.ed.gov/CEDSElementDetails.aspx?TermId=7021> | **TRT:**subject  **DWSA:**AssessmentAcademicSubject  **AIR:**TestSubj |
| DeliveryMode | xsd:token | 10 | Mode of the test. Either 'online', 'paper' or 'scanned'. Here 'paper' means it was a data entry test (meaning the student took the test on paper and someone else then entered the responses in the online system). | online paper scanned  Defaults to “online”. | Paper or scanned: Required  Online: Optional |  | **TRT:**mode  **AIR:**TestMode (opt) |
| TestGrade | xsd:token | 2 | The typical grade or combination of grade-levels, developmental levels, or age-levels for which an assessment is designed. | IT, PR, PK, TK, KG, 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, PS, UG | Always | <https://ceds.ed.gov/element/000177> | **TRT:**grade  **DWSA:**AssessmentLevelForWhichDesigned  **AIR:**TestGrd |
| AssessmentType | xsd:token | 50 | The category of an assessment based on format and content. | Summative Interim | Always | <https://ceds.ed.gov/element/000029> | **TRT:**assessmentType  **DWSA:**AssessmentType |
| SchoolYear | xsd:integer | 4 | The school year in which the test is administered. For academic years that span a calendar year this is the four digit year-end. E.g. 2013 for 2012-2013 | 1900 <= YYYY <= 9999 | Always | <https://ceds.ed.gov/element/000243> | **TRT:**academicYear  **DWSA:**AssessmentYear  **AIR:**SchlYr |
| AssessmentVersion | xsd:token | 30 | The version number of the Assessment Form. | Alphanumeric | Optional | <https://ceds.ed.gov/element/001183> | **TRT:**assessmentVersion |
| **Student Information** |  |  |  |  |  |  |  |
| StudentIdentifier | xsd:token | 40 | State-issued student ID | One or more printable characters | Identifed: Required  Deidentified: Prohibited | <https://ceds.ed.gov/element/001071> | **TRT:**ExamineeAttribute-StudentIdentifier  **DWSA:**StudentIdentifer  **DWIL:**studentId  **AIR:**SSID |
| AlternateSSID | xsd:token | 40 Present  65 Future | Alternate State Student ID. This ID is required with de-identified student data so that the recipient match data that corresponds to the same student but cannot identify the student.[[2]](#footnote-2) | One or more printable characters | Identifed: Optional  Deidentified: Required | <https://ceds.ed.gov/element/001071> | **TRT:**ExamineeAttribute-AlternateSSID  **DWSA:**ExternalSSID |
| FirstName | xsd:token | 35 | Student first name | One or more printable characters. | Identifed: Required  Deidentified: Prohibited | <https://ceds.ed.gov/element/000115> | **TRT:**ExamineeAttribute-FirstName  **DWSA:**FirstName |
| MiddleName | xsd:token | 35 | Student middle name | One or more printable characters. | Identifed: Optional  Deidentified: Prohibited | <https://ceds.ed.gov/element/000184> | **TRT:**ExamineeAttribute-MiddleName  **DWSA:**MiddleName |
| LastOrSurname | xsd:token | 35 | Student last name | One or more printable characters. | Identifed: Required  Deidentified: Prohibited | <https://ceds.ed.gov/element/000172> | **TRT:**ExamineeAttribute-LastOrSurname  **DWSA:**LastOrSurname |
| Birthdate | xsd:date | 10 | Student’s birthdate | YYYY-MM-DD. For example 2006-07-15 | Identifed: Required  Deidentified: Prohibited | <https://ceds.ed.gov/element/000033> | **TRT:**ExamineeAttribute-Birthdate  **DWSA:**Birthdate |
| GradeLevelWhenAssessed | xsd:token | 2 | The grade or developmental level of a student when assessed. | IT, PR, PK, TK, KG, 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, PS, UG | Always | <https://ceds.ed.gov/element/000126> | **TRT:**ExamineeAttribute-GradeLevelWhenAssessed  **DWSA:**GradeLevelWhenAssessed  **AIR:**Grade |
| Sex | xsd:token | 6 | The student’s gender. | Male, Female | Always | <https://ceds.ed.gov/element/000255> | **TRT:**ExamineeAttribute-Sex  **DWSA:**Sex  **AIR:**Gndr |
| HispanicOrLatinoEthnicity | xsd:token | 3 | An indication that the person traces his or her origin or descent to Mexico, Puerto Rico, Cuba, Central and South America, and other Spanish cultures, regardless of race. | Yes, No | Always | <https://ceds.ed.gov/element/000144> | **TRT:**ExamineeAttribute-HispanicOrLatinoEthnicity  **DWSA:**HispanicOrLatinoEthnicity  **AIR:**HispEthnicFg |
| AmericanIndianOrAlaskaNative | xsd:token | 3 | A person having origins in any of the original peoples of North and South America (including Central America), and who maintains cultural identification through tribal affiliation or community attachment. | Yes, No | Always | <https://ceds.ed.gov/element/000016> | **TRT:**ExamineeAttribute-AmericanIndianOrAlaskaNative  **DWSA:**AmericanIndianOrAlaskaNative  **AIR:**AmerIndianAlsknNtvRaceFg |
| Asian | xsd:token | 3 | A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian Subcontinent. This area includes, for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam. | Yes, No | Always | <https://ceds.ed.gov/element/000020> | **TRT:**ExamineeAttribute-Asian  **DWSA:**Asian  **AIR:**AsianRaceFg |
| BlackOrAfricanAmerican | xsd:token | 3 | A person having origins in any of the black racial groups of Africa. | Yes, No | Always | <https://ceds.ed.gov/element/000034> | **TRT:**ExamineeAttribute-BlackOrAfricanAmerican  **DWSA:**BlackOrAfricanAmerican  **AIR:**BlackRaceFg |
| White | xsd:token | 3 | A person having origins in any of the original peoples of Europe, Middle East, or North Africa. | Yes, No | Always | <https://ceds.ed.gov/element/000301> | **TRT:**ExamineeAttribute-White **DWSA:**White  **AIR:**WhiteRaceFg |
| NativeHawaiianOrOtherPacificIslander | xsd:token | 3 | A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands. | Yes, No | Always | <https://ceds.ed.gov/element/000192> | **TRT:**ExamineeAttribute-NativeHawaiianOrOtherPacificIslander  **DWSA**:NativeHawaiianOrOtherPacificIslander  **AIR:** PacIslndrRaceFg |
| DemographicRaceTwoOrMoreRaces | xsd:token | 3 | A person having origins in any of more than one of the racial groups.  To support backward compatibility for systems that cannot derive this, i.e. systems that use a single race/ethnicity element rather than separate flags that can indicate one or more ethnicities | Yes, No | Always | <https://ceds.ed.gov/element/000973> | **TRT:**ExamineeAttribute-DemographicRaceTwoOrMoreRaces  **DWSA:**DemographicRaceTwoOrMoreRaces  **AIR:**DemographicRaceTwoOrMoreRaces |
| IDEAIndicator | xsd:token | 3 | Student has an Individual Education Plan according to the IDEA act. (See reference for the full definition). | Yes, No | Always | <https://ceds.ed.gov/element/000151> | **TRT:**ExamineeAttribute-IDEAIndicator  **DWSA:**IDEAIndicator  **AIR:**IEP |
| LEPStatus | xsd:token | 3 | Student with Limited English Proficiency. See reference for the full definition). | Yes, No | Always | <https://ceds.ed.gov/element/000180> | **TRT:**ExamineeAttribute-LEPStatus  **DWSA:**LEPStatus  **AIR:**LEP |
| Section504Status | xsd:token | 3 | Individuals with disabilities who are being provided with related aids and services under Section 504 of the Rehabilitation Act of 1973, as amended. | Yes, No | Always | <https://ceds.ed.gov/element/000249> | **TRT:**ExamineeAttribute-Section504Status  **DWSA:** Section504Status  **AIR:**504Plan |
| EconomicDisadvantageStatus | xsd:token | 3 | An indication that the student met the State criteria for classification as having an economic disadvantage. | Yes, No, Unspecified | Always | <https://ceds.ed.gov/element/000086> | **TRT:**ExamineeAttribute-EconomicDisadvantageStatus  **DWSA:**EconomicDisadvantageStatus  **AIR:**EconomicDisadvantageStatus |
| LanguageCode | xsd:token | 3 | The code for the specific language or dialect that a person uses to communicate. | See <http://ceds.ed.gov/languageCodes.aspx> | Optional | <https://ceds.ed.gov/CEDSElementDetails.aspx?TermId=7317> | **TRT:**ExamineeAttribute-LanguageCode (opt) |
| EnglishLanguageProficiencyLevel | xsd:token | 20 | A state-specific indication of the student’s English language proficiency level. | Should match a state-specific taxonomy, | Optional | Related to <https://ceds.ed.gov/CEDSElementDetails.aspx?TermId=5527> | **TRT:**ExamineeAttribute-EnglishLanguageProficiencyLevel (opt)  **AIR:**EnglishLanguageProficiencyLevel (opt) |
| MigrantStatus | xsd:token | 3 | Student and/or parents are migratory. (See reference for the complete definition.) | Yes, No | Optional | <https://ceds.ed.gov/element/000189> | **TRT:**ExamineeAttribute-MigrantStatus  **AIR:**MigrantStatus (opt) |
| FirstEntryIntoUSSchool | xsd:date | 10 | The year, month and day of a person's initial enrollment into a United States school. | YYYY-MM-DD | Optional | <https://ceds.ed.gov/element/000529> | **TRT:**ExamineeAttribute-FirstEntryIntoUSSchool  **AIR:**FirstEntryIntoUSSchool (opt) |
| LimitedEnglishProficiencyEntryDate | xsd:date | 10 | The year, month and day a student classified as limited English proficient entered the LEP program. | YYYY-MM-DD | Optional | <https://ceds.ed.gov/element/001247> | **TRT:**ExamineeAttribute-LimitedEnglishProficiencyEntryDate  **AIR:**LimitedEnglishProficiencyEntryDate (opt) |
| LEPExitDate | xsd:date | 10 | The year, month and day a student classified as limited English proficient exited the LEP program. | YYYY-MM-DD | Optional | <https://ceds.ed.gov/element/000570> | **TRT:**ExamineeAttribute-LEPExitDate  **AIR:**LEPExitDate (opt) |
| TitleIIILanguageInstructionProgramType | xsd:token | 20 | The type of Title III language instructional programs. | See the reference for the set of acceptable codes and definitions. | Optional | <https://ceds.ed.gov/element/000447> | **TRT:**ExamineeAttribute-TitleIIILanguageInstructionProgramType  **AIR:**TitleIIILanguageInstructionProgramType (opt) (opt) |
| PrimaryDisabilityType | xsd:token | 3 | The major or overriding disability condition that best describes a person's impairment. | See the reference for the set of acceptable codes and definitions. | Optional | <https://ceds.ed.gov/element/000218> | **TRT:**ExamineeAttribute-PrimaryDisabilityType  **AIR:**PrimaryDisabilityType (opt) |
| **Institution Information** |  |  |  |  |  |  |  |
| StateAbbreviation | xsd:token | 2 | Abbreviation for the state or territory in which the student attends school. | A two-letter state or territory abbreviation according to U.S. Postal standards. | Required | <https://ceds.ed.gov/element/000267> | **TRT:**ExamineeRelationship-StateAbbreviation  **DWSA:**StateAbbreviation |
| DistrictId | xsd:token | 40 | The ID of the district responsible for specific educational services and/or instruction of the student. | Alphanumeric | Identifed: Required  Deidentified: Optional[[3]](#footnote-3) | <https://ceds.ed.gov/element/000637> | **TRT:**ExamineeRelationship-DistrictId  **DWSA:**ResponsibleDistrictIdentifier  **AIR:**DistrictID |
| DistrictName | xsd:token | 60 | The Name of the district responsible for specific educational services and/or instruction of the student. | Alphanumeric | Optional | <https://ceds.ed.gov/element/000204> | **TRT:**ExamineeRelationship-DistrictName  **DWSA:**OrganizationName |
| SchoolId | xsd:token | 40 | A unique number or alphanumeric code assigned to an institution by a school, school system, a state, or other agency or entity. | Alphanumeric | Identifed: Required  Deidentified: Optional | <https://ceds.ed.gov/element/001069> | **TRT:**ExamineeRelationship-SchoolId  **DWSA:**ResponsibleSchoolIdentifier  **AIR:**SchoolID |
| SchoolName | xsd:token | 60 | The full legally accepted name of the institution. | Alphanumeric | Optional | <https://ceds.ed.gov/element/000191> | **TRT:**ExamineeRelationship-SchoolName  **DWSA:**NameOfInstitution |
| StudentGroupNames | xsd:token | 50 | One or more names of groups to which the student belongs. These may be classes, categories, programs or other groups that serve local needs.  The physical format specification should indicate the format of the list (e.g. semicolon-delimited string, list of XML elements, JSON array, etc. | Up to ten names of up to 50 characters each. | Optional |  | **TRT:**ExamineeRelationship-StudentGroupName  **DWSA:**Group1Id to Group10Id |
| **Test Delivery Information** |  |  |  |  |  |  |  |
| TestOpportunityId | xsd:token | 40 | A unique identifier of the student-test opportunity. (Typically a GUID) | One or more printable characters | Always | <https://ceds.ed.gov/element/001540> | **TRT:**Opportunity-Key  TRT see also Opportunity-oppId  **AIR:**VndrTstEvent\_ID |
| AssessmentAdministrationStartDate | xsd:date | 10 | The first date of the first window for a given assessment. | YYYY-MM-DD | Always | <https://ceds.ed.gov/element/000962> | **TRT:**effectiveDate |
| StartDateTime | xsd:dateTime | 23 | The actual date and time when the individual started taking the test. | YYYY-MM-DDTHH:MM:SS | Always | <https://ceds.ed.gov/element/001021> | **TRT:**startDate  **AIR:**TStartDt |
| SubmitDateTime | xsd:dateTime | 23 | Date the student submitted the opportunity for scoring. | YYYY-MM-DDTHH:MM:SS | Always | <https://ceds.ed.gov/element/001022> | **TRT:**dateCompleted  **AIR:**TEndDt |
| ForceSubmitDateTime | xsd:dateTime | 23 | The date and time in which a test was force-submitted in behalf of the student. This may be an incomplete test (not all questions answered) or a complete test in which the student neglected to submit final answers. When this field is present, SubmitDateTime should be the last time the student answered a question or otherwise interacted with the testing system. | YYYY-MM-DDTHH:MM:SS | Optional |  | **TRT:**dateForceCompleted |
| Status | xsd:token | 50 | Status of the opportunity. Tracks the status of this test opportunity through the process of administration, resets, scoring, and reporting.  (The values of completed and invalidated are deprecated in favor the Validity and Completeness fields.) | appeal completed (deprecated) expired handscoring invalidated (deprecated) paused reported reset scored  submitted | Always |  | **TRT:**status  **AIR:**TestStatus |
| StatusDateTime | xsd:dateTime | 23 | The date and time the status of this opportunity last changed. | YYYY-MM-DDTHH:MM:SS | Optional |  | **TRT:**statusDate |
| AdministrationCondition | xsd:token | 7 | Conditions of the test administration:   * **Valid or (Blank)** indicates that the assessment was given in a standardized (proctored) environment. Typically applied to summative assessments. * **Invalid (IN)** indicates that the test result has been marked invalid due to problems in the test administration or environment. Typically applied to summative assessments. * **Standardized** **(SD)** The assessment was administered in a standardized manner. It is appropriate to compare this score with other scores in the same manner. Typically applied to interim assessments. * **Nonstandardized (NS)** The assessment was administered in an informal – nonstandardized manner. | (blank)  Valid  SD  NS  IN | Optional  If not present, Valid is presumed |  | **TRT:**administrationCondition  **DWSA:**administrationCondition |
| Completeness | xsd:token | 8 | Completeness of the test (whether student responded to all items in the test). | (blank)  Partial  Complete | Optional  If not present, Complete is presumed |  | **TRT:**completeStatus  **DWSA:**completeStatus |
| AccessibilityCodes | xsd:token | 1000 | A list of accessibility feature codes paired with accessibility feature use codes indicating the accessibility resources that were made available to the student.  The physical format of the list and delimiters should be specified in the data serialization specification. | See the “ISAAP Accessibility Feature Codes” specification. | Always | See: <https://ceds.ed.gov/element/000385> | **TRT:**Accommodation-Code  **DWSA:** Accommodation[[4]](#footnote-4)  **AIR:**Accommodation |
| NumberOfResponses | xsd:unsignedInt | 8 | Number of items in this report.  (Early software releases may include prefetched items that the student never saw but this behavior is discouraged). | Integer, 0 or greater | Always | <https://ceds.ed.gov/element/001009> | **TRT:**ItemCount  **AIR:**NAttempt |
| FieldTestCount | xsd:unsignedInt | 8 | Number of field test items included in Itemcount | Integer, 0 or greater | Optional |  | **TRT:**ftCount (opt) |
| PauseCount | xsd:unsignedInt | 8 | number of times Examinee paused the opportunity | Integer, 0 or greater | Optional |  | **TRT:**pauseCount (opt)  **AIR:**TOT\_NUM\_PAUSED (opt) |
| GracePeriodRestarts | xsd:unsignedInt | 8 | The number of times the student paused the test and restarted it within the grace period (typically 20 minutes). | Integer, 0 or greater | Optional |  | **TRT:**gracePeriodRestarts (opt)  **AIR:**NUM\_PAUSED\_20 (opt) |
| AbnormalStarts | xsd:unsignedInt | 8 | The number of times the test was restarted after an abrupt end to a test (browser crash, power shutdown, network loss etc.). | Integer, 0 or greater | Optional |  | **TRT:**abnormalStarts |
| OpportunityCount | xsd:unsignedInt | 8 | A the number of times the student has taking this test including the present opportunity. | Integer, 1 or greater | Optional |  | **TRT:**opportunity (opt)  **AIR:**Oprtnty |
| TestWindowId | xsd:token | 50 | the ID of the window in which the test was administered (E.g. SBAC-Spring-2015) | One or more printable characters | Always |  | **TRT:**windowId |
| TestSessionId | xsd:token | 40 | Test Delivery System ID for the session in which this test was taken. Typically unique to a time, location, and test administrator. | Zero or more printable characters | De-identified: Prohibited  Otherwise: Optional |  | **TRT:**sessionId  **DWSA:**AssessmentSessionLocationId  **AIR:**TASessionID (opt) |
| TestAdministratorId | xsd:token | 128 | ID of the Test Administrator that administered this test.  (Often the email address of the TA has been used but this is discouraged for privacy reasons.) | Zero or more printable characters | De-identified: Prohibited  Otherwise: Optional | <https://ceds.ed.gov/element/001572> | **TRT:**TAID (opt)  **AIR:**TAUserID (opt) |
| OrganizationName | xsd:token | 60 | The name of the organization with overall responsibility for the assessment event.  Typically the name of the state (e.g. “Oregon”) | One or more printable characters | Optional | <https://ceds.ed.gov/element/000966> | **TRT:**clientName |
| UserAgent | xsd:string | 512 | A space-delimited list of product tokens (keywords) with optional comments that identifies the client hardware and software with which the assessment was delivered to the student during the assessment session.  In most cases, this is the User Agent String from a web browser. In other cases, it should follow the same format. | Alphanumeric | Online: Always | <https://ceds.ed.gov/element/001152> | **TRT:**assessmentParticipantSessionPlatformUserAgent |
| TestDeliveryServer | xsd:token | 128 | Name of the Test Delivery Service (TDS server that was used to administer this test. | One or more printable characters | Optional |  | **TRT:**server |
| TestDeliveryDatabase | xsd:token | 128 | Name of the TDS DB that was used to administer this test. | Zero or more printable characters | Optional | <https://ceds.ed.gov/element/001539> | **TRT:**database |
| WindowOpportunityCount | xsd:unsignedInt | 8 | The number of times a student has taken this test in this window. | Integer, 1 or greater | Optional |  | **TRT:**windowOpportunity |
| **Test Score Information** |  |  |  |  |  |  |  |
| ScaleScore | xsd:float | 8 | The overall Scale Score earned by the student on this test. | A positive number, typically an integer. | Always | <https://ceds.ed.gov/element/000245> | **TRT:**Score/value[[5]](#footnote-5)  **DWSA:**AssessmentSubtestResultScoreValue  **AIR:**SS\_TOT |
| ScaleScoreStandardError | xsd:float | 8 | The standard error for the TestScaleScore | Floating point number | Always | <https://ceds.ed.gov/element/001546> | **TRT:**Score/standardError  **DWSA:**AssessmentSubtestMinimumValue[[6]](#footnote-6)  **AIR:**SEM\_TOTSS (opt) |
| ScaleScoreAchievementLevel | xsd:integer | 1 | The achievement level corresponding to the scale score. | For Smarter Balanced, overall achievement levels are 1 to 4. | Always | <https://ceds.ed.gov/element/000245> | **TRT:**Score/value  **DWSA:**AssessmentPerformanceLevelIdentifier  **AIR:**PL\_TOT (opt) |
| OverallTheta | xsd:float | 8 | The overall theta value | Floating point number | Required for Validity Studies |  | **AIR:**THETA\_TOT (opt) |
| OverallThetaStandardError | xsd:float | 8 | The standard error for the overall theta | Floating point number | Required for Validity Studies |  | **AIR:**SEM\_TOT\_THETA (opt) |
| Claim1Score | xsd:float | 8 | Score for claim #1  For Smarter Balanced: ELA Claim 1 is Reading Math Claim 1 is Concepts & Procedures | A positive number, typically an integer. | Conditional[[7]](#footnote-7) | <https://ceds.ed.gov/element/000245> | **TRT:** Score/value  **DWSA:**AssessmentSubtestREsultScoreClaim1Value  **AIR:**SS\_SRC1 |
| Claim1ScoreStandardError | xsd:float | 8 | Standard error for claim #1 | Floating point number | Conditional | <https://ceds.ed.gov/element/001546> | **TRT:** Score/standardError  **DWSA:**AssessmentSubtestResultScoreClaim1MinimumValue  **AIR:**SEM\_SRC1 |
| Claim1ScoreAchievementLevel | xsd:integer | 1 | The achievement level corresponding to claim score #1 | For Smarter Balanced, claim achievement levels are 1 to 3. | Conditional | <https://ceds.ed.gov/element/000245> | **TRT:** Score/value  **DWSA:**AssessmentClaim1PerformanceLevelIdentifier  **AIR:**PL\_SRC1 |
| Claim1Theta | xsd:float | 8 | The theta value for claim #1 | Floating point number | Required for Validity Studies |  | **AIR:**THETA\_SRC1 |
| Claim1ThetaStandardError | xsd:float | 8 | Standard error for the claim 1 theta | Floating point number | Required for Validity Studies |  | **AIR:**SEM\_THETA\_SRC1 |
| Claim2Score | xsd:float | 8 | Score for claim #2  For Smarter Balanced: ELA Claim 2 is Writing Math combines the scores for Claim 2-Problem Solving, and Claim 4-Modeling and Data Analyisis into ClaimScore2 | A positive number, typically an integer. | Conditional | <https://ceds.ed.gov/element/000245> | **TRT:**Score/value  **DWSA:**AssessmentSubtestREsultScoreClaim2Value  **AIR:**SS\_SRC2 |
| Claim2ScoreStandardError  (Score/standardError) | xsd:float | 8 | Standard error for claim #2 | Floating point number | Conditional | <https://ceds.ed.gov/element/001546> | **TRT:**Score/standardError  **DWSA:**AssessmentSubtestResultScoreClaim2MinimumValue  **AIR:**SEM\_SRC2 |
| Claim2ScoreAchievementLevel | xsd:integer | 1 | The achievement level corresponding to claim score #2 | For Smarter Balanced, claim achievement levels are 1 to 3. | Conditional | <https://ceds.ed.gov/element/000245> | **TRT:**Score/value  **DWSA:**AssessmentClaim2PerformanceLevelIdentifier  **AIR:**PL\_SRC2 |
| Claim2Theta | xsd:float | 8 | The theta value for claim #1 | Floating point number | Required for Validity Studies |  | **AIR:**THETA\_SRC1 |
| Claim2ThetaStandardError | xsd:float | 8 | Standard error for the claim 1 theta | Floating point number | Required for Validity Studies |  | **AIR:**SEM\_THETA\_SRC1 |
| Claim3Score | xsd:float | 8 | Score for claim #3  For Smarter Balanced: ELA Claim 3 is Speaking and Listening Math Claim 3 is Communicating Reasoning | A positive number, typically an integer. | Conditional | <https://ceds.ed.gov/element/000245> | **TRT:**Score/value  **DWSA:**AssessmentSubtestREsultScoreClaim3Value  **AIR:**SS\_SRC3 |
| Claim3ScoreStandardError | xsd:float | 8 | Standard error for claim #3 | Floating point number | Conditional | <https://ceds.ed.gov/element/001546> | **TRT:**Score/standardError  **DWSA:**AssessmentSubtestResultScoreClaim3MinimumValue  **AIR:**SEM\_SRC3 |
| Claim3ScoreAchievementLevel | xsd:integer | 1 | The achievement level corresponding to claim score #3. | For Smarter Balanced, claim achievement levels are 1 to 3. | Conditional | <https://ceds.ed.gov/element/000245> | **TRT:**Score/value  **DWSA:**AssessmentClaim3PerformanceLevelIdentifier  **AIR:**PL\_SRC3 |
| Claim3Theta | xsd:float | 8 | The theta value for claim #1 | Floating point number | Required for Validity Studies |  | **AIR:**THETA\_SRC3 |
| Claim3ThetaStandardError | xsd:float | 8 | Standard error for the claim 1 theta | Floating point number | Required for Validity Studies |  | **AIR:**SEM\_THETA\_SRC3 |
| Claim4Score | xsd:float | 8 | Score for claim #4  For Smarter Balanced: ELA Claim 4 is Research/Inquiry Math does not use this value as claim 4 is combine with claim 2. | A positive number, typically an integer. | Conditional | <https://ceds.ed.gov/element/000245> | **TRT:**Score/value  **DWSA:**AssessmentSubtestREsultScoreClaim4Value  **AIR:**SS\_SRC4 |
| Claim4ScoreStandardError | xsd:float | 8 | Standard error for claim #4 | Floating point number | Conditional | <https://ceds.ed.gov/element/001546> | **TRT:**Score/standardError  **DWSA:**AssessmentSubtestResultScoreClaim4MinimumValue  **AIR:**SEM\_SRC4 |
| Claim4ScoreAchievementLevel | xsd:integer | 1 | The achievement level corresponding to claim score #4. | For Smarter Balanced, claim achievement levels are 1 to 3. | Conditional | <https://ceds.ed.gov/element/000245> | **TRT:**Score/value  **DWSA:**AssessmentClaim4PerformanceLevelIdentifier  **AIR:**PL\_SRC4 |
| Claim4Theta | xsd:float | 8 | The theta value for claim #1 | Floating point number | Required for Validity Studies |  | **AIR:**THETA\_SRC4 |
| Claim4ThetaStandardError | xsd:float | 8 | Standard error for the claim 1 theta | Floating point number | Required for Validity Studies |  | **AIR:**SEM\_THETA\_SRC4 |

Entity Segment

**Description** Information about one test segment.

**Relationships** n:1 Segment to Test  
1:n Segment to Item

**Occurrence** One occurrence per test segment included in a test. Most Smarter Balanced tests have one segment which is either fixed-form or computer-adaptive.

Table 2: Segment Entity Fields

| **Segment Field Name**  **(TRT Field Name)** | **Data Type** | **Width (chars)** | **Description** | **Acceptable Values** | **Required** | **Reference** | **Cross Reference** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| SegmentId | xsd:token | 40 | Identifier for this test segment (unique per test) | One or more printable characters | Optional | <https://ceds.ed.gov/element/000367> | **TRT:**Segment/id (opt)  **DWIL:**segmentId  **AIR:**SegmentId (opt) |
| SegmentPosition | xsd:unsignedInt | 8 | Position of the segment on the test. | Positive 32-bit integer, null allowed | Optional |  | **TRT:**Segment/position (opt) |
| SelectionAlgorithm | xsd:token | 40 | Item selection algorithm that was used for this segment. (“Fixed” for a fixed-form segment.) | One or more printable characters | Optional |  | **TRT:**Segment/algorithm (opt) |
| SelectionAlgorithmVersion | xsd:token | 40 | Item selection algorithm version | One or more printable characters | Optional |  | **TRT:**Segment/algorithmVersion (opt) |

Entity Item

**Description:** Information about one test item.

**Includes**:

* Item information
* Student response

**Relationships:** n:1 Item to Segment  
1:n Item to ResponseScore

**Occurrence**: One occurrence per item delivered to a student in a test session.

Table 3: Item Entity Fields

| **Item Field Name**  **(TRT Field Name)** | **Data Type** | **Width (chars)** | **Description** | **Acceptable Values** | **Required** | **Reference** | **AIR Proposed CSV** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Item Information** |  |  |  |  |  |  |  |
| ItemID | xsd:token | 40 | Item ID. Typically assigned by item authoring.  Original Smarter Balanced item IDs are in the form “<bankKey>-<itemKey>” e.g. “200-12345”. Future IDs may be in GUID or other forms. | String of printable characters | Always | <https://ceds.ed.gov/element/000630> | **TRT:**Item/key Item/bankKey  **DWIL:**key  **AIR:**Item\_ID |
| ItemPosition | xsd:unsignedInt | 8 | Ordinal position of item on test. E.g. 1 for the first item presented to the student. | Positive 32-bit integer | Always |  | **TRT:**Item/position  **DWIL:**position  **AIR:**ItemOrdr |
| FieldTest | xsd:token | 3 | Indicates that the assessment item is being field tested on this form of the test, and does not contribute to the test score. | Yes, No | Optional (defaults to “No”) | <https://ceds.ed.gov/element/001536> | **TRT:**Item/operational  **DWIL:**operational  **AIR:**item\_life\_stage |
| Dropped | xsd:token | 3 | Indicates that the item was dropped from the test and is not to be included for scoring. | Yes, No | Optional (defaults to “No”) |  | **TRT:**Item/dropped  **DWIL:**dropped |
| ItemType | xsd:token | 40 | Item type (e.g. MC (multiple choice) or GI (grid item)). | EBSR, EQ, ER, GI, HT, HTQ, MC, MI, MS, NL, SA, TI, TUT, WER, WORDLIST, Stimulus | Optional | <https://ceds.ed.gov/element/001158> | **TRT:**Item/format  **DWIL:**format  **AIR:**Item\_format |
| **Student Response Information** | |  |  |  |  |  |  |
| AdminDateTime | xsd:dateTime | 23 | Date and time item was administered to Examinee | YYYY-MM-DDTHH-MM-SS | Always | <https://ceds.ed.gov/element/000959> <https://ceds.ed.gov/element/000958> | **TRT:**Item/adminDate |
| Submitted | xsd:token | 3 | Indicates whether the student submitted a response to this item | Yes,No | Optional (defaults to “Yes”) |  | **TRT:**Item/isSelected  **DWIL:**isSelected |
| SubmitDateTime | xsd:dateTime | 23 | Date and time the student submitted a response to the item. | YYYY-MM-DDTHH-MM-SS | Optional | <https://ceds.ed.gov/element/000959> <https://ceds.ed.gov/element/000958> | **TRT:**Item/Response/date  **DWIL:**adminDate |
| NumberOfVisits | xsd:unsignedInt | 8 | Number of times the student set or changed a response to the item | Integer 1 or greater | Optional |  | **TRT:**numberVisits (opt)  **DWIL:**numberVisits  **AIR:**NbrItemVisits (opt) |
| ResponseDuration | xsd:float | 8 | The total amount of time in seconds or milliseconds that a person spent responding to a given assessment item. When multiple items are on a page, the time on that page MAY be divided evenly among the items.[[8]](#footnote-8) | Time spent in seconds. Decimals may express fractions of seconds. | Optional | <https://ceds.ed.gov/element/000958> | **TRT:**pageTime ÷ pageVisits |
| ResponseContentType | xsd:token | 50 | MIME type of item response. E.g. text/plain | One or more printable characters | Optional |  | **TRT:**Item/mimeType  **AIR:**RespTypCd |
| ResponseValue | xsd:string | unlimited | The student’s response to the item. |  | Online: Always | <https://ceds.ed.gov/element/001063> | **TRT:**Item/Response  **AIR:**Response (opt) |

Entity ResponseScore

Description Represents a student’s score for a test item.

Relationships n:1 ItemScore to Item

Occurrence Most items have a single score. However, certain items such as extended writing have scores in multiple dimensions. In those cases, there will be one ItemScore instance per dimension.

Table 4: ResponseScore Entity Fields

| **ResponseScore Field Name**  **(TRT Field Name)** | **Data Type** | **Width (chars)** | **Description** | **Acceptable Values** | **Required** | **Reference** | **AIR Proposed CSV** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Score | xsd:float | 8 | The score given to a person's response to an assessment item. | unsigned float | Always | <https://ceds.ed.gov/element/000724> | **TRT:**Item/score  **DWIL:**score  **AIR:**ItemScore |
| ScoreDimension | xsd:token | 0 | Dimension name or code to which this score corresponds. | One or more printable characters. May be blank or omitted if the item has only one scoring dimension. | Required if item has more than one scoring dimension. |  | **TRT:**Item/ScoreInfo/scoreDimension  **AIR:**ScoringDimension (opt) |
| Rater1Score | xsd:float | 8 | The score given by hand scoring rater 1 | Unsigned float | Required for Validity Studies | <https://ceds.ed.gov/element/000724> | **AIR:**Scr\_Rater1 |
| Rater1UserId | xsd:string | 50 | ID of the user who scored human-scored item | Alphanumeric ID up to 50 characters. | See Footnote[[9]](#footnote-9) | <https://ceds.ed.gov/element/001572> | **TRT:**userId  **AIR:**ID\_Rater1 (opt) |
| Rater2Score | xsd:float | 8 | The score given by hand scoring rater 1 | Unsigned float | Required for Validity Studies | <https://ceds.ed.gov/element/000724> | **AIR:**Scr\_Rater2 |
| Rater2UserId | xsd:string | 50 | ID of the user who scored human-scored item | Alphanumeric ID up to 50 characters. | See Footnote | <https://ceds.ed.gov/element/001572> | **TRT:**userId  **AIR:**ID\_Rater2 (opt) |
| Rater3Score | xsd:float | 8 | The score given by hand scoring rater 1 | Unsigned float | Required for Validity Studies | <https://ceds.ed.gov/element/000724> | **AIR:**Scr\_Rater2 |
| Rater4UserId | xsd:string | 50 | ID of the user who scored human-scored item | Alphanumeric ID up to 50 characters. | See Footnote | <https://ceds.ed.gov/element/001572> | **TRT:**userId  **AIR:**ID Rater3 (opt) |
| ScoreRationale | xsd:string | 255 | Rationale given by the human scorer. If multiple raters gave rational may be concatenated messages. | Printable text. | Optional |  |  |

# Appendix A: Test Results Transmission Format – Scores

The TRT format uses the <Score> element for all scores. In each case, the “value” attribute provides the score value and the “standardError” attribute indicates the standard error value. Scores are distinguished by the “measureOf” and “measureLabel” attributes according to the following table:

|  |  |  |
| --- | --- | --- |
|  | **measureOf** | **measureLabel** |
| Overall test scale score | Overall | ScaleScore |
| Overall test achievement level | Overall | PerformanceLevel |
| Math Claim 1 scale score | 1 | ScaleScore |
| Math Claim 1 achievement level | 1 | PerformanceLevel |
| ELA Claim 1 scale score | SOCK\_R | ScaleScore |
| ELA Claim 1 achievement level | SOCK\_R | PerformanceLevel |
| Math Claim 2,4 scale score | SOCK\_2 | ScaleScore |
| Math Claim 2,4 achievement level | SOCK\_2 | PerformanceLevel |
| ELA Claim 2 scale score | 2-W | ScaleScore |
| ELA Claim 2 achievement level | 2-W | PerformanceLevel |
| Math Claim 3 scale score | 3 | ScaleScore |
| Math Claim 3 achievement level | 3 | PerformanceLevel |
| ELA Claim 3 scale score | SOCK\_LS | ScaleScore |
| ELA Claim 3 achievement level | SOCK\_LS | PerformanceLevel |
| ELA Claim 4 scale score | 4-CR | ScaleScore |
| ELA Claim 4 achievement level | 4-CR | PerformanceLevel |

# Appendix B: Omitted Fields

The following fields exist in the cross-referenced physical formats but have not been included in the data model. In many cases, the data is redundant with other fields. In other cases, they have been omitted because the fields have been inherited from previous projects but are not relevant to the Smarter Balanced test administration.

## Fields in Test Results Transmission Format (TRT) but not in the data model

|  |  |  |
| --- | --- | --- |
| * Test/bankKey * Test/handScoreProject (optional) * Test/contract (optional) * Examinee/key (optional) * Examinee/isDemo (optional) * ExamineeAttribute/Context * ExamineeAttribute/ContextDate * ExamineeRelationship/entityKey * ExamineeRelationship/Context * ExamineeRelationship/ContextDate * Opportunity/TAName * Accommodation/type | * Accommodation/value (code is the required indicator) * Accommodation/segment (Smarter Balanced doesn’t differentiate accommodations by segment) * Score/measureLabel * GenericVariable * Item/clientId (optional) * Item/scoreStatus * Item/strand * Item/contentLevel * Item/pageNumber * Item/pageVisits * Item/pageTime | * Response/date (redundant with Item/adminDate) * ScoreInfo * SubScoreList * Comment * Score/conditionCode * Score/type * Score/userFirstName * Score/userLastName * ToolUsage * ToolPage |

## Fields in Data Warehouse Student Assessment (DWSA) but not in the data model

|  |  |  |
| --- | --- | --- |
| * Group1Text to Group 10Text | * AssessmentSessionLocation | * AssessmentAdministrationFinishDate |

## Fields in Data Warehouse Item Level (DWIL) but not in the data model

|  |  |  |
| --- | --- | --- |
| * clientId * scoreStatus * strand | * contentLevel * pageNumber * pageVisits | * pageTime |

## Fields in American Institutes for Research CSV (AIR) but not in data model

|  |  |  |
| --- | --- | --- |
| * AssessmentSubtestResultDateCreated (Optional) * GradeLevelWhenReported * LanguageCode (Optional) * TestMonitorEmailAddress (Optional) * Num\_Itms\_TOT (Optional) * AttemptednessIndicator Y=Attempted, N-Non-Participant, P=Participant * Label\_SRC1 (Optional) * Num\_Itms\_SRC1 (Optional) * Label\_SRC2 (Optional) * Num\_Itms\_SRC2 (Optional) * Label\_SRC3 (Optional) * Num\_Itms\_SRC3 (Optional) * Label\_SRC4 (Optional) | * Num\_Itms\_SRC4 (Optional) * Label\_SRC5 (Optional) * Num\_Itms\_SRC5 (Optional) * THETA\_SRC5 (Optional) * SEM\_THETA\_SRC5 (Optional) * SS\_SRC5 (Optional) * SEM\_SRC5 (Optional) * PL\_SRC5 (Optional) * Label\_SRC6 (Optional) * Num\_Itms\_SRC6 (Optional) * THETA\_SRC6 (Optional) * SEM\_THETA\_SRC6 (Optional) * SS\_SRC6 (Optional) * SEM\_SRC6 (Optional) | * PL\_SRC6 (Optional) * Accommodations\_Segment1 (Optional) * SegmentID2 (Optional) * Accommodations\_Segment2 (Optional) * SegmentID3 (Optional) * Accommodations\_Segment3 (Optional) * AssessmentFormNumber (Optional) * Scr\_Rater1 (Optional) (Scores from each rater) * Scr\_Rater2 (Optional) * Scr\_Rater3 (Optional) * CC\_Rater1 (Optional) (Condition Code) * CC\_Rater2 (Optional) * CC\_Rater3 (Optional) * CC\_Reso (Optional) |

1. The field definition for “Subject” matches CEDS. But the CEDS value enumeration is not used. [↑](#footnote-ref-1)
2. Any method that generates a consistent alternate ID for each student is acceptable, Smarter Balanced recommends applying a keyed-hash algorithm like HMAC-SHA1 to the StudentIdentifier. The algorithm is described here: <https://tools.ietf.org/html/rfc2104>. When using a keyed-hash algorithm, the key should be kept private to the state and their service provider and not disclosed to Smarter Balanced. Possession of the key will allow the state to match the AlternateSSID to the state-issued StudentIdentifier. However, Smarter Balanced will not have that ability. There have been some security concerns raised relative to SHA1 and MD5 but they do not apply to this use pattern. Newer algorithms like HMAC-SHA256 are free of known issues but they generate codes that are too long for the reserved field length of 40 characters. Future updates will increase the maximum field length to allow longer values. [↑](#footnote-ref-2)
3. DistrictId, DistrictName, SchoolId, and SchoolName are optional in de-identified data. In certain areas, the school or district may be small enough that the school and/or district combined with gender, race, and ethnicity can identify the student. In those cases, the district and school information should be omitted to preserve student privacy. However, doing so prevents the generation of anonymous aggregate reports and the school and district level. Accordingly, states may choose their policy for inclusion according to local policy, population patterns, and requirements. [↑](#footnote-ref-3)
4. As of 2015 The DWSA format uses separate fields for each accessibility code family. The format will be updated in the future. The columns correspond to the families in table 5. Field names are AccommodationAmericanSignLanguage, AccommodationBraille, AccommodationClosedCaptioning, AccommodationTextToSpeech, AccommodationAbacus, AccommodationAlternateResponseOptions, AccommodationCalculatior, AccommodationMultiplicationTable, AccommodationPrintOnDemand, AccommodationPrintOnDemandItems, AccommodationReadAloud, AccommodationScribe, AccommodationSpeechToText, AccommodationStreamlineMode, AccommodationNoiseBuffer. [↑](#footnote-ref-4)
5. The TRT format uses the <Score> element for all scores and standard errors. See Appendix A for how to locate each particular score. [↑](#footnote-ref-5)
6. In place of Standard Error, the DWSA format uses AssessmentSubtestMinimumValue and AssessmentSubtestMaximumValue which are the scale score minus and plus the standard error respectively. The same principle is applied to subscores which use AssessmentSubtestClaim1MinimumValue and AssessmentSubtestClaim1MaximumValue (substituting the claim number for 1 in subsequent claims). [↑](#footnote-ref-6)
7. Claim scores are required if the associated test produces them. For example, the Smarter Balanced summative tests produce four claim scores for ELA and three for Mathematics. When a claim score is present, the associated standard error and achievement level are also required. [↑](#footnote-ref-7)
8. A common type of analysis is to take the sum of time spent on items to estimate the time spent taking a test. Therefore, allocation of time to items SHOULD be done in such a way that taking the sum of times produces a reasonably accurate estimate of aggregate time (e.g. time on test or time on segment). Many test delivery systems can only measure time spent on a page, not time spent on an item. When multiple items are on a single page then the page time SHOULD be divided among the items. When there is a reading passage associated with a set of items, the time spent reading the passage SHOULD be divided among the associated items. [↑](#footnote-ref-8)
9. Rater IDs are required for validity studies; otherwise optional. In de-identified data, rater IDs must identify the actual person. For example, an email address would be inappropriate. A numeric ID would be acceptable. A keyed cryptographic hash like the one suggested for AlternateSSID could be used to obscure and ID that would otherwise be sensitive. [↑](#footnote-ref-9)