

**California Department of Education Assessment Development & Administration Division**



# California Assessment of Student Performance and Progress California Alternate Assessment for Science 2020–‍2021 Technical Report

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**By ETS**



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[Table 9.B.17 “How might this embedded performance task be changed so your student could be successful in showing what they know and can do?”—Grade Five, Physical Sciences 200](#_Toc102548474)

[Table 9.B.18 “How might this embedded performance task be changed so your student could be successful in showing what they know and can do?”—Grade Five, Earth and Space Sciences 201](#_Toc102548475)

[Table 9.B.19 “How might this embedded performance task be changed so your student could be successful in showing what they know and can do?”—Grade Eight, Life   
Sciences 201](#_Toc102548476)

[Table 9.B.20 “How might this embedded performance task be changed so your student could be successful in showing what they know and can do?”—Grade Eight, Physical Sciences 201](#_Toc102548477)

[Table 9.B.21 “How might this embedded performance task be changed so your student could be successful in showing what they know and can do?”—Grade Eight, Earth and Space Sciences 202](#_Toc102548478)

[Table 9.B.22 “How might this embedded performance task be changed so your student could be successful in showing what they know and can do?”—High School, Life   
Sciences 202](#_Toc102548479)

[Table 9.B.23 “How might this embedded performance task be changed so your student could be successful in showing what they know and can do?”—High School, Physical Sciences 202](#_Toc102548480)

[Table 9.B.24 “How might this embedded performance task be changed so your student could be successful in showing what they know and can do?”—High School, Earth and Space Sciences 203](#_Toc102548481)

Acronyms and Initialisms Used in the *California Alternate Assessment for Science Technical Report*

|  |  |
| --- | --- |
| **Term** | **Definition** |
| 1PL | one-parameter logistic |
| 1PL-IRT | one-parameter logistic item response theory |
| AERA | American Educational Research Association |
| AIS | average item score |
| ALTRD | Assessment and Learning Technology Research & Development |
| APA | American Psychological Association |
| CA NGSS | California Next Generation Science Standards |
| CAA | California Alternate Assessment |
| CAASPP | California Assessment of Student Performance and Progress |
| CALPADS | California Longitudinal Pupil Achievement Data System |
| CAI | Cambium Assessment, Inc. |
| CalTAC | California Technical Assistance Center |
| CAST | California Science Test |
| *CCR* | *California Code of Regulations* |
| CCSS | Common Core State Standards |
| CDE | California Department of Education |
| CERS | California Educator Reporting System |
| COVID-19 | novel coronavirus disease 2019 |
| *DFA* | *Directions for Administration* |
| DIF | differential item functioning |
| *EC* | *Education Code* |
| EL | English learner |
| ELA | English language arts/literacy |
| ELD | English Language Development |
| ELPAC | English Language Proficiency Assessments for California |
| eSKM | Enterprise Score Key Management |
| EUs | essential understandings |
| FKSA | focal knowledge, skills, and abilities |
| GPCM | generalized partial credit model |
| IDEA | Individuals with Disabilities Act |
| IEP | individualized education program |
| IRT | item response theory |
| ISAAP | Individual Student Assessment Accessibility Profile |
| LEA | local educational agency |
| MH | Mantel-Haenszel |
| NCME | National Council on Measurement in Education |

Table of Acronyms and Initialisms *(continuation)*

|  |  |
| --- | --- |
| **Term** | **Definition** |
| OTI | Office of Testing Integrity |
| PCM | partial credit model |
| PE | performance expectation |
| PT | performance task |
| QA | quality assurance |
| RMSEA | root mean square error of approximation |
| SBE | State Board of Education |
| SCOE | Sacramento County Office of Education |
| SD | standard deviation |
| SEM | standard error of measurement |
| SFTP | Secure File Transfer Protocol |
| SMD | standardized mean difference |
| SR | selected response |
| SSID | Statewide Student Identifier |
| STAIRS | Security and Test Administration Incident Reporting System |
| TDS | test delivery system |
| TEI | technology-enhanced items |
| TOMS | Test Operations Management System |
| UAT | user acceptance testing |
| USC | United States Code |

## Introduction

This chapter provides an overview of the California Alternate Assessment (CAA) for Science program, including background information, the purpose of the test, the intended population, and organizations and systems involved. Additionally, this chapter provides a summary of the impact of the novel coronavirus disease 2019 (COVID-19) pandemic on psychometric analyses and reporting (refer to section [*1.8. Impact of the Novel Coronavirus Disease 2019 Pandemic on Psychometric Analyses and Reporting*](#_Impact_of_the_1)).

### Background

In October 2013, Assembly Bill 484 established the California Assessment of Student Performance and Progress (CAASPP) as the new student assessment system that replaced the Standardized Testing and Reporting program. The primary purpose of the CAASPP System of assessments is to assist teachers, administrators, and students and their parents/‌guardians by promoting high-quality teaching and learning through the use of a variety of item types and assessment approaches. These tests provide the foundation for the state’s school accountability system.

California adopted the California Next Generation Science Standards (CA NGSS) in September 2013. The CAA for Science is an assessment aligned with the Science Core Content Connectors (Science Connectors) derived from the CA NGSS. Its field test was administered during the 2018–2019 CAASPP administration.

The CAA for Science is designed for students with the most significant cognitive disabilities and measures what students know and can do in science. The CAA for Science assesses students in grades five and eight and high school (grade ten, eleven, or twelve [as long as the student is not repeating grade twelve]) whose individualized education program (IEP) teams have determined that alternate assessments are appropriate (California Department of Education [CDE], 2021a).

During the 2020–2021 administration, the CAASPP System comprised the following assessments:

* Smarter Balanced assessments and tools for the general student population:
* Summative Assessments—Computer-based assessments for English language arts/literacy (ELA) and mathematics in grades three through eight and grade eleven
* Interim Assessments—Optional resources developed for grades three through eight and grade eleven designed to inform and promote teaching and learning by providing information that can be used to monitor student progress toward mastery of the Common Core State Standards that may be administered to students at any grade level
* Tools for Teachers—Professional development materials and instructional resources designed to help teachers use formative assessment processes for improved teaching and learning in all grades
* CAAs for ELA and mathematics in grades three through eight and grade eleven for students with significant cognitive disabilities
* Science assessments in grades five and eight and high school (grade ten, eleven, or twelve, as long as the student is not repeating grade twelve; these are the California Science Test [CAST] and the CAA for Science)
* The California Spanish Assessment, optional for eligible students in grades three through eight and high school and designed to measure a student’s Spanish competency in reading, writing mechanics, and listening, as well as a high school measure suitable to be used in part for the California Seal of Biliteracy

Note that this technical report focuses on the CAA for Science and not the CAAs for ELA and mathematics, which are described in a separate technical report. More background information about the CAASPP System can be found on the CAASPP Description – *CalEdFacts* web page on the CDE website.

### Test Purposes

The purposes of the CAA for Science are twofold:

1. To measure what eligible students know and can do based on the Science Connectors, which are linked to the CA NGSS across the three science domains (i.e., Earth and Space Sciences, Life Sciences, and Physical Sciences)
2. To help identify and address gaps in knowledge or skills early so students can receive the support they need (CDE, 2021a and 2021b)

The CAA for Science assesses the Science Connectors derived from the CA NGSS for the CAA-eligible student population. The Science Connectors provide learning goals that are aligned appropriately with the needs of students with the most significant cognitive disabilities and serve as the basis for the state’s CA NGSS alternate summative science assessments for eligible students.

### Content and Structure

The California State Board of Education (SBE) approved the conceptual design for the CAA for Science in July 2016. This assessment follows an embedded performance task (PT) design, meaning that each embedded PT is expected to be administered shortly after content related to the Science Connectors has been taught. Test examiners administer four embedded PTs over the course of the school year, each comprised of a set of test questions measuring two Science Connectors from one of the three science domains (CDE, 2018).

#### Assessment Model

In cases where implementation has been particularly successful, alternate assessments based on a collection of embedded PTshave been shown to leverage higher academic learning expectations for students taking an alternate assessment while promoting enhanced curricular and instructional supports for teachers (Gong & Marion, 2006).

The guiding principles adopted for the CAA for Science are that these assessments

* support and promote teachers’ implementation of the CA NGSS;
* embed summative assessment into instructional practice;
* offer a developmentally appropriate opportunity for students with the most significant cognitive disabilities to be assessed on their science knowledge, skills, and abilities; and
* provide meaningful information about academic performance to both parents/‌guardians and teachers.

The use of this model is reasonable and feasible, given the low number of students who take the CAA for Science.[[1]](#footnote-2)

#### Science Connectors

The assessment is aligned with the Science Connectors. The Science Connectors are the appropriate standards for the student population assigned to take the CAA for Science. The Science Connectors bridge the CA NGSS performance expectations (PEs) for the standard student population to the expectations developed to provide appropriate levels of challenge and rigor for students with the most significant cognitive disabilities. Table 1.1 provides descriptions of the terminology associated with the Science Connectors.

Table 1.1 Terminology Associated with the CAA for Science Content Standards

|  |  |
| --- | --- |
| **Terminology** | **Description** |
| PE | Incorporates a disciplinary core idea, a science and engineering practice, and a crosscutting concept into an assessable statement of what students should know and be able to accomplish with regard to the three science domains (i.e., Earth and Space Sciences, Life Sciences, and Physical Sciences) and the Engineering, Technology, and Applications of Science |
| Science Connector | Builds a bridge to the content of a CA NGSS PE |
| Focal Knowledge, Skills, and Abilities (FKSA) | Describes what students should know and be able to do in terms of the Science Connector (FKSA1 up to FKSA6) |
| Essential Understanding | Defines a basic, foundational key idea or concept |

#### Test Components for the 2020–2021 Administration

The 2020–2021 CAA for Science involved three components:

1. Four embedded PTs (Refer to subsection [*5.4.2 Embedded Performance Tasks*](#_Embedded_Performance_Tasks) for a description of how these were administered.)
2. A brief survey to collect information about the student’s responsiveness to the embedded PT (Refer to [*Chapter 9: Post–Performance Task Survey*](#_Test_Examiner_Survey) for detailed information about survey development, content, and administration.)
3. Optional practice or training test content (Refer to subsection [*5.3.2 Practice and Training Tests*](#_Practice_and_Training) for additional information.)

##### Embedded Performance Tasks

The CAA for Science follows an assessment design known as curriculum-embedded PTs. The intent behind this assessment model is to have educators embed PTs as summative assessments following classroom instructional activities related to the Science Connectors. Each PT is comprised of two Connector sets that assess Science Connectors from one of the three science domains of Life Sciences, Physical Sciences, and Earth and Space Sciences.

For the 2020–2021 CAASPP administration, students were tested for the CAA for Science with four grade-level-specific embedded PTs for grade five, grade eight, and high school (i.e., grade ten, eleven, or twelve). Each embedded PT included *Directions for Administration (DFAs)* describing how to administer the embedded PT items and hands-on activities. The embedded PT item types included selected-response, match, and grid items; these are described in subsection [*3.1.3 Embedded Performance Task and Item Format*](#_Embedded_Performance_Task).

The secure embedded PTs were delivered to students through the CAASPP test delivery system (TDS). The *DFAs* were delivered to local educational agencies (LEAs) as downloadable PDFs within the Test Operations Management System (TOMS). Test examiners administered the embedded PTs in one-on-one sessions, with the answers recorded in the TDS.

##### Test Administration Surveys

During the 2020–2021 administration year, test examiners were asked to respond to four short surveys. After each embedded PT was administered to the student, test examiners were presented with a routing question asking them whether or not their student had been responsive during the testing session. Based on their response to that routing question, the test examiners were presented with the appropriate short survey to complete. The purpose of the survey was to collect basic information about students’ experiences with the assessment process.

Refer to [chapter 9](#_Test_Examiner_Survey) for additional information about the post-PT survey design.

##### Practice and Training Tests

Practice tests for each individual grade for all tested grade levels in all content domains were provided to LEAs to prepare students and LEA staff for the CAA for Science. A single training test that could be taken by students at all grade levels was also available. Students, teachers, and the public may access practice and training tests using a web browser.

These tests simulate the experience of the CAA for Science computer-based assessment and allow students and test examiners to become familiar with the user interface, item formats and functionality, available accessibility resources, and components of the TDS, as well as with the process of starting and completing a testing session. Practice and training tests align with Science Connectors but do not produce scores.

### Intended Population

All eligible students enrolled in grades five, eight, and high school (i.e., grade ten, eleven, or twelve) whose IEP indicated an alternate assessment were identified to take the CAA for Science (*California Code of Regulations*, Title 5 [5*CCR*]Education, Division 1, Chapter 2, Subchapter 3.75, Article 1, Section 851.5[c]).

For students identified for special education services, the decision to administer the CAST or the CAA for Science was made by their IEP team. Students whose parents/guardians submit a written request may opt out of taking the tests (*Education Code [EC]* Section 60615). Additionally, students who were not tested because of a medical emergency were also exempt.

### Intended Use and Purpose of the Test Scores

The results of tests within the CAASPP System, including the CAA for Science, are used for two primary purposes as described in *EC* sections 60602.5(a) and (a)(4). (This was excerpted from the *EC* Section 60602 web page.)

“60602.5(a) It is the intent of the Legislature in enacting this chapter to provide a system of assessments of pupils that has the primary purposes of assisting teachers, administrators, and pupils and their parents; improving teaching and learning; and promoting high-quality teaching and learning using a variety of assessment approaches and item types. The assessments, where applicable and valid, will produce scores that can be aggregated and disaggregated for the purpose of holding schools and local educational agencies accountable for the achievement of all their pupils in learning the California academic content standards.”

“60602.5(a)(4) Provide information to pupils, parents and guardians, teachers, schools, and local educational agencies on a timely basis so that the information can be used to further the development of the pupil and to improve the educational program.”

In other words, results for tests within the CAASPP System are used for two primary purposes:

1. To communicate students’ progress in achieving the state’s academic standards to students, parents/guardians, and teachers
2. To inform decisions that teachers and administrators make about improving the educational program

Sections 60602.5(c) and (d) provide additional information regarding use and purpose of test scores for the system of assessments:

“60602.5(c) It is the intent of the Legislature that parents, classroom teachers, other educators, pupil representatives, institutions of higher education, business community members, and the public be involved, in an active and ongoing basis, in the design and implementation of the statewide pupil assessment system and the development of assessment instruments.”

“60602.5(d) It is the intent of the Legislature, insofar as is practically feasible and following the completion of annual testing, that the content, test structure, and test items in the assessments that are part of the statewide pupil assessment system become open and transparent to teachers, parents, and pupils, to assist stakeholders in working together to demonstrate improvement in pupil academic achievement. A planned change in annual test content, format, or design should be made available to educators and the public well before the beginning of the school year in which the change will be implemented.”

Because of the COVID-19 pandemic, the number of students who took the CAA for Science during the 2020–2021 administration was insufficient to form a sample representative of the target population. Therefore, preliminary indicators consisting of a percent correct and an indicator category were reported for the 2020–2021 results.

### Testing Window

For the 2020–2021 CAASPP administration, the CAA for Science embedded PTs were available for administration on or after September 8, 2020, and were available for administration through the last day of instruction at the LEA or July 30, 2021, whichever came first (5 *CCR,* Section 855[a][2]). The July 30, 2021, date was an approved extension to the legislated testing window and offered LEAs more flexibility in testing, allowing schools more time for students to test.

Similar to other CAASPP assessments, the CAA for Science embedded PTs were untimed for test takers. This assessment was administered individually, and testing time varied from one student to another on the basis of factors such as the student’s response time and attention span. Administration of the CAA for Science embedded PTs occurred over as many days as required to meet a student’s needs.

### Significant Developments for the CAA for Science 2020–‍2021 Administration

#### Standard Setting

Standard setting was conducted virtually with California special education and science educators from August 3–5, 2021, and will be described in the technical report for the 2021–2022 CAA for Science administration.

#### California Educator Reporting System

As of January 2021, the California Educator Reporting System (CERS) replaced the Online Reporting System. Scores for the CAA for Science were anticipated to be posted to CERS in November 2022.

#### Accessibility Resources

The following accessibility resource–related updates were made:

* CAASPP Matrix One was combined with the English Language Proficiency Assessments for California Matrix Four to create the California Assessment Accessibility Resources Matrix that serves both testing programs.
* A break was considered as both an embedded and a non-embedded universal tool.
* The multiplication table accessibility resource was expanded to be a 12 × 12 table.
* The description of the scratch paper resource indicated that students could create graphic organizers.

### Impact of the Novel Coronavirus Disease 2019 Pandemic on Psychometric Analyses and Reporting

COVID-19 significantly impacted the 2020–2021 administration of the CAA for Science. In fact, the number of test takers was significantly lower than what was expected; only 812 grade five students, 740 grade eight students, and 920 high school students completed the CAA for Science. These results occurred even though more than 4,000 students were registered to take each CAA for Science grade-level test. Because of the small numbers of students completing the CAA for Science, ETS was unable to conduct the full data analyses for this administration, meaning that there were no classical item analyses, item response theory analyses, or reliability analyses conducted. In addition, while the data obtained from the students who completed a test is used in this report, the sample is not representative of the population as a whole.

Table 5.1 provides the number of students who were registered to take the CAA for Science and the percentage of students who completed the assessment.

### Groups and Organizations Involved with the Assessment

#### California State Board of Education

The SBE is the state agency that establishes educational policy for kindergarten through grade twelve in the areas of standards, instructional materials, assessment, and accountability. The SBE adopts textbooks for kindergarten through grade eight, adopts regulations to implement legislation, and has the authority to grant waivers of the *EC*.

In addition to adopting the rules and regulations for itself, its appointees, and California’s public schools, the SBE also is the state educational agency responsible for overseeing California’s compliance with the Every Student Succeeds Act as well as the state’s Public School Accountability Act that measures the academic performance and progress of schools on a variety of academic metrics (CDE, 2021e).

#### California Department of Education

The CDE oversees California’s public school system, which is responsible for the education of more than 6,00,000 children and young adults in more than 10,500 schools.[[2]](#footnote-3) California aims to provide a world-class education for all students, from early childhood to adulthood. The CDE serves the state by innovating and collaborating with educators, school staff, parents/guardians, and community partners, which together, as a team, prepare students to live, work, and thrive in a highly connected world.

Within the CDE, it is the Instruction, Measurement, & Administration Branch that oversees programs promoting improved student achievement. Programs include oversight of statewide assessments and the collection and reporting of educational data (CDE, 2021c).

#### California Educators

A variety of California educators, including school administrators and teachers experienced in teaching students with cognitive disabilities—who were selected based on their qualifications, experience, demographics, and geographic locations—were invited to participate in the entire CAA for Science assessment development process. This included defining the purpose and scope of the assessment, assessment design, item development, standard setting, data review, and score reporting.

#### Contractors

##### Primary Testing Contractor—ETS

The CDE and the SBE contract with ETS to develop and administer the CAA for Science. As the primary testing contractor, ETS has the overall responsibility for working with the CDE to implement and maintain an effective assessment system and coordinating ETS’ work with its subcontractors. Activities conducted directly by ETS include, but are not limited to, the following:

* Providing management of the program activities
* Supporting and training county offices of education, LEAs, and direct funded charter schools
* Providing a tiered help desk support system for LEAs
* Hosting and maintaining a website with resources for LEA CAASPP coordinators
* Developing, hosting, and providing support for TOMS
* Developing all CAA for Science embedded PTs
* Constructing, producing, and controlling the quality of CAASPP test forms and related test materials, including grade- and content-specific *DFAs* and *Administration Planning Guides*
* Processing student test assignments
* Completing all psychometric procedures
* Producing and distributing score reports electronically
* Developing a score reporting website that can be viewed by the public

##### Subcontractor—Cambium Assessment, Inc.

ETS also monitors and manages the work of Cambium Assessment, Inc. (CAI), subcontractor to ETS for the CAASPP System of computer-based assessments. Activities conducted by CAI include

* providing the CAI proprietary TDS, including the Student Testing Interface, Test Administrator Interface, secure browser, and practice and training tests;
* hosting and providing support for its TDS, a component of the overall CAASPP Assessment Delivery System;
* scoring machine-scorable items; and
* providing high-level technology help desk support to LEAs for technology issues directly related to the TDS.

##### Subcontractor—Sacramento County Office of Education

ETS contracted with the Sacramento County Office of Education to manage all activities associated with educator recruitment, training, and outreach, including the following:

* Supporting and training county offices of education, LEAs, and charter schools
* Developing informational materials
* Recruiting and providing logistics for educator meetings

### Systems Overview and Functionality

#### Test Operations Management System

TOMS is the password-protected, web-based system used by LEAs to manage all aspects of CAASPP testing. TOMS serves various functions for the CAA for Science, including, but not limited to, the following:

* Managing test administration windows
* Assigning CAA test examiner user roles
* Managing student test assignments and accessibility resources
* Viewing and downloading reports
* Providing a platform for authorized user access to secure materials such as CAA for Science *DFAs*, CAASPP user information, and access to the *CAASPP Security and Test Administration Incident Reporting System* process

TOMS receives student enrollment data, including LEA and school hierarchy data, from the California Longitudinal Pupil Achievement Data System (CALPADS) via daily feed. CALPADS is “a longitudinal data system used to maintain individual-level data including student demographics, course data, discipline, assessments, staff assignments, and other data for state and federal reporting.”[[3]](#footnote-4)

LEA staff involved in the administration of the CAA for Science—such as LEA CAASPP coordinators, CAASPP test site coordinators, and test examiners—are assigned varying levels of access to TOMS. For example, only an LEA CAASPP coordinator is given permission to set up the LEA’s test administration window; a test examiner cannot download student reports. A description of user roles is explained more extensively in the *2020–2021 CAASPP Online Test Administration Manual* (CDE, 2021a).

#### Test Delivery System

The TDS is the means by which the statewide computer-based assessments are delivered to students. Components of the TDS include

* the Test Administrator Interface, the web browser–based application that allows test administrators and test examiners to activate student tests and monitor student testing;
* the Student Testing Interface, on which students take the CAA for Science using the secure browser and with assistance from the test examiner as needed; and
* the secure browser, the web-based application through which the Student Testing Interface may be accessed. The secure browser prevents students from accessing other applications during testing.

#### Practice and Training Tests

The publicly available practice and training tests are provided to prepare students for the summative assessment. These tests, available for grades five and eight and high school, simulate the experience of the CAA for Science computer-based assessments. The practice and training tests align with the Science Connectors but do not produce scores. Students may access them using a web browser.

The purposes of the practice and training tests are to

* allow students and administrators to quickly become familiar with the user interface and components of the TDS and the process of starting and completing a testing session;
* introduce students and administrators to new grade-specific items similar to those on the operational assessment, which included discrete items and embedded PTs; and
* provide an opportunity for educators to assign embedded designated supports and accommodations and determine how they worked for their students prior to using the resources in an operational test setting.

Details on practice and training tests are presented in subsection [*5.3.2 Practice and Training Tests*](#_Practice_and_Training).

#### California Educator Reporting System

CERS is the system used by LEAs to view preliminary student results from the CAASPP. The primary purpose of CERS is to provide educators and administrators with access to timely test results data for individual students and groups of students.

CERS allows educators to view their students’ assessment results at the individual student level and at the aggregated level using grouping and other features. For example, educators can create customized groups from assigned student groups based on demographic information, achievement level, or other characteristics of their choosing. The student results sent to CERS are appropriate for analysis of assessment results for use in planning instruction.

Because preliminary indicators were used to report CAA for Science results for the 2020–‍2021 administration, a decision was made that CAA for Science results were not to be included in CERS reporting. For more information on preliminary indicators, please refer to the Preliminary Indicator Toolkit (CDE, 2021d). CAA for Science results were to be reported in CERS starting in November 2022.

### Overview of the Technical Report

This technical report addresses the characteristics of the CAA for Science administered from September 8, 2020, through July 30, 2021, and contains nine additional chapters as follows:

* [Chapter 2](#_Chapter_2:_Overview) presents an overview of processes involved in the CAA for Science, including descriptions of item development, test administration, and psychometric analyses.
* [Chapter 3](#_Embedded_Performance_Task_1) discusses the detailed procedures of embedded PT development for the CAA for Science.
* [Chapter 4](#_Test_Assembly) describes the process of test assembly for the CAA for Science.
* [Chapter 5](#_Test_Administration) describes the details of administering the embedded PTs for the CAA for Science, as well as the procedures followed by ETS to ensure test security.
* [Chapter 6](#_Scoring_and_Reporting) summarizes the scoring approaches and type of scores that are reported for the CAA for Science.
* [Chapter 7](#_Psychometric_Analyses) summarizes the statistical procedures conducted for a typical CAA for Science administration, including a description of typical classical item analyses, test completion rates and analyses, and differential item functioning analyses.
* [Chapter 8](#_Quality_Control_Procedures) discusses the various procedures used to ensure the quality of the CAA for Science.
* [Chapter 9](#_Test_Examiner_Survey) describes the development and administration of the post–performance task survey questionnaires and the results of analyses conducted on their responses.
* [Chapter 10](#_Continuous_and_Systematic) discusses the various procedures used to gather information to improve the CAA for Science, as well as strategies to implement possible improvements.

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## An Overview of the CAA for Science Processes

This chapter presents an overview of processes involved in the California Alternate Assessment (CAA) for Science 2020–2021 administration, including descriptions of item development, test administration, and accessibility resources.

### Embedded Performance Task Item Development

As part of the adaptation and alignment process, ETS developed all embedded performance tasks (PTs) for the CAA for Science in accordance with the *ETS* *Standards for Quality and Fairness* (2014).

#### Selection of Science Core Content Connectors for Embedded Performance Task Development

ETS developed four embedded PTs for each grade level or grade band according to the blueprint (California Department of Education [CDE], 2018): three operational embedded PTs and one field test embedded PT. The California State Board of Education (SBE)–approved blueprint document identifies the California Next Generation Science Standards (CA NGSS) Core Content Connectors (Science Connectors) eligible to be assessed through embedded PTs. The blueprint was developed in consultation with the CDE. It consists of a Science Connector prioritization plan based on input from California educators and other internal and external experts on both the CA NGSS and alternate assessments. Each of the embedded PTs assesses two of these Science Connectors.

#### Embedded Performance Task Development

ETS developed each embedded PT with two Connector sets of items; each set assesses a particular Science Connector. Connector sets are groups of five items, along with an orienting activity, that assess a Science Connector. The concepts or topics that serve as the context for each item were reviewed to ensure that the content and presentation were accessible to, and developmentally appropriate for, students with the most significant cognitive disabilities.

A full review of the process to develop embedded PTs, including the number of items and the type of items, can be found in [chapter 3](#_Embedded_Performance_Task_1).

##### Item Format

The CAA for Science includes the following primary computer-based item formats:

* **Selected-response (SR) items—**Students are instructed to select one or more choices. Most CAA items have two or three options; a few items have four options.
* **Technology-enhanced items (TEIs)—**Technology beyond simple option selection is incorporated in some items. These items can resemble simple classroom activities in which students might complete a diagram or make a selection from information in a chart.

Detailed information on item format is included in subsection [*3.1.3 Embedded Performance Task and Item Format*](#_Embedded_Performance_Task) in [*Chapter 3: Embedded Performance Task Item Development Process*](#_Embedded_Performance_Task_1).

SR items and TEIs are assigned either one or two points and are machine-scored.

##### Item Specifications

The CAA for Science item specifications provide descriptions of item characteristics that are intended to measure each content standard consistently. The item specifications were developed based on the CA NGSS guidelines and clarifications from the Science Connectors; the focal knowledge, skills, and abilities (FKSAs); and essential understandings (EUs). During item development, item developers were provided with CAA for Science item specifications and a CAA style guide that contained detailed information about the consistency in item development and item review processes. Refer to subsection [*3.1.1 Specifications for the Embedded Performance Tasks and Items*](#_Specifications_for_the) in [chapter 3](#_Embedded_Performance_Task_1) for detailed information about item specifications.

##### Item Banking

No item analyses were conducted after the 2020–2021 CAA for Science administration because of its insufficient sample size. Therefore, none of the typical item-banking work was performed after the administration. This subsection details the procedure for entering items into the item bank typically performed after each administration.

After each CAA for Science administration, item analyses are implemented and the results are reviewed by ETS psychometric and assessment development staff, who provide recommendations to the CDE on whether the items should be included or excluded in the pool of items for future administrations. Content experts from ETS and the CDE, as well as selected California educators, usually review the associated item statistics and evaluate the performance of items during the annual data review meeting. They also review the flagged items—those whose statistics fall beyond expected ranges—and work to provide plausible explanations for these particular items based on their knowledge of the student population.

With the CDE’s approval, the items, together with their statistical information, are entered into the item bank for form assembly in future administrations. It is expected that more new items will be developed, field-tested, and entered into the item bank after each administration. Over time, the item bank will expand gradually to support future operational forms.

#### Universal Design Principles

The application of universal design in assessment development involves establishing that tests and testing environments are usable by all students to the greatest extent possible. To allow for the widest possible range of students taking the CAA for Science, ETS trains all item writers to follow the principles of universal design in their development and revision of test items. These principles include, but are not limited to

* reducing wordiness;
* avoiding complex sentence structures and sentences that begin with dependent clauses;
* avoiding ambiguity;
* breaking up compound sentences;
* avoiding colloquialisms and words with double meanings, including language cognates;
* using active voice when possible;
* selecting developmentally appropriate text levels and terminology; and
* consistently applying concept names and graphic conventions.

Universal design principles also inform decisions about test layout and design, including such features as type size, line length, spacing, and graphics. These principles provide flexibility for the ways information is presented as well as for the ways students are engaged with, and respond to, that information. The goal is to reduce barriers in assessing *all* students.

### Test Assembly

The 2020–2021 operational field test assessment was assembled in accordance with the CAA for Science blueprint, which was approved by the SBE in January 2018 (CDE, 2018). The CAA for Science is a linear form comprised of three operational embedded PTs, each made up of two Connector sets that assess Science Connectors from one of the three science domains of Life Sciences, Physical Sciences, and Earth and Space Sciences.

The assembly began with selection of approved anchor items from the item bank. Anchor items are a common set of items across the CAA for Science 2020–2021 test forms that were used in previous test forms and have operational statistics. For the CAA for Science 2020–2021 administration, anchor items were intended to provide a link across the 2020–‍2021 test forms, to help establish a common score scale for all test forms; however, the score scale was not constructed in 2020–2021 because of low testing volume.

For each embedded PT, a Connector set of five anchor items was paired with a Connector set of five operational field test items. After the initial assembly, test developers reviewed the assembled forms using comprehensive checklists to evaluate blueprint alignment, item content, clueing and content overlap, and overall balance of content with regard to gender and ethnicity representation, variety of item types, and so forth.

After test developers assembled and reviewed the draft test forms, the forms were submitted for psychometric review and approval. Approved forms then received additional content and editorial reviews, including key checks and review of scoring files, before being submitted to the CDE for review and feedback. After responding to feedback from the CDE, forms received a final content review to ensure any requested revisions were implemented accurately before submittal to the CDE for approval.

#### Test Design

The CAA for Science is based on a linear design comprised of three operational embedded PTs, each comprised of two Connector sets that assess standards from one of the three science domains. The Connector sets also incorporate contexts aligned to the Engineering, Technology, and Applications of Science domain. There is an additional, fourth embedded PT, comprised of field test items, that does not count toward the student’s total raw score.

Connector sets are groups of five items, along with an orienting activity, that assess a Science Connector. Two Connector sets are paired to create an embedded PT that consists of 10 items and two orienting activities.

The four embedded PTs—three operational embedded PTs and one field test embedded PT—are intended to be administered throughout the school year, shortly after students received instruction in the Science Connectors assessed by the embedded PT. Thus, the embedded PTs can be administered in any order throughout the instructional year.

The operational embedded PTs for 2020–2021 were available for administration from September 8, 2020, through July 30, 2021.

#### Test Blueprint

The test blueprint specifies the total number of items on each test and the number of items in each science domain according to standards (CDE, 2018). The standards upon which the CAA for Science test blueprint is built consist of the Science Connectors, FKSAs, and EUs, all derived from the CA NGSS. The blueprint for the CAA for Science was adopted by the SBE in January 2018.

The CAA for Science test blueprint content is unique to each grade level. This blueprint designates the breakdown first by science domain and then by item complexity level. The test blueprint provides information on the specific ratio of each content category or domain on the overall test and the specific Science Connectors and performance expectations to be assessed.

#### Test Length

The number of items in the CAA for Science is the same across grade levels—there are 10 items per embedded PT. For the 2020–2021 operational field test administration, each student was given three embedded PTs and one field test embedded PT.

Refer to section [*4.1 Overview*](#_Overview) in [*Chapter 4: Test Assembly*](#_Test_Assembly) for more details on test form assembly.

### Test Administration

The CAA for Science items were administered via the California Assessment of Student Performance and Progress (CAASPP) test delivery system (TDS). Authorized school and local educational agency (LEA) staff downloaded the *Directions for Administration (DFAs)* for each embedded PT from the secure Test Operations Management System (TOMS). Test examiners used the *DFA* materials in printed or electronic format.

#### Test Security and Confidentiality

All operational tests within the CAASPP System are secure. For the CAA for Science, every person having access to test materials maintains the security and confidentiality of the tests. ETS’ internal Code of Ethics requires that all test information, including tangible materials associated with the CAA for Science, such as confidential files, processes, and activities, were kept secure. To ensure security for all tests that ETS develops or handles, ETS maintains an Office of Testing Integrity (OTI). A detailed description of the OTI and its mission is presented in subsection [*5.8.1 ETS’ Office of Testing Integrity*](#_ETS’_Office_of_1).

In pursuit of enforcing secure practices, ETS strives to safeguard the various processes involved in a test development and administration cycle. The practices related to each of the following security processes are discussed in detail in section [*5.8 Test Security and Confidentiality*](#_Test_Security_and):

* [Procedures to maintain standardization of test security](#_Procedures_to_Maintain)
* [Test security monitoring](#_Test_Security_Monitoring)
* [Security of electronic files using a firewall](#_Security_of_Electronic)
* [Transfer of scores via secure data exchange](#_Transfer_of_Scores)
* [Data management in the secure database](#_Data_Management_in)
* [Statistical analysis on secure servers](#_Statistical_Analysis_on)
* [Student confidentiality](#_Student_Confidentiality)

#### Procedures to Maintain Standardization

ETS takes all necessary measures to ensure the standardization of CAA for Science test administration by individual test examiners. The measures for standardization include, but are not limited to, the aspects described in these subsections.

##### Test Administration

ETS employs processes to ensure the standardization of an administration cycle; these processes are discussed in more detail in [*Chapter 5: Test Administration*](#_Test_Administration).

All staff at LEAs who are involved in the CAASPP administration, including CAA for Science administration, are provided with directions about their responsibilities. Their roles include LEA CAASPP coordinators, CAASPP test site coordinators, and CAA test examiners. The responsibilities of each of the staff members specifically for the CAAs are described in the *2020–2021 CAASPP Online Test Administration Manual* (CDE, 2021c).

##### Test Directions

Several series of instructions regarding the CAASPP, including administration of the CAA for Science, are compiled in detailed manuals and provided to LEA staff. Such documents include, but are not limited to, the following:

* ***CAA for Science DFA*s—**The secure, grade-level *DFAs* are manuals that provide the script to be followed exactly by test examiners during a testing session. The *DFAs* for the CAA for Science contain embedded PT–specific instructions. Each version of each grade-level CAA for Science embedded PT has a unique *DFA.* (Refer to [*5.5.4.2 Directions* *for* *Administration*](#_Directions_for_Administration_1) in [chapter 5](#_Test_Administration) for more information.)
* ***CAASPP Online Test Administration Manual*—**This is a web-based manual that provides test administration procedures and guidelines for LEA CAASPP coordinators, CAASPP test site coordinators, test examiners, and test administrators (CDE, 2021c). (Refer to [*5.5.4.1 CAASPP* *Online* *Test* *Administration* *Manual*](#_CAASPP_Online_Test) in [chapter 5](#_Test_Administration) for more information.)
* ***CAASPP and English Language Proficiency Assessments for California (ELPAC) TOMS User Guide*—**This is a web-based manual that provides instructions for TOMS, allowing LEA staff, including LEA CAASPP coordinators and CAASPP test site coordinators, to perform a number of tasks, including setting up test administrations, adding and managing users, assigning tests, configuring computer-based student test settings, and accessing the secure *DFAs* (CDE, 2021b). (Refer to [*5.5.4.3 CAASPP and ELPAC TOMS User Guide*](#_CAASPP_and_English) in [chapter 5](#_Test_Administration) for more information.)

### Fairness and Accessibility

There are several procedures in place to ensure that the CAA for Science is fair and accessible to all test takers. This section provides information on the available accessibility resources for use with the computer-based CAA for Science. Additionally, the differential item functioning (DIF) analysis used to identify items that may function differently across groups of examinees (e.g., gender, ethnicity) is discussed briefly.

#### Universal Tools, Designated Supports, and Accommodations

The CAA for Science is specifically designed for students with significant cognitive disabilities and for whom an individualized education program (IEP) calls for the use of an alternate assessment. Additional resources are sometimes needed for these students.

The CDE maintains a list of the universal tools, designated supports, and accommodations permitted for use in CAASPP computer-based assessments in its web document, the California Assessment Accessibility Resources Matrix (Accessibility Matrix) (CDE, 2020).

**Universal tools** are available to all students taking the CAA for Science. These resources may be turned on and off when embedded as part of the technology platform for the computer-based CAAs on the basis of student preference and selection.

**Designated supports** are available to students taking the CAA for Science when determined as needed by an educator or team of educators, with parent/guardian and student input as appropriate, or when specified in the student’s IEP.

**Accommodations** must be permitted on the CAA for Science for all eligible students when specified in the student’s IEP.

While most of the resources presented for the CAASPP computer-based assessments are available for the CAA for Science, there are a few resources that are not applicable because the CAA for Science is designed to be given one-on-one in the student’s language of instruction, using the student’s identified instructional resources.

Table 2.A.1 through table 2.A.6 in [appendix 2.A](#_Appendix_2.A:_Accessibility) present the number and percentages of students using designated supports, accommodations, and unlisted resources by embedded PT for the 2020–2021 CAA for Science administration. The use of universal tools is not tracked because they are available to all students in the TDS.

These tables are provided for each of the three operational embedded PTs for each science domain. All students who completed the embedded PT and used at least one of the designated supports or accommodations are included in these tables.

Refer to section [*1.10 Systems Overview and Functionality*](#_Systems_Overview_and_1) in [*Chapter 1: Introduction*](#_Introduction) for more details.

##### Selection

The full list of the universal tools, designated supports, and accommodations used in all CAASPP computer-based assessments, including the CAA for Science, are documented in the Accessibility Matrix (CDE, 2020). Most embedded and non-embedded universal tools, designated supports, and accommodations listed in parts 1, 2, and 3 of the Accessibility Matrix are available for the CAA for Science through the computer-based testing interface or, in the case of non-embedded resources, from the school or LEA. Part 4 of the Accessibility Matrix includes instructional supports and resources available for a student taking an alternate assessment. Part 5 of the Accessibility Matrix includes approved unlisted resources that are available. School-level personnel, IEP teams, and Section 504 teams used the Accessibility Matrix when deciding how best to support the student’s test-taking experience.

IEP teams may consider what other designated supports and accommodations, other than universal resources already available in the TDS, may be appropriate for the student. On the rare occasion when a student has both an IEP and a Section 504 plan, the Section 504 plan also should be referenced for accessibility resources.

##### Assignment

Designated supports and accommodations are assigned to individual students on the basis of identified student need. Such assignments are implemented in TOMS by the LEA CAASPP coordinator or CAASPP test site coordinator, either through individual assignment in the student’s profile in TOMS or in a batch upload for multiple students. For a batch upload, settings were uploaded into TOMS using a spreadsheet with data that had either been entered into a template downloaded from TOMS; or created by selecting and entering information into the web-based Individual Student Assessment Accessibility Profile (ISAAP) Tool. The ISAAP Tool could be used by LEAs in conjunction with the *Smarter Balanced Assessment Consortium:* *Usability, Accessibility, and Accommodations Guidelines* (Smarter Balanced, 2020)[[4]](#footnote-5) and the 2020–2021 CAASPP and ELPAC Accessibility Guide for Online Testing (CDE, 2021a), as well as with state regulations and policies (such as the Accessibility Matrix) related to assessment accessibility*.*

The embedded designated supports and accommodations were delivered to the student through the TDS at the time of testing; the non-embedded designated supports and accommodations were provided at the time of testing to the student by the LEA. Refer to section [*1.10 Systems Overview and Functionality*](#_Systems_Overview_and_1) in [*Chapter 1: Introduction*](#_Introduction) for more details regarding the TDS.

##### Delivery

Universal tools, designated supports, and accommodations can be delivered as either embedded or non-embedded resources. Embedded resources are digitally delivered features or settings available as part of the technology platform for the computer-based CAA for Science. Examples of embedded resources applicable to the CAA for Science include masking, color contrast, and print size. Non-embedded resources for the CAA for Science include magnification, calculator, and scribe.

#### Individualizations

The CAA for Science is designed to strike a careful balance between standardized administration and maximizing student engagement. To meet this goal, some parts of each embedded PT can be individualized to improve student engagement. The individualizations are described in section [*5.6.1 Accessibility Features for the 2020–2021 Administration*](#_Accessibility_Features_for_1).

#### Description of Differential Item Functioning Analyses

DIF analyses were not conducted for the 2020–2021 CAA for Science administration because of its insufficient sample size. When conducted, DIF analyses typically detect differences in student performance by identifying items on which one group of students performs significantly better than another group (e.g., male vs. female or White vs. African-American) after matching students on ability. If an item performed differentially across student groups, even when students were matched on ability, the item may be measuring something other than the intended construct. Therefore, it is important to identify items flagged for DIF. Content experts and bias and sensitivity experts review these DIF-flagged items to determine the sources and meanings of performance differences. Refer to section [*7.3 Differential Item Functioning Analyses*](#_Differential_Item_Functioning) for DIF analyses conducted.

### Scores

Individual student scores were reported for the 2020–2021 CAA for Science administration. Student performance in terms of preliminary indicator categories is described in subsection [*6.2.3 Preliminary Indicator Categories*](#_Preliminary_Indicator_Categories).

For information regarding score specifications and score reports, refer to [*Chapter 6: Scoring and Reporting*](#_Scoring_and_Reporting).

#### Score Reporting

There were no individual student scores reported for the 2020–2021 CAA for Science administration due to the novel coronavirus disease 2019 pandemic. Prior to the 2020–2021 administration, the expectation was for this administration’s reporting scale to serve as the baseline scale when equating future CAA for Science administrations to a baseline scale. However, because the small sample of results obtained was not representative of the CAA for Science target population, these results cannot be used to form a baseline scale. Instead, the baseline scale will be developed after the 2021–2022 administration.

For the 2020–2021 results, ETS prepared a data file of students’ percent-correct scores and the associated preliminary indicator category for LEAs.

#### Aggregation Procedures

To provide meaningful results to interested educators, CAA for Science results for a given grade-level assessment were aggregated and generated at the school, LEA or direct funded charter school, county, and state levels. State-level results can be accessed through the Test Results for California’s Assessments website. The aggregated scores were presented for all students or selected demographic student groups.

The aggregation procedures used to present CAA for Science results are described in subsection [*6.2.4 Aggregated Score Reporting*](#_Aggregate_Score_Reporting). Aggregated scores that summarize student performance by grade for selected groups of students are provided in table 6.B.1 through table 6.B.3 in [appendix 6.B](#_Appendix_6.B:_Demographic). The tables show the numbers of students with valid scores in each student group, raw score means and standard deviations, and percentage in a preliminary indicator category. Students are grouped by demographic characteristics, including gender, ethnicity, English-language fluency, primary disability, and economic status. Definitions for the demographic student groups included in these tables are provided in table 6.5.

### Overview of Psychometric Analyses

There were a number of psychometric analyses planned for the CAA for Science data, including classical item analyses, DIF, item response theory (IRT) calibrations, reliability, and response time analyses. These analyses are described fully in [*Chapter 7: Psychometric Analyses*](#_Psychometric_Analyses). Because an insufficient number of students completed the assessment to ensure the sample was representative of the target population, the planned psychometric analyses were not conducted for the 2020–2021 administration.

#### Description of the Classical Item Analyses

The psychometric analyses for the CAA for Science typically consist of classical item analyses and DIF analyses to evaluate the performance of the embedded PT items. The classical item analyses include the computation of item difficulty indices, the item-total correlation indices, the omit rate of each embedded PT item, and the proportion of test takers obtaining each score point for the polytomous items. Flagging rules based on these statistics identify items not performing as expected. Descriptions of the typical psychometric analyses are provided in section [*7.2 Classical Item Analyses*](#_Classical_Item_Analyses)*.*

#### Description of Item Response Theory Analyses

Typically, a concurrent calibration is conducted to estimate parameters for all items. As a result of the concurrent calibration, the item parameter estimates are placed on a common scale for test items from the same grade-level test. The concurrent calibration requires either “common items” or “random equivalent groups.”

The CAA for Science versions are assembled with common items between the versions, which support the efficiency and accuracy of the concurrent calibrations. The one-parameter logistic IRT model (Hambleton and Rogers, 1991) and the partial credit model (Masters, 1982) are used for item calibration of the CAA for Science with flexMIRT® (Cai, 2017) version 3.51 software.

Detailed procedures for the concurrent calibrations are included in subsection [*7.4.2. Item Calibration*](#_Item_Calibration).

### References

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### Appendix 2.A: Accessibility

**Notes:**

* The total students tested refers to the number of students who started the embedded PT.
* Some students are eligible for multiple accessibility resources. As a result, the number of students tested per grade level may not equal the sum of the number of students eligible per accessibility resource across all accessibility resources.

Table 2.A.1 Assignment of Designated Supports and Accommodations—Grades Five and Eight for Earth and Space Sciences

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Accessibility Resource** | **Grade 5: N** | **Grade 5: % of Total Tested** | **Grade 8: N** | **Grade 8: % of Total Tested** |
| Non-Embedded Accommodation—Abacus | 6 | 1% | 7 | 1% |
| Non-Embedded Accommodation—Additional Instructional Supports for Alternate Assessments | 101 | 12% | 87 | 12% |
| Non-Embedded Accommodation—Alternate Response Options | 77 | 9% | 65 | 9% |
| Non-Embedded Accommodation—Print on Demand | 5 | 1% | 3 | 0% |
| Non-Embedded Accommodation—Unlisted Resources | 0 | 0% | 0 | 0% |
| Non-Embedded Accommodation—Word Prediction | 21 | 3% | 10 | 1% |
| Embedded Designated Support—Color Contrast | 4 | 0% | 2 | 0% |
| Embedded Designated Support—Masking | 32 | 4% | 42 | 6% |
| Embedded Designated Support—Mouse Pointer | 5 | 1% | 4 | 1% |
| Embedded Designated Support—Permissive Mode | 12 | 1% | 4 | 1% |
| Embedded Designated Support—Print Size | 14 | 2% | 10 | 1% |
| Embedded Designated Support—Streamline | 19 | 2% | 15 | 2% |
| Embedded Designated Support—Turn Off Any Universal Tools | 0 | 0% | 0 | 0% |

Table 2.A.1 *(continuation)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Accessibility Resource** | **Grade 5: N** | **Grade 5: % of Total Tested** | **Grade 8: N** | **Grade 8: % of Total Tested** |
| Non-Embedded Designated Support—Amplification | 7 | 1% | 1 | 0% |
| Non-Embedded Designated Support—Color Contrast | 1 | 0% | 2 | 0% |
| Non-Embedded Designated Support—Color Overlay | 0 | 0% | 1 | 0% |
| Non-Embedded Designated Support—Magnification | 11 | 1% | 16 | 2% |
| Non-Embedded Designated Support—Medical Supports | 0 | 0% | 0 | 0% |
| Non-Embedded Designated Support—Multiplication Table | 28 | 3% | 53 | 7% |
| Non-Embedded Designated Support—Noise Buffers | 67 | 8% | 60 | 8% |
| Non-Embedded Designated Support—Read Aloud Items | 172 | 21% | 183 | 25% |
| Non-Embedded Designated Support—Scribe Items | 87 | 11% | 88 | 12% |
| Non-Embedded Designated Support—Separate Setting | 176 | 22% | 192 | 26% |
| Non-Embedded Designated Support—100s Number Table | 45 | 6% | 55 | 7% |
| **Total Students Tested** | **816** | **N/A** | **742** | **N/A** |

Table 2.A.2 Assignment of Designated Supports and Accommodations—Grades Five and Eight for Physical Sciences

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Accessibility Resource** | **Grade 5: N** | **Grade 5: % of Total Tested** | **Grade 8: N** | **Grade 8: % of Total Tested** |
| Non-Embedded Accommodation—Abacus | 6 | 1% | 7 | 1% |
| Non-Embedded Accommodation—Additional Instructional Supports for Alternate Assessments | 101 | 12% | 87 | 12% |
| Non-Embedded Accommodation—Alternate Response Options | 79 | 10% | 65 | 9% |
| Non-Embedded Accommodation—Print on Demand | 5 | 1% | 3 | 0% |
| Non-Embedded Accommodation—Unlisted Resources | 0 | 0% | 0 | 0% |
| Non-Embedded Accommodation—Word Prediction | 21 | 3% | 10 | 1% |
| Embedded Designated Support—Color Contrast | 4 | 0% | 2 | 0% |
| Embedded Designated Support—Masking | 34 | 4% | 42 | 6% |
| Embedded Designated Support—Mouse Pointer | 5 | 1% | 4 | 1% |
| Embedded Designated Support—Permissive Mode | 12 | 1% | 4 | 1% |
| Embedded Designated Support—Print Size | 14 | 2% | 12 | 2% |
| Embedded Designated Support—Streamline | 19 | 2% | 15 | 2% |
| Embedded Designated Support—Turn Off Any Universal Tools | 0 | 0% | 0 | 0% |
| Non-Embedded Designated Support—Amplification | 7 | 1% | 1 | 0% |
| Non-Embedded Designated Support—Color Contrast | 1 | 0% | 2 | 0% |
| Non-Embedded Designated Support—Color Overlay | 0 | 0% | 1 | 0% |
| Non-Embedded Designated Support—Magnification | 11 | 1% | 17 | 2% |
| Non-Embedded Designated Support—Medical Supports | 0 | 0% | 0 | 0% |
| Non-Embedded Designated Support—Multiplication Table | 28 | 3% | 54 | 7% |
| Non-Embedded Designated Support—Noise Buffers | 69 | 8% | 60 | 8% |
| Non-Embedded Designated Support—Read Aloud Items | 186 | 23% | 183 | 25% |
| Non-Embedded Designated Support—Scribe Items | 87 | 11% | 88 | 12% |
| Non-Embedded Designated Support—Separate Setting | 179 | 22% | 193 | 26% |
| Non-Embedded Designated Support—100s Number Table | 45 | 6% | 56 | 8% |
| **Total Students Tested** | **816** | **N/A** | **742** | **N/A** |

Table 2.A.3 Assignment of Designated Supports and Accommodations—Grades Five and Eight for Life Sciences

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Accessibility Resource** | **Grade 5: N** | **Grade 5: % of Total Tested** | **Grade 8: N** | **Grade 8: % of Total Tested** |
| Non-Embedded Accommodation—Abacus | 6 | 1% | 7 | 1% |
| Non-Embedded Accommodation—Additional Instructional Supports for Alternate Assessments | 101 | 12% | 87 | 12% |
| Non-Embedded Accommodation—Alternate Response Options | 79 | 10% | 65 | 9% |
| Non-Embedded Accommodation—Print on Demand | 5 | 1% | 3 | 0% |
| Non-Embedded Accommodation—Unlisted Resources | 0 | 0% | 0 | 0% |
| Non-Embedded Accommodation—Word Prediction | 21 | 3% | 10 | 1% |
| Embedded Designated Support—Color Contrast | 4 | 0% | 2 | 0% |
| Embedded Designated Support—Masking | 32 | 4% | 42 | 6% |
| Embedded Designated Support—Mouse Pointer | 5 | 1% | 4 | 1% |
| Embedded Designated Support—Permissive Mode | 12 | 1% | 4 | 1% |
| Embedded Designated Support—Print Size | 14 | 2% | 11 | 1% |
| Embedded Designated Support—Streamline | 19 | 2% | 15 | 2% |
| Embedded Designated Support—Turn Off Any Universal Tools | 0 | 0% | 0 | 0% |
| Non-Embedded Designated Support—Amplification | 7 | 1% | 1 | 0% |
| Non-Embedded Designated Support—Color Contrast | 1 | 0% | 2 | 0% |
| Non-Embedded Designated Support—Color Overlay | 0 | 0% | 1 | 0% |
| Non-Embedded Designated Support—Magnification | 11 | 1% | 15 | 2% |
| Non-Embedded Designated Support—Medical Supports | 0 | 0% | 0 | 0% |
| Non-Embedded Designated Support—Multiplication Table | 28 | 3% | 53 | 7% |
| Non-Embedded Designated Support—Noise Buffers | 67 | 8% | 59 | 8% |
| Non-Embedded Designated Support—Read Aloud Items | 172 | 21% | 182 | 25% |
| Non-Embedded Designated Support—Scribe Items | 87 | 11% | 86 | 12% |
| Non-Embedded Designated Support—Separate Setting | 177 | 22% | 191 | 26% |
| Non-Embedded Designated Support—100s Number Table | 45 | 6% | 55 | 7% |
| **Total Students Tested** | **816** | **N/A** | **742** | **N/A** |

Table 2.A.4 Assignment of Designated Supports and Accommodations—High School for Earth and Space Sciences

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Accessibility Resource** | **Grade 10: N** | **Grade 10: % of Total Tested** | **Grade 11: N** | **Grade 11: % of Total Tested** | **Grade 12: N** | **Grade 12: % of Total Tested** | **High School: N** | **High School: % of Total Tested** |
| Non-Embedded Accommodation—Abacus | 0 | 0% | 0 | 0% | 3 | 1% | 3 | 0% |
| Non-Embedded Accommodation—Additional Instructional Supports for Alternate Assessments | 1 | 1% | 17 | 5% | 18 | 4% | 36 | 4% |
| Non-Embedded Accommodation—Alternate Response Options | 0 | 0% | 13 | 4% | 12 | 3% | 25 | 3% |
| Non-Embedded Accommodation—Print on Demand | 0 | 0% | 1 | 0% | 2 | 0% | 3 | 0% |
| Non-Embedded Accommodation—Unlisted Resources | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% |
| Non-Embedded Accommodation—Word Prediction | 0 | 0% | 9 | 2% | 4 | 1% | 13 | 1% |
| Embedded Designated Support—Color Contrast | 0 | 0% | 0 | 0% | 1 | 0% | 1 | 0% |
| Embedded Designated Support—Masking | 0 | 0% | 6 | 2% | 4 | 1% | 10 | 1% |
| Embedded Designated Support—Mouse Pointer | 0 | 0% | 1 | 0% | 4 | 1% | 5 | 1% |
| Embedded Designated Support—Permissive Mode | 0 | 0% | 3 | 1% | 3 | 1% | 6 | 1% |
| Embedded Designated Support—Print Size | 0 | 0% | 3 | 1% | 1 | 0% | 4 | 0% |
| Embedded Designated Support—Streamline | 1 | 1% | 4 | 1% | 5 | 1% | 10 | 1% |
| Embedded Designated Support—Turn Off Any Universal Tools | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% |

Table 2.A.4 *(continuation)*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Accessibility Resource** | **Grade 10: N** | **Grade 10: % of Total Tested** | **Grade 11: N** | **Grade 11: % of Total Tested** | **Grade 12: N** | **Grade 12: % of Total Tested** | **High School: N** | **High School: % of Total Tested** |
| Non-Embedded Designated Support—Amplification | 0 | 0% | 2 | 1% | 0 | 0% | 2 | 0% |
| Non-Embedded Designated Support—Color Contrast | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% |
| Non-Embedded Designated Support—Color Overlay | 0 | 0% | 1 | 0% | 0 | 0% | 1 | 0% |
| Non-Embedded Designated Support—Magnification | 0 | 0% | 3 | 1% | 4 | 1% | 7 | 1% |
| Non-Embedded Designated Support—Medical Supports | 0 | 0% | 1 | 0% | 0 | 0% | 1 | 0% |
| Non-Embedded Designated Support—Multiplication Table | 0 | 0% | 15 | 4% | 7 | 1% | 22 | 2% |
| Non-Embedded Designated Support—Noise Buffers | 1 | 1% | 16 | 4% | 18 | 4% | 35 | 4% |
| Non-Embedded Designated Support—Read Aloud Items | 0 | 0% | 41 | 11% | 59 | 12% | 100 | 11% |
| Non-Embedded Designated Support—Scribe Items | 0 | 0% | 15 | 4% | 23 | 5% | 38 | 4% |
| Non-Embedded Designated Support—Separate Setting | 1 | 1% | 88 | 24% | 88 | 19% | 177 | 19% |
| Non-Embedded Designated Support—100s Number Table | 0 | 0% | 12 | 3% | 14 | 3% | 26 | 3% |
| **Total Students Tested** | **85** | **N/A** | **369** | **N/A** | **473** | **N/A** | **927** | **N/A** |

Table 2.A.5 Assignment of Designated Supports and Accommodations—High School for Physical Sciences

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Accessibility Resource** | **Grade 10: N** | **Grade 10: % of Total Tested** | **Grade 11: N** | **Grade 11: % of Total Tested** | **Grade 12: N** | **Grade 12: % of Total Tested** | **High School: N** | **High School: % of Total Tested** |
| Non-Embedded Accommodation—Abacus | 0 | 0% | 0 | 0% | 3 | 1% | 3 | 0% |
| Non-Embedded Accommodation—Additional Instructional Supports for Alternate Assessments | 1 | 1% | 19 | 5% | 18 | 4% | 38 | 4% |
| Non-Embedded Accommodation—Alternate Response Options | 0 | 0% | 15 | 4% | 13 | 3% | 28 | 3% |
| Non-Embedded Accommodation—Print on Demand | 0 | 0% | 1 | 0% | 2 | 0% | 3 | 0% |
| Non-Embedded Accommodation—Unlisted Resources | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% |
| Non-Embedded Accommodation—Word Prediction | 0 | 0% | 11 | 3% | 5 | 1% | 16 | 2% |
| Embedded Designated Support—Color Contrast | 0 | 0% | 0 | 0% | 1 | 0% | 1 | 0% |
| Embedded Designated Support—Masking | 0 | 0% | 6 | 2% | 7 | 1% | 13 | 1% |
| Embedded Designated Support—Mouse Pointer | 0 | 0% | 1 | 0% | 4 | 1% | 5 | 1% |
| Embedded Designated Support—Permissive Mode | 0 | 0% | 3 | 1% | 3 | 1% | 6 | 1% |
| Embedded Designated Support—Print Size | 0 | 0% | 3 | 1% | 1 | 0% | 4 | 0% |
| Embedded Designated Support—Streamline | 1 | 1% | 4 | 1% | 6 | 1% | 11 | 1% |
| Embedded Designated Support—Turn Off Any Universal Tools | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% |

Table 2.A.5 *(continuation)*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Accessibility Resource** | **Grade 10: N** | **Grade 10: % of Total Tested** | **Grade 11: N** | **Grade 11: % of Total Tested** | **Grade 12: N** | **Grade 12: % of Total Tested** | **High School: N** | **High School: % of Total Tested** |
| Non-Embedded Designated Support—Amplification | 0 | 0% | 2 | 1% | 0 | 0% | 2 | 0% |
| Non-Embedded Designated Support—Color Contrast | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% |
| Non-Embedded Designated Support—Color Overlay | 0 | 0% | 1 | 0% | 0 | 0% | 1 | 0% |
| Non-Embedded Designated Support—Magnification | 0 | 0% | 4 | 1% | 4 | 1% | 8 | 1% |
| Non-Embedded Designated Support—Medical Supports | 0 | 0% | 1 | 0% | 0 | 0% | 1 | 0% |
| Non-Embedded Designated Support—Multiplication Table | 0 | 0% | 15 | 4% | 8 | 2% | 23 | 2% |
| Non-Embedded Designated Support—Noise Buffers | 1 | 1% | 17 | 5% | 20 | 4% | 38 | 4% |
| Non-Embedded Designated Support—Read Aloud Items | 0 | 0% | 43 | 12% | 59 | 12% | 102 | 11% |
| Non-Embedded Designated Support—Scribe Items | 0 | 0% | 17 | 5% | 23 | 5% | 40 | 4% |
| Non-Embedded Designated Support—Separate Setting | 1 | 1% | 92 | 25% | 93 | 20% | 186 | 20% |
| Non-Embedded Designated Support—100s Number Table | 0 | 0% | 13 | 4% | 14 | 3% | 27 | 3% |
| **Total Students Tested** | **85** | **N/A** | **369** | **N/A** | **473** | **N/A** | **927** | **N/A** |

Table 2.A.6 Assignment of Designated Supports and Accommodations—High School for Life Sciences

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Accessibility Resource** | **Grade 10: N** | **Grade 10: % of Total Tested** | **Grade 11: N** | **Grade 11: % of Total Tested** | **Grade 12: N** | **Grade 12: % of Total Tested** | **High School: N** | **High School: % of Total Tested** |
| Non-Embedded Accommodation—Abacus | 0 | 0% | 0 | 0% | 3 | 1% | 3 | 0% |
| Non-Embedded Accommodation—Additional Instructional Supports for Alternate Assessments | 1 | 1% | 17 | 5% | 18 | 4% | 36 | 4% |
| Non-Embedded Accommodation—Alternate Response Options | 0 | 0% | 14 | 4% | 13 | 3% | 27 | 3% |
| Non-Embedded Accommodation—Print on Demand | 0 | 0% | 1 | 0% | 2 | 0% | 3 | 0% |
| Non-Embedded Accommodation—Unlisted Resources | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% |
| Non-Embedded Accommodation—Word Prediction | 0 | 0% | 9 | 2% | 5 | 1% | 14 | 2% |
| Embedded Designated Support—Color Contrast | 0 | 0% | 0 | 0% | 1 | 0% | 1 | 0% |
| Embedded Designated Support—Masking | 0 | 0% | 6 | 2% | 7 | 1% | 13 | 1% |
| Embedded Designated Support—Mouse Pointer | 0 | 0% | 1 | 0% | 4 | 1% | 5 | 1% |
| Embedded Designated Support—Permissive Mode | 0 | 0% | 3 | 1% | 3 | 1% | 6 | 1% |
| Embedded Designated Support—Print Size | 0 | 0% | 3 | 1% | 1 | 0% | 4 | 0% |
| Embedded Designated Support—Streamline | 1 | 1% | 4 | 1% | 6 | 1% | 11 | 1% |
| Embedded Designated Support—Turn Off Any Universal Tools | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% |

Table 2.A.6 *(continuation)*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Accessibility Resource** | **Grade 10: N** | **Grade 10: % of Total Tested** | **Grade 11: N** | **Grade 11: % of Total Tested** | **Grade 12: N** | **Grade 12: % of Total Tested** | **High School: N** | **High School: % of Total Tested** |
| Non-Embedded Designated Support—Amplification | 0 | 0% | 2 | 1% | 0 | 0% | 2 | 0% |
| Non-Embedded Designated Support—Color Contrast | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% |
| Non-Embedded Designated Support—Color Overlay | 0 | 0% | 1 | 0% | 0 | 0% | 1 | 0% |
| Non-Embedded Designated Support—Magnification | 0 | 0% | 3 | 1% | 4 | 1% | 7 | 1% |
| Non-Embedded Designated Support—Medical Supports | 0 | 0% | 1 | 0% | 0 | 0% | 1 | 0% |
| Non-Embedded Designated Support—Multiplication Table | 0 | 0% | 15 | 4% | 7 | 1% | 22 | 2% |
| Non-Embedded Designated Support—Noise Buffers | 1 | 1% | 16 | 4% | 20 | 4% | 37 | 4% |
| Non-Embedded Designated Support—Read Aloud Items | 0 | 0% | 42 | 11% | 60 | 13% | 102 | 11% |
| Non-Embedded Designated Support—Scribe Items | 0 | 0% | 16 | 4% | 23 | 5% | 39 | 4% |
| Non-Embedded Designated Support—Separate Setting | 1 | 1% | 89 | 24% | 91 | 19% | 181 | 20% |
| Non-Embedded Designated Support—100s Number Table | 0 | 0% | 12 | 3% | 14 | 3% | 26 | 3% |
| **Total Students Tested** | **85** | **N/A** | **369** | **N/A** | **473** | **N/A** | **927** | **N/A** |

## Embedded Performance Task Item Development Process

This chapter discusses the detailed procedures of embedded performance task (PT) development for the 2020–2021 California Alternate Assessment (CAA) for Science administration.

### Embedded Performance Task Item Development

Each CAA for Science embedded PT item was developed through a comprehensive cycle and designed to conform to ETS-defined principles of item writing. Each item in the CAA for Science item bank was developed to measure a specific Science Core Content Connector (Science Connector). The Science Connectors are based on the performance expectations (PEs) from the California Next Generation Science Standards (CA NGSS) and were designed to incorporate the science and engineering practices, disciplinary core ideas, and the crosscutting concepts that comprise the CA NGSS. The Science Connectors are further broken down into more discrete focal knowledge, skills, and abilities (FKSAs) and, at the simplest level, the essential understandings (EUs).

In addition, guidelines for style, fairness, and bias and sensitivity helped item developers and reviewers ensure consistency across the item development process.

#### Specifications for the Embedded Performance Tasks and Items

The item specifications for prioritized Science Connectors describe the characteristics of the tasks to be developed to measure each Science Connector and provide detailed information to task writers who develop items for the CAA for Science. The specifications include the following:

* The full statement of the associated CA NGSS PE
* The full statement of the Science Connector
* The full content of each assessed FKSA of the Science Connector
* The full content of each assessed EU of the Science Connector
* How mastery of the EUs and FKSA(s) is demonstrated

#### Five-Year Plan

The CAA for Science blueprint requires that all of the Science Connectors prioritized for assessment be assessed at least once during a five-year period (California Department of Education [CDE], 2018). To support the planning for this rotation, ETS and the CDE collaborated to create a five-year coverage plan. This plan contains a running record of the Science Connectors that have been assessed as well as a projection of the Science Connectors proposed for assessments in the coming years. The plan is reviewed and updated annually and is consulted during the planning for item development and forms construction.

#### Embedded Performance Task and Item Format

Embedded PTs for the CAA for Science were designed to be engaging to the target population. Embedded PTs were developed with the understanding that a test examiner would deliver each task individually to each eligible student and assist the student in responding as appropriate during each portion of the embedded PT. Instructions and guidance for each embedded PT were contained within the embedded PT *Directions for Administration (DFAs)*.

Each embedded PT *DFA* began with background information and instructions for the test examiner. These instructions included

* guidelines on student engagement;
* guidance on the concept of individualization;
* the Student Response Decision Matrix;
* orienting activities and graphics for the orienting activities, if needed;
* the associated script for the computer-based test questions; and
* a complete list of materials needed for the administration of this embedded PT and suggestions for individualization, if needed.

The CAA for Science included the following item formats in the computer-based test delivery system:

* **Selected response (SR)—**A student was instructed to select one or more options. Most CAA for Science items had two or three options; a few items had four options.
* **Match—**A student was instructed to select and place a picture on a specified part of a diagram or chart presented on the device’s screen.
* **Grid—**A student was instructed to place a check mark in a specified section in a table of responses presented on the device’s screen.

All SR, match, and grid items were scored by the test delivery system.

The number of items and points for each embedded PT is provided in table 3.1.

Table 3.1 Number of Items and Points for Each Embedded PT

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Grade Level or Grade Band** | **Number of Items—PT 1** | **Number of Points—PT 1** | **Number of Items—PT 2** | **Number of Points—PT 2** | **Number of Items—PT 3** | **Number of Points—PT 3** | **Number of Items—Field Test PT** | **Number of Points—Field Test PT** | **Total Number of Operational Items** | **Maximum Number of Points** |
| Grade 5 | 10 | 12 | 10 | 12 | 10 | 12 | 10 | 12 | 30 | 36 |
| Grade 8 | 10 | 12 | 10 | 12 | 10 | 12 | 10 | 12 | 30 | 36 |
| High School | 10 | 12 | 10 | 12 | 10 | 12 | 10 | 12 | 30 | 36 |

**Note:** The field test embedded PT does not count towards a student’s total raw score, the total number of operational items, or the maximum number of points.

#### Recruitment and Selection of Embedded Performance Task Item Writers

Applications for embedded PT item writing were screened by senior ETS content staff. Only those applicants with strong science content or special education teaching backgrounds were approved for inclusion in the training program for item writing.

All item writers were recruited in an attempt to meet the following qualifications:

* Possession of a bachelor’s degree in a science content area or in the field of education, with special focus on a particular science content area (An advanced degree in science or special education was desirable.)
* Experience teaching students with cognitive disabilities and, preferably, experience teaching science in grades five through twelve
* Previous experience or training in writing items for standards-based assessments, including knowledge of the many considerations that are important when developing items for special student populations
* Previous experience or training in writing items in the content areas covered by CAA for Science grade levels, content domains, or both
* Familiarity, understanding, and support of the Science Connectors, EUs, and FKSAs

#### Embedded Performance Task Item Writer Training

Item writer training for the 2020–2021 assessment cycle took place over two days in July 2018. Attendees received training on the Science Connectors used for the CAA for Science, general principles of universal design, CAA for Science item specifications, and how to account for bias and sensitivity when writing items.

During the training, attendees wrote sample items that were evaluated and returned with feedback from ETS science assessment specialists.

### ETS Item Review Process

The activities and items developed for the CAA for Science embedded PTs underwent an extensive item review process that was designed to provide the best standards-based assessments possible. This section summarizes the item review process that ensured the quality of CAA for Science activities and items.

#### Overview

Tasks and items submitted by the item writers were reviewed by ETS assessment specialists, who determined whether each embedded PT and item met the criteria expected for submission, including accuracy and adherence to the item specifications. Embedded PTs and items that did not meet the criteria were rejected, with notes for future revision submitted to authors. Items that met the criteria were accepted into the pool and authored into the system.

Once an item was accepted for further development—that is, once it was entered into the ETS item bank and formatted for use in an assessment—ETS employed a series of internal reviews to judge the quality of item content and ensure that each item measured what it was intended to measure. These internal reviews also examined the overall quality of the test items before presentation to the CDE and California educators.

The ETS review process for the CAA for Science included the following; these tasks are described in the following subsections:

1. Content review
2. Accessibility review
3. Editorial review
4. Sensitivity and fairness review

Throughout this multistep item review process, the lead content-area assessment specialists and development team members continually evaluated the activities and items in adherence to the rules for item development.

#### ETS Content Review

During the development cycle, embedded PTs underwent three rounds of content reviews by content-area assessment specialists with increasing levels of expertise, called Round 1, Round 2, and Final Round. The assessment specialists ensured thatthe embedded PTs complied with the approved item specifications, the *California Assessment of Student Performance and Progress (CAASPP) and English Language Proficiency Assessments for California (ELPAC) Item Review Acceptance Criteria* (ETS, 2019), and with ETS written guidelines for clarity, style, accuracy, and appropriateness for California students. Assessment specialists reviewed each embedded PT and item for the following characteristics:

* Relevance to the purpose of the test
* Alignment with the item specifications, including the level of item complexity
* Alignment with the principles of quality item writing
* Match to the identified standard or standards
* Difficulty
* Accuracy of the content
* Readability
* Grade-level appropriateness
* Appropriateness of any illustrations, graphs, or figures

Each embedded PT item was classified with the Science Connector and either EU or FKSA it was intended to measure. Assessment specialists checked each item against its classification codes, both to evaluate the correctness of the classification and to ensure that the task posed by the item was relevant to the outcome it was intended to measure. The reviewers could accept the item and classification as written, suggest revisions, or recommend that the item be discarded. These steps occurred prior to the CDE’s review.

#### ETS Accessibility Review

The structure of the CAA for Science allows a test examiner to administer the assessment to the student one-on-one, which gives test examiners an opportunity to use any support that improves the student’s accessibility to the assessment. The ETS Accessible Content & Inclusive Solutions team advised on alternative text appropriateness and accessibility of items and item types during the ETS content review. Outside of this review, ETS did not conduct a separate accessibility review for the CAA for Science outside of the review described in subsection [*3.2.2 ETS Content Review*](#_ETS_Content_Review).

#### ETS Editorial Review

After the content-area assessment specialists reviewed each item, a group of specially trained editors also reviewed each embedded PT and item in preparation for consideration by the CDE and California educators. The editors checked items for clarity, correctness of language, appropriateness of language for the grade level assessed, adherence to the CAA for Science style guidelines, and conformity with accepted item-writing practices.

#### ETS Sensitivity and Fairness Review

ETS assessment specialists who are specially trained to identify and eliminate questions that contain content or wording that could be construed to be offensive to, or biased against, members of specific student groups—ethnic, racial, or gender—reviewed every item before the CDE and formal embedded PT item reviews.

The review process promoted a general awareness of, and responsiveness to, the following:

* Diversity of background, cultural tradition, and viewpoints to be found in the test-taking population
* Changing roles and attitudes toward various groups
* Role of language in setting and changing attitudes toward various groups
* Topics that may be unsettling or otherwise distract the student from the content being measured, such as natural disasters, disease, or family discord
* Contributions of diverse groups (including ethnic and minority groups, individuals with disabilities, and women) to the history and culture of the United States and the achievements of individuals within these groups
* Item accessibility for English learner (EL) students

### California Department of Education Review

After ETS reviews of items were completed, the items were reviewed by the CDE content teams. CDE content experts reviewed the items using the same criteria used in the ETS reviews. After CDE reviews occurred, ETS made edits to the items based on the CDE feedback, and the items were then finalized for item review meetings with California educators.

### California Educator Review

Item review meetings with California educators were held at the end of the item review process as the final content expert review that items must undergo before being placed in an operational assessment.

#### California Educators as Content Experts

California educators filled an advisory role to the CDE and ETS and provided guidance on matters related to embedded PT item development for the CAA for Science.

These educators were responsible for reviewing all newly developed items for alignment with the Science Connectors. Meeting participants also reviewed the items for accuracy of content, clarity of phrasing, and quality, using the CAASPP and ELPAC *Item Review Acceptance Criteria* (ETS, 2019) for reference. In their examination of embedded PT items, participants could raise concerns about the appropriateness of the items as related to the grade, age, and cognitive level of the test taker. Additionally, items were evaluated for any potential bias or sensitivity concerns associated with disability, gender, race, ethnicity, religion, or socioeconomic status. ETS recorded educator feedback for each item and adjusted item content based on approval from the CDE.

#### Composition of Item Review Panels

For the last item review meeting, the group of participating California educators consisted of current and former teachers (some of whom had taught students who comprised the identified population and others who were subject matter experts in science), resource specialists, administrators, curriculum and content experts, and other education professionals. Minimum qualifications to be invited to participate were

* three or more years of teaching experience in kindergarten through grade twelve, and
* bachelor’s or higher degree in a grade or content area related to special education.

Preferred qualifications included

* experience teaching students with more than one type of disability, and
* three to five years of experience as a teacher or school administrator with a special education credential.

School administrators; local educational agency (LEA), county content, or program specialists; or university educators must have met the following qualifications to be invited to participate:

* Three or more years of experience as a school administrator; LEA, county content, or program specialist; or university instructor in a content-specific area
* Knowledge of, and experience with, the CA NGSS

Every effort was made to ensure that groups of item reviewers included a wide representation of gender, geographic regions, and ethnic groups in California. Efforts also were made to ensure representation by members with experience serving California’s diverse special education population.

Table 3.2 shows the educational qualifications, present occupation, and credentials of the individuals who participated in CAA for Science item review.

Table 3.2 Number of Item Reviewers with Each Qualification

|  |  |  |
| --- | --- | --- |
| **Qualification Type** | **Qualification** | **Number of Reviewers** |
| **N/A** | **Total number of reviewers** | **11** |
| **Occupation** | Teacher or Program Specialist, Elementary School | 4 |
| **Occupation** | Teacher or Program Specialist, Middle School | 4 |
| **Occupation** | Teacher or Program Specialist, High School | 3 |
| **Occupation** | Other District Personnel | 0 |
| **Highest Degree Earned** | Bachelor’s Degree | 7 |
| **Highest Degree Earned** | Master’s Degree | 4 |
| **Highest Degree Earned** | Doctorate | 0 |
| **K–12 Teaching Credential** | Elementary Teaching (multiple subjects) | 6 |
| **K–12 Teaching Credential** | Secondary Teaching (single subject) | 0 |
| **K–12 Teaching Credential** | Special Education | 5 |
| **K–12 Teaching Credential** | Reading Specialist | 0 |
| **K–12 Teaching Credential** | EL (Crosscultural, Language and Academic Development; Bilingual, Crosscultural, Language and Academic Development) | 0 |
| **K–12 Teaching Credential** | Administrative | 0 |
| **K–12 Teaching Credential** | Other | 0 |

**Note:** Numbers may not match the totals because members may have multiple occupations or teaching credentials or are currently working toward earning their highest degree.

Item reviewers were recruited through an application process. Recommendations were solicited from LEAs and county offices of education as well as from the CDE. Applications were reviewed by ETS assessment directors, who confirmed that an applicant’s qualifications met the specified criteria. Applicants who met the criteria had their information forwarded to the CDE for further review and agreement before invitations to participate were distributed.

#### Meetings for Review of CAA for Science Embedded Performance Tasks and Items

The 2020–2021 CAA for Science Item Review Meeting was held from to March 10 to March 12, 2020. ETS content-area assessment specialists facilitated CAA for Science item review meetings. Each meeting began with a brief training session on how to review and make recommendations for revising items. ETS provided training on the following topics:

* Overview of the purpose and scope of the CAA for Science
* Overview of the CAA for Science test design specifications and blueprint
* Analysis of the CAA for Science embedded PT item specifications
* Overview of criteria for evaluating test items
* Review and evaluation of items for bias and sensitivity issues

The criteria for evaluating items included the following:

* Overall technical quality
* Alignment with the Science Connectors
* Alignment with the construct being assessed by the Science Connector
* Difficulty range
* Clarity
* Correctness of the answer
* Plausibility of the distractors
* Bias and sensitivity factors

Criteria also encompassed more global factors, including the quality of the alternative text to confirm that it describes an image in an age- and audience-appropriate manner within the context of the question. Meeting participants also were trained on how to make recommendations for revising items.

Guidelines for reviewing items were provided by ETS and approved by the CDE. The set of guidelines for reviewing items is summarized next:

* Does the item
* have one and only one clearly correct answer (for single-select items)?
* measure the content standard?
* match the item specifications?
* align with the construct being measured?
* test worthwhile concepts or information?
* Is the stimulus, if any, for the item
* required to answer the item?
* likely to be interesting to students?
* clearly and correctly labeled?
* providing all the information needed to answer the item?

### Data Review

No data review meeting was held after the 2020–2021 CAA for Science administration; a sample representative of the target population could not be formed because, due to the novel coronavirus disease 2019 pandemic, an insufficient number of students completed an assessment during the administration. Typically, after items are administered to students, ETS prepares the items and the associated statistics for review by the CDE and California educators.

In previous data review meetings for the CAA for Science, review materials included embedded PT items with their statistical data and statistical flags based on the respective administration’s item analyses along with annotated comment sheets for use by reviewers. ETS typically conducts an introductory training to highlight any new issues and to serve as a statistical refresher. Reviewers then make decisions about which items should be included in the item bank for future assembly. If an item is considered problematic and not to be included in the item bank, it could be revised, reintroduced to the item development process, field-tested once again, and put through another round of item analysis; or the item could be deactivated and removed from the item bank. ETS psychometric and content staff are available to reviewers throughout this process.

ETS content staff facilitate the meeting, confirming that all educators weigh in on each flagged item to confirm whether there are any concerns, from a content perspective, as it pertained to the flag. ETS psychometricians provide training on the item statistics and respond to questions about the item statistics during the item discussion. The data review meeting participants review the content and statistics of each item and then make a recommendation to accept or reject an item.

Content staff record each participant’s recommendations and comments regarding the flagged items. The feedback is referenced when working with the CDE to reconcile educator feedback and to make a final decision on whether to include the item in the operational pool.

### References

California Department of Education. (2018). *California Alternate Assessment for Science blueprint*. California Department of Education website.

Educational Testing Service. (2019). *CAASPP and ELPAC item acceptance criteria*. [Unpublished manuscript]. Princeton, NJ: Educational Testing Service.

## Test Assembly

This chapter provides details of test assembly, including a description of the content being measured (i.e., test blueprint), process of item selection, final reviews before test production, and the production process (e.g., preparation of the test forms for computer-based test delivery).

### Overview

The 2020–2021 California Alternate Assessment (CAA) for Science operational field test was administered as three embedded performance tasks (PTs) during the school year in grades five and eight and once in high school. Each embedded PT within a grade assessed one of the three science domains, which are Life Sciences, Physical Sciences, and Earth and Space Sciences and two Science Core Content Connectors (Science Connectors) from a domain.

The embedded PTs contained an orienting activity and five questions aligned to each of the two Science Connectors. Thus, an embedded PT contained 10 questions assessing two Science Connectors, each with an orienting activity. Some of the orienting activities and questions incorporated simple activities designed to demonstrate a key concept associated with the assessed Science Connector.

### Test Blueprint and Test Content Specifications

The CAA for Science incorporates innovations and best practices from recent national alternate assessment initiatives, such as the Dynamic Learning Maps, and from the work done by the National Center and State Collaborative. All items and tasks are developed to assess the Science Connectors developed by California educators, ETS, and EdCount. An essential understanding (EU) and focal knowledge, skills, and abilities (FKSA) are identified for each Science Connector. EUs define a basic, foundational key idea or concept based on the Science Connector that builds increasing understanding of the grade-level content. FKSAs provide more specific detail about the requirements described by the Science Connectors.

#### Test Blueprint

The CAA for Science test blueprint is unique to each grade level or grade band (California Department of Education [CDE], 2018). The blueprint designates the breakdown of each assessment, first by science domain and then by Science Connectors. Information on a test blueprint for a given grade level and content area includes the

* specific ratio of each content domain on the overall assessment,
* specific Science Connectors to be assessed, and
* number of items on a test.

The 2020–2021 forms had 100 percent alignment with the test blueprint. Each of the three content domains were assessed by 10 items for a total of 12 points.

Overall, the percentage of items per content domain based on the Science Connector assigned during item development and those in the CAA for Science blueprint are comparable.

#### Test Content Specifications

The CAA for Science assesses each Science Connector through the FKSAs and EUs derived from the Science Connectors. The Science Connectors are derived from the California Next Generation Science Standards performance expectations. Additionally, the Science Connectors focus on the core content, knowledge, and skills needed to help students at each grade level succeed; and identify priorities in science to guide the instruction for students in this population and for an alternate assessment. Finally, the Science Connectors provide a foundation that permits teachers, parents/guardians, and the students themselves to help students with significant cognitive disabilities identify and address gaps in knowledge or skills early so students can receive the support they need (CDE, 2021).

Each content standard is assessed through the Science Connectors and related FKSAs and EUs under a three-level structure of item complexity.

### Test Production Process

#### Selection of Items

From the eligible item pool, test developers selected items that, as a whole,

* met the coverage specifications of the test blueprint,
* met the form-building guidelines developed by the ETS psychometrics team,
* represented a wide variety of item types, and
* provided a wide variety of item contexts.

#### Test Forms

Table 4.1 provides the number of Science Connectors for each grade level and for high school (grade ten, eleven, or twelve [as long as the student is not repeating grade twelve]) for the operational and field test embedded PTs.

Table 4.1 The Number of Science Connectors for 2020–2021 CAA for Science Forms

|  |  |  |  |
| --- | --- | --- | --- |
| **PT Description** | **Grade 5** | **Grade 8** | **High School** |
| Operational PTs | 9 | 9 | 9 |
| Field test PTs | 2 | 2 | 2 |

The number of Science Connectors summarized in table 4.1 resulted in four unique forms for each grade level and high school. Alternate versions of the four unique forms allowed additional items and Connector sets to be tested for each grade level. All the forms mentioned previously were evaluated using the psychometric criteria as described in subsection [*4.3.3 Psychometric Criteria and Review*](#_Psychometric_Criteria_and).

#### Psychometric Criteria and Review

ETS test developers sent the proposed assessment to the ETS psychometrics team for approval prior to use of the forms in student testing. The proposed assessment was reviewed to ensure that all statistical guidelines were met for both individual items and the assessment as a whole. For this review, the psychometricians reviewed item statistics from prior administrations to assess the items on the forms.

ETS psychometricians reviewed the item statistics, such as the *p*-value (item difficulty; refer to subsection [*7.2.1 Classical Item Difficulty Indices (p-value and Average Item Score)*](#_Classical_Item_Difficulty) for more details on this statistic) and item-total correlation (item discrimination; refer to subsection [*7.2.2 Item Discrimination (Item-Total Correlation)*](#_Item_Discrimination_(Item-Total) for more details on this statistic) obtained from the field test administration, and used them to inform the item selection for the operational forms. At the form level, the distribution of *p*-values ranged from 0.35 to 0.92, and all the items selected had item-total correlations higher than 0.30.

The following psychometric criteria were applied in the form assembly:

* The *p*-value is between 0.2 and 0.95. A *p*-value less than 0.2 suggests that the item might be too difficult; a *p*-value greater than 0.95 suggests that the item might be too easy. Items that were too easy or too difficult were not used, as they provided little information on evaluating students’ abilities.
* The item-total correlation is at least 0.2. Items selected had item-total correlations higher than 0.3.
* Items with C-DIF should not be used unless it is necessary for content coverage (refer to section [*7.3 Differential Item Functioning Analyses*](#_Differential_Item_Functioning) for more details on the differential item functioning [DIF]). All C-DIF items were reviewed by a DIF panel that included members of the focal groups that were affected and who confirmed the items were not biased before the items could be selected for use. The panelists did not have a vested interest in the outcome of the decision.

Psychometric review results, including the number of forms and number of items, are presented in table 4.2.

Table 4.2 Number of Forms and Items Reviewed Psychometrically

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Grade Level or Grade Band** | **Number of Forms** | **Number of Unique Operational Items** | **Number of Unique Field Test Items** | **Total Number of Unique Items** |
| Grade 5 | 4 | 60 | 16 | 76 |
| Grade 8 | 4 | 59 | 14 | 73 |
| High school | 4 | 59 | 15 | 74 |
| **Overall** | **12** | **178** | **45** | **223** |

**Note:** Operational field test items are categorized as operational items, and some operational and field test items are administered across two or more forms.

#### Content Review of Forms

After psychometric approval, the proposed assessment underwent two additional content reviews and one editorial review. The form reviewers are content specialists who work on testing programs other than the CAA for Science, so they were able to bring a fresh perspective to the review. They were given the appropriate materials to complete the following tasks:

* Verification of item keys
* Identification of possible clueing across the items
* Verification that individual items met the standard
* Verification of coverage of the standards
* Identification of any possible grammatical or production errors

#### California Department of Education Forms Review

Following the ETS content review, all proposed assessments were sent to the CDE for review to ensure the proposed assessments met CAA for Science test blueprint requirements and to check that there was no clueing between items. The CDE was provided with the following materials:

* Access to items in the item banking system
* *Directions for Administration* *(DFAs)* for the items
* Modified form planners
* Comment sheets

Comments from the CDE were resolved during a virtual meeting with the ETS test development team.

#### Configuration of the Test Delivery System

Once all the test reviews were completed and concerns, if any, were resolved, the official ordered item sequence of the proposed forms was sent to Cambium Assessment, Inc. (CAI) for configuration of the California Assessment of Student Performance and Progress test delivery system (TDS).

CAI’s TDS supported a variety of item layouts. Some of the item layouts had the stimulus and item response options and response area displayed side by side. In this item layout, both the stimulus and response options had independent scroll bars. Each item underwent an extensive platform review on different operating systems such as Windows, Linux, and iOS, to ensure that the item rendered consistently across all platforms.

The platform review was conducted by a team at CAI consisting of a team leader and several team members. The team leader presented the item as it was approved in ETS and CAI item banks. Each team member was assigned a different platform—hardware device and operating system—and reviewed the item to confirm that it rendered as expected. This platform review ensured that all items would be presented consistently to all students, regardless of testing device or operating system, for standardization of the test administration.

Prior to deployment, the testing system and content were deployed to a staging server, where they were subjected to user acceptance testing (UAT) by both ETS and CAI staff. The TDS UAT served as both a software evaluation and a content approval.

The UAT procedures followed by the ETS staff included reviewing all items.

Following the UAT by ETS and CAI staff, separate UAT cycles were conducted by the CDE. The UAT review provided the CDE with an opportunity to interact with the exact test that would be administered to the students. The CDE approved the CAA for Science as previewed during UAT before the test could be released for administration to students.

#### Test Form Delivery

Each embedded PT was expected to be administered shortly after content related to the Science Connectors was taught. To do so, the test examiner began a session in the Test Administrator Interface on one device and in the secure TDS on another device and then selected one of the four available CAA for Science PTs for the student in the TDS. After establishing this test session, the test examiner referred to the *DFA* for step-by-step instructions for the orienting activities, the test itself, and then the survey, all of which would be completed within the TDS.

### Science Connector Coverage

The items comprising each embedded PT of the CAA for Science covered an extensive range of Science Connectors. These Science Connectors at the operational item–pool level are presented for all three grade levels in table 4.3. The percentage of Connectors assessed in 2019–2020 and in 2020–2021 matched because the 2019–2020 CAA for Science forms were reused in 2020–2021.

Table 4.3 Science Connectors Assessed on the CAA for Science—All Grade Levels

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Grade Level or Grade Band** | **Connectors Assessed** | **Connectors Available** | **Percent of Connectors Assessed in 2020–2021** | **Percent of Connectors Assessed in 2019–‍2020 and 2020–2021** |
| Grade 5 | 9 | 23 | 39% | 39% |
| Grade 8 | 9 | 28 | 32% | 32% |
| High school | 9 | 32 | 28% | 28% |

The five-year coverage plan contains a running record of the Science Connectors that have been assessed as well as a projection of the Science Connectors proposed for assessments in the coming years. Table 4.A.1 through table 4.A.3 in [appendix 4.A](#_Appendix_4.A:_Five-Year) present the five-year coverage plan for all three grade levels, starting with the 2020–2021 operational field test administration.

### References

California Department of Education. (2018). *California Alternate Assessment for Science blueprint*. California Department of Education website.

California Department of Education. (2021). *California Alternate Assessment for Science*. California Department of Education website.

### Appendix 4.A: Five-Year Coverage Plan

**Notes:** In table 4.A.1 through table 4.A.3,

* “FT” indicates the year that a Connector set is being field-tested;
* “O” indicates the year that a Connector set is administered as operational items that do not have statistics;
* “A” indicates the year a Connector set is administered as an operational anchor set;
* an asterisk (\*) indicates a Connector set with one or more items that align to a content Connector and an Engineering, Technology, and Application of Science (ETS) Connector; and
* “N/A” indicates no testing for the given Science Connector for the given administration.

Table 4.A.1 Five-Year Coverage Plan—Grade Five

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Science Connector** | **2020–2021 Field Test Administration** | **2020–2021 Operational Administration** | **2021–2022 Field Test Administration** | **2021–2022 Operational Administration** | **2022–2023 Field Test Administration** | **2022–2023 Operational Administration** | **2023–2024 Field Test Administration** | **2023–2024 Operational Administration** | **2024–2025 Field Test Administration** | **2024–2025 Operational Administration** | **Number of Operational Administrations in Five Years** |
| 3-LS1-1 | N/A | N/A | N/A | O | N/A | N/A | N/A | N/A | N/A | A | 2 |
| 3-LS2-1 | N/A | O | N/A | N/A | N/A | O | N/A | N/A | N/A | N/A | 2 |
| 3-LS3-1 | N/A | O | FT | N/A | N/A | N/A | FT | O | N/A | N/A | 2 |
| 3-LS4-2 | N/A | N/A | FT | N/A | N/A | O | N/A | A | N/A | O | 3 |
| 4-LS1-1 | N/A | A | N/A | A | N/A | N/A | FT | N/A | N/A | O | 3 |
| 5-LS2-1 | N/A | N/A | N/A | O | N/A | A | N/A | O | N/A | N/A | 3 |
| 3-PS2-1 | FT | O | N/A | N/A | N/A | A | N/A | O\* | N/A | N/A | 3 |
| 4-PS3-2 | N/A | A | N/A | A | N/A | N/A | N/A | N/A | N/A | N/A | 2 |
| 4-PS3-3 | N/A | N/A | N/A | O\* | N/A | O | N/A | N/A | N/A | N/A | 2 |
| 4-PS4-2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | O | N/A | A | 2 |
| 5-PS1-1 | N/A | N/A | N/A | O | N/A | N/A | N/A | N/A | N/A | N/A | 1 |
| 5-PS1-2 | N/A | O | N/A | N/A | N/A | O | N/A | N/A | N/A | O | 3 |
| 5-PS1-3 | FT | N/A | N/A | N/A | N/A | N/A | N/A | A | N/A | O | 2 |

Table 4.A.1 *(continuation)*

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Science Connector** | **2020–2021 Field Test Administration** | **2020–2021 Operational Administration** | **2021–2022 Field Test Administration** | **2021–2022 Operational Administration** | **2022–2023 Field Test Administration** | **2022–2023 Operational Administration** | **2023–2024 Field Test Administration** | **2023–2024 Operational Administration** | **2024–2025 Field Test Administration** | **2024–2025 Operational Administration** | **Number of Operational Administrations in Five Years** |
| 4-ESS1-1 | N/A | A | N/A | A | N/A | N/A | N/A | N/A | FT | N/A | 2 |
| 4-ESS2-2 | N/A | N/A | N/A | O | FT | N/A | N/A | N/A | N/A | O | 2 |
| 4-ESS3-2 | N/A | N/A | N/A | N/A | N/A | O | N/A | O | N/A | N/A | 2 |
| 5-ESS1-2 | N/A | N/A | N/A | N/A | FT | N/A | N/A | O | N/A | O | 2 |
| 5-ESS2-1 | N/A | O | N/A | N/A | N/A | N/A | N/A | N/A | N/A | A | 2 |
| 5-ESS2-2 | N/A | N/A | N/A | O | N/A | O | N/A | A | N/A | N/A | 3 |
| 5-ESS3-1 | N/A | O\* | N/A | N/A | N/A | A\* | N/A | N/A | FT\* | N/A | 2 |
| 3-5-ETS1-1 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | **\*** | N/A | N/A | 1 |
| 3-5-ETS1-2 | N/A | **\*** | N/A | **\*** | N/A | N/A | N/A | N/A | N/A | N/A | 2 |
| 3-5-ETS1-3 | N/A | N/A | N/A | N/A | N/A | **\*** | N/A | N/A | **\*** | N/A | 1 |

Table 4.A. Five-Year Coverage Plan—Grade Eight

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Science Connector** | **2020–2021 Field Test Administration** | **2020–2021 Operational Administration** | **2021–2022 Field Test Administration** | **2021–2022 Operational Administration** | **2022–2023 Field Test Administration** | **2022–2023 Operational Administration** | **2023–2024 Field Test Administration** | **2023–2024 Operational Administration** | **2024–2025 Field Test Administration** | **2024–2025 Operational Administration** | **Number of Operational Administrations in Five Years** |
| MS-LS1-1 | N/A | O | N/A | N/A | N/A | N/A | N/A | N/A | N/A | A | 2 |
| MS-LS1-2 | N/A | O | N/A | N/A | N/A | N/A | N/A | N/A | FT | N/A | 1 |
| MS-LS1-7 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | O | N/A | N/A | 1 |
| MS-LS1-8 | N/A | N/A | N/A | O | N/A | A | N/A | N/A | FT | N/A | 2 |
| MS-LS2-1 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | O | N/A | N/A | 1 |
| MS-LS2-2 | N/A | N/A | N/A | N/A | N/A | O | N/A | N/A | N/A | N/A | 1 |
| MS-LS2-3 | N/A | A | FT | A | N/A | N/A | N/A | N/A | N/A | N/A | 2 |
| MS-LS2-4 | N/A | N/A | FT | N/A | N/A | N/A | N/A | A | N/A | N/A | 1 |
| MS-LS3-2 | N/A | N/A | N/A | N/A | N/A | O | N/A | N/A | N/A | O | 2 |
| MS-LS4-6 | N/A | N/A | N/A | O\* | N/A | N/A | N/A | N/A | N/A | O\* | 2 |
| MS-PS1-2 | FT | N/A | N/A | N/A | N/A | A | N/A | N/A | N/A | O | 2 |
| MS-PS1-6 | N/A | N/A | N/A | O | N/A | N/A | N/A | N/A | N/A | A | 2 |
| MS-PS2-1 | N/A | N/A | N/A | O | N/A | N/A | N/A | O | N/A | N/A | 2 |
| MS-PS2-2 | N/A | A | N/A | A | FT | O | N/A | N/A | N/A | N/A | 3 |
| MS-PS3-2 | N/A | O | N/A | N/A | N/A | O | N/A | N/A | N/A | N/A | 2 |
| MS-PS3-3 | FT | O | N/A | N/A | N/A | N/A | N/A | O\* | N/A | N/A | 2 |
| MS-PS4-2 | N/A | N/A | N/A | N/A | FT | N/A | N/A | A | N/A | O | 2 |
| MS-ESS1-1 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | O | N/A | N/A | 1 |
| MS-ESS2-1 | N/A | N/A | N/A | O | N/A | N/A | N/A | N/A | N/A | A | 2 |
| MS-ESS2-5 | N/A | N/A | N/A | N/A | N/A | O | N/A | A | N/A | O | 3 |
| MS-ESS3-2 | N/A | O | N/A | O | N/A | N/A | N/A | O | N/A | N/A | 3 |
| MS-ESS3-3 | N/A | O | N/A | N/A | N/A | A | FT | N/A | N/A | N/A | 2 |
| MS-ESS3-4 | N/A | A\* | N/A | A\* | N/A | N/A | FT | N/A | N/A | N/A | 2 |
| MS-ESS3-5 | N/A | N/A | N/A | N/A | N/A | O\* | N/A | N/A | N/A | O\* | 2 |
| MS-ETS1-1 | N/A | N/A | N/A | N/A | N/A | \* | N/A | N/A | N/A | \* | 2 |
| MS-ETS1-2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | \* | N/A | N/A | 1 |
| MS-ETS1-3 | N/A | \* | N/A | \* | N/A | N/A | N/A | N/A | N/A | \* | 3 |
| MS-ETS1-4 | N/A | N/A | N/A | \* | N/A | N/A | N/A | N/A | N/A | N/A | 1 |

Table 4.A. Five-Year Coverage Plan—High School

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Science Connector** | **2020–2021 Field Test Administration** | **2020–2021 Operational Administration** | **2021–2022 Field Test Administration** | **2021–2022 Operational Administration** | **2022–2023 Field Test Administration** | **2022–2023 Operational Administration** | **2023–2024 Field Test Administration** | **2023–2024 Operational Administration** | **2024–2025 Field Test Administration** | **2024–2025 Operational Administration** | **Number of Operational Administrations in Five Years** |
| HS-LS1-2 | N/A | N/A | N/A | N/A | N/A | O | N/A | N/A | N/A | A | 2 |
| HS-LS1-4 | N/A | N/A | N/A | O | N/A | N/A | N/A | N/A | N/A | O | 2 |
| HS-LS1-6 | N/A | A | N/A | A | N/A | N/A | N/A | N/A | N/A | N/A | 2 |
| HS-LS2-2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | O | N/A | N/A | 1 |
| HS-LS2-4 | N/A | O | N/A | N/A | N/A | N/A | N/A | A | FT | N/A | 2 |
| HS-LS2-8 | N/A | N/A | N/A | N/A | N/A | O | N/A | N/A | N/A | N/A | 1 |
| HS-LS3-2 | N/A | N/A | N/A | O | N/A | A | N/A | N/A | N/A | N/A | 2 |
| HS-LS4-3 | N/A | O | N/A | N/A | N/A | N/A | N/A | N/A | N/A | O | 2 |
| HS-LS4-6 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | O | FT | N/A | 1 |
| HS-PS1-1 | N/A | O | N/A | N/A | N/A | N/A | N/A | N/A | N/A | A | 2 |
| HS-PS1-4 | N/A | O | N/A | N/A | N/A | N/A | N/A | A | N/A | N/A | 2 |
| HS-PS1-8 | N/A | N/A | N/A | N/A | N/A | O | N/A | N/A | N/A | N/A | 1 |
| HS-PS2-1 | N/A | N/A | N/A | O | FT | N/A | N/A | N/A | N/A | O | 2 |
| HS-PS2-3 | N/A | A\* | N/A | A\* | N/A | N/A | N/A | N/A | N/A | N/A | 2 |
| HS-PS2-6 | FT | N/A | N/A | N/A | N/A | O\* | N/A | N/A | N/A | N/A | 1 |
| HS-PS3-4 | N/A | N/A | N/A | O | N/A | N/A | N/A | N/A | N/A | O | 2 |
| HS-PS3-5 | FT | N/A | N/A | N/A | N/A | A | N/A | N/A | N/A | N/A | 1 |
| HS-PS4-3 | N/A | N/A | N/A | N/A | FT | N/A | N/A | O | N/A | N/A | 1 |
| HS-PS4-5 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | O | N/A | N/A | 1 |
| HS-ESS1-1 | N/A | N/A | FT | N/A | N/A | N/A | N/A | A | N/A | N/A | 1 |
| HS-ESS1-4 | N/A | A | N/A | A | N/A | N/A | FT | N/A | N/A | N/A | 2 |
| HS-ESS1-5 | N/A | N/A | N/A | O | N/A | N/A | N/A | N/A | N/A | A | 2 |
| HS-ESS2-2 | N/A | N/A | FT | N/A | N/A | O | N/A | N/A | N/A | N/A | 1 |
| HS-ESS2-3 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | O | N/A | N/A | 1 |
| HS-ESS2-5 | N/A | N/A | N/A | O\* | N/A | A\* | N/A | N/A | N/A | O\* | 3 |
| HS-ESS3-1 | N/A | O | N/A | N/A | N/A | N/A | N/A | O\* | N/A | N/A | 2 |
| HS-ESS3-3 | N/A | O | N/A | N/A | N/A | N/A | FT | N/A | N/A | O | 2 |
| HS-ESS3-6 | N/A | N/A | N/A | N/A | N/A | O | N/A | N/A | N/A | N/A | 1 |
| MS-ETS1-1 | N/A | N/A | N/A | N/A | N/A | \* | N/A | N/A | N/A | N/A | 1 |
| MS-ETS1-2 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | \* | N/A | N/A | 1 |
| MS-ETS1-3 | N/A | N/A | N/A | \* | N/A | \* | N/A | N/A | N/A | \* | 3 |
| MS-ETS1-4 | N/A | \* | N/A | \* | N/A | N/A | N/A | N/A | N/A | N/A | 2 |

## Test Administration

This chapter describes the details of administering the embedded performance tasks (PTs) for the 2020–‍2021 California Alternate Assessment (CAA) for Science administration, as well as the procedures followed by ETS to ensure test security.

### Student Test-Taking Requirements

All local educational agencies (LEAs) with eligible students in grades five and eight and high school (grade ten, eleven, or twelve [as long as the student is not repeating grade twelve]) should have administered the CAA for Science. Students in high school who were selected by the LEA to take a science assessment and whose individualized education program (IEP) indicated an alternate assessment were assigned to take the CAA for Science (California Science Teachers Association, 2019).

Students in grades five and eight and in high school (grade ten, eleven, or twelve) who met all of the following eligibility requirements were eligible to take the CAA for Science:

* The student has a significant cognitive disability that is described in the student’s IEP.
* The student is learning content derived from the Core Content Connectors (Science Connectors).
* The student requires extensive direct individualized instruction and substantial resources to achieve measurable gains in the grade- and age-appropriate curriculum.

#### Grades Five and Eight

All students enrolled in grades five and eight were automatically registered in the Test Operations Management System (TOMS) to take the California Science Test (CAST). If the student’s IEP team indicated an alternate assessment, the LEA and school registered the eligible student manually in TOMS to take the CAA for Science.

#### High School

At the high school level, schools and LEAs were responsible for registering students in grade ten or eleven to take the CAST or the CAA for Science. Guidelines were provided by the California Department of Education (CDE) suggesting that students who completed or were in the process of completing their last high school science course should take the science test, either the CAST or CAA for Science, depending on the student’s eligibility. All grade twelve students who were eligible to take the CAA for Science but had not previously completed it in grade ten or eleven were automatically registered to take the CAST and then registered manually by the LEA or school to take the CAA for Science if indicated by the student’s IEP. Neither students in grade nine nor students who repeated grade twelve were eligible to take a science test (CDE, 2019).

### Test-Taking Summary

The decision to assign a student to take the CAA for Science is made by the student’s IEP team, which uses the information on the CDE Alternate Assessment IEP Team Guidance web page to make that determination. This web page describes the CAA and its administration, criteria for test takers, and the students who should be assigned to take this test (CDE, 2021a).

A student must meet all three of the following criteria to take the CAA for Science:

1. **The student has a significant cognitive disability.** Review of the student’s school records indicates a disability or multiple disabilities that significantly impact intellectual functioning and adaptive behavior essential for a person to live independently and to function safely in daily life.
2. **The student is learning content derived from the California Common Core State Standards (CCSS) or the CA NGSS or is acquiring proficiency as identified in the 2012 English Language Development (ELD) Standards.** Goals and instruction listed in the IEP for the student are linked to the grade-level California CCSS, CA NGSS, or 2012 ELD Standards and address knowledge and skills that are appropriate and set high expectations for this student.
3. **The student needs extensive, direct individualized instruction and substantial supports to achieve measurable gains in the grade-level and age-appropriate curriculum, including the following:**

* Instruction and support that are not of a temporary or transient nature
* Substantially adapted materials and individualized methods of accessing information in alternative ways to acquire, maintain, generalize, demonstrate, and transfer skills across multiple settings

All students who were identified to take the CAAs were required to test, if eligible. Students repeating grade twelve were not eligible to test (CDE, 2019).

Table 5.1 presents the number of test takers assigned to take the CAA for Science and the number of students who started the CAA for Science. Table 5.1 also presents the number of students whose test expired, whose test was force-completed, or who submitted all four embedded PTs. Students with an expired test started one or more embedded PTs but did not complete the started embedded PT(s); these embedded PTs that were not submitted by a student were submitted for processing by the system. Students who had their tests force-completed had unused embedded PTs that required additional, manual steps to submit for processing after the end of the statewide testing window.

The majority of students assigned to take the CAA for Science did not start any of the embedded PTs during the 2020–2021 administration. Across all grade levels, most students who started the CAA for Science completed all four embedded PTs.

Table 5.1 CAA for Science Test-Taking Rates—Registered Students

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Group** | **Grade 5** | **Grade 8** | **HS Grade 10** | **HS Grade 11** | **HS Grade 12** | **HS All Grades** |
| Number Assigned | 4,714 | 4,810 | 288 | 2,693 | 2,802 | 5,783 |
| Number Started | 902 | 826 | 96 | 408 | 517 | 1,021 |
| Percent Started | 19 | 17 | 33 | 15 | 18 | 18 |
| Number of Force-Completed | 85 | 83 | 11 | 39 | 44 | 94 |
| Percent Force-Completed | 2 | 2 | 4 | 1 | 2 | 2 |
| Number of Expired | 5 | 3 | 1 | 4 | 2 | 7 |
| Percent Expired | 0 | 0 | 0 | 0 | 0 | 0 |
| Number of Submitted | 812 | 740 | 84 | 365 | 471 | 920 |
| Percent Submitted | 17 | 15 | 29 | 14 | 17 | 16 |

**Note:** The percentages of students with force-completed, expired, or submitted tests may not sum to the percentage of students who started the tests because of rounding.

Table 5.A.1 through table 5.A.3 in [appendix 5.A](#_Appendix_5.A:_Test-Taking) present the number of registered students, the number of test takers, and the percentage of registered students taking the CAA for Science, grouped by demographic characteristics, including gender, ethnicity, English language fluency, economic status (disadvantaged or not), primary disability, and migrant status. For most student groups, less than 20 percent of registered students were administered the CAA for Science during the 2020–2021 administration.

#### Completion Rates

Completion rates indicate the proportion of students who completed each of the four embedded PTs on the test. A student’s record for the CAA for Science is not considered complete unless the student answered at least one test question from each of the four embedded PTs.

Table 5.B.1 in [appendix 5.B](#_Appendix_5.B:_Completion) lists the percentage of students in each grade level by the number of embedded PTs completed. For all grade levels (with the exception of grade ten), less than 20 percent of registered students’ records were considered complete, by completing all four embedded PTs, during the 2020–2021 administration. Table 5.B.2 lists the completion rate by grade level for each embedded PT. The completion rates by embedded PT were similar across embedded PTs within each grade level.

### Administration Preparations

The embedded PTs were designed to be administered to students in conjunction with the normal course of instruction related to the Science Connector being assessed. The test examiner was instructed to administer the embedded PT shortly after the student received instruction aligned with the Science Connector.

#### Resources for Administration

To ensure the 2020–2021 test administration was a successful experience for CAA test examiners and students, ETS provided an online, self-guided training tutorial for CAA test examiners (CDE, 2020b) as well as virtual test administration workshops in September 2020. ETS also produced webcasts and videos for detailed information on California Assessment of Student Performance and Progress (CAASPP) test administration procedures. The virtual workshops included a session dedicated exclusively to the topic of the CAA test administration procedures.

In addition, ETS developed and posted a number of test administration resources for schools and LEAs on both the public CAASPP website and on the secure TOMS website. These resources included detailed information on topics such as technology readiness, test administration, test security, accessibility resources, using the test delivery system (TDS), and general testing rules. These resources are discussed in more detail in section [*5.5 Procedures to Maintain Standardization*](#_Procedures_to_Maintain_1).

Given that the CAAs are administered to students who have the most significant cognitive disabilities, a test examiner—usually the student’s teacher, who is familiar to the student—administers the CAA to the student one-on-one.

#### Practice and Training Tests

The publicly available practice and training tests are provided to prepare students for the summative assessment. These tests, available for grades five and eight and high school, simulate the experience of the CAA for Science computer-based assessments. Practice and training tests align with Science Connectors but do not produce scores. Students may access them using a web browser.

The purposes of the practice and training tests are to

* allow students and administrators to become familiar with the user interface and components of the TDS and the process of starting and completing a testing session; and
* introduce students and administrators to new grade-specific items similar to those on the operational assessment.

#### Local Educational Agency Training

Each year, ETS, in collaboration with the CDE and its Assessment Validity and Outreach contractor, the Sacramento County Office of Education (SCOE), establishes and implements a comprehensive training plan for LEA assessment staff and educators on all aspects of the assessment program. The ETS and SCOE annual training plans are developed with stakeholder feedback and specify the audience, topics, frequency, and mode (in person, webcast, videos, modules, etc.) of the training, including such elements as format, participants, and logistics.

In 2020–2021, ETS and SCOE adapted training plans to meet the needs of educators deciding how to complete testing during the novel coronavirus disease 2019 (COVID-19) pandemic while adhering to local health guidance. All in-person trainings were converted to a virtual format, and the longer trainings were separated into shorter segments to avoid learner fatigue.

Knowing that educators were confronted with new challenges daily that put additional demands on their time, ETS and SCOE made every effort to make the information available in a variety of ways that allowed educators access to training at a time that was responsive to their varying circumstances. This included offering training events on multiple days and times, livestreaming events, recording and archiving trainings, and converting trainings to self-paced modules that could be taken any time, at the learner’s convenience.

All training opportunities were posted in one centralized location on the CAASPP website. LEA staff were able to register for training opportunities, across both CDE contractors’ offerings, in one place, on the Upcoming Training Opportunities web page. A Past Training Opportunities web page was also created, making it easier for educators to find missed training opportunities and providing easier access to recorded trainings.

##### Workshops, Virtual Training, and Webcasts

All offered virtual trainings were recorded and made available for on-demand viewing. Most trainings were offered via Zoom, a platform that educators quickly became familiar with and comfortable using during the COVID-19 pandemic. Zoom provided an opportunity for educators to ask questions and get answers in real time. Virtual trainings were also livestreamed on YouTube so that educators still had access if a particular training reached registration capacity.

In response to an environment where educators had competing priorities to juggle, ETS and SCOE employed a variety of strategies to increase engagement during virtual trainings. Live polls were presented to solicit real-time feedback about attendees’ knowledge of a particular topic, allowing presenters to tailor presentations to the audience’s level of understanding. The chat functionality was enabled to give participants an opportunity to interact with each other or provide open-ended feedback, or it was disabled to minimize distraction and drive attendees’ focus to the information being presented. Breakout groups were used in smaller group trainings, as appropriate. Breaks and processing time were incorporated into presentations to give attendees opportunities to attend to other responsibilities that might result as part of their job or home environment. Registered participants received an email from SCOE with a link to the virtual trainings.

Working closely with the CDE, ETS and SCOE were able to increase support to educators during a particularly challenging year. ETS offered weekly Office Hours and Coffee Sessions. Office Hours included CDE and ETS leadership to provide quickly changing updates on policies related to testing. Guest speakers from LEAs were invited to offer solutions and strategies for dealing with the challenges happening at the local level. Coffee Sessions included technical staff who could answer questions about all aspects of testing, including the newly offered remote testing option. SCOE continued to offer assessment update meetings intended to provide LEA coordinators with regular updates about California’s assessment system. All trainings and meetings were recorded and archived for on-demand viewing on the Past Training Opportunities web page on the CAASPP website.

An unexpected benefit of the COVID-19 pandemic is that educators had greater access to CDE, ETS, and SCOE staff than they had in prior administration years. This challenging year provided an opportunity to provide more targeted support to educators that will have a lasting impact on the administrations to come.

##### Videos and Guides

To supplement the virtual trainings, ETS continued to produce videos on various aspects of administering the CAASPP. SCOE produced the accompanying quick reference guides, providing multiple avenues of support for educators administering the assessments.

##### Training for Proper Identification and Assignment of Designated Supports and Accommodations

ETS produced short demonstration videos for every embedded accessibility resource, demonstrating how to use the resource for educators, students, and parents/guardians. The videos were available in both English and Spanish on the Accessibility Resources Demonstration Videos web page on the CAASPP website. In addition, ETS developed a video with LEA staff to help California educators learn more about the importance of implementing CAASPP accessibility resources and best practices used by educators in the field. The “Importance of Implementing CAASPP and the English Language Proficiency Assessments for California (ELPAC) Accessibility Resources: Voices from Educators” video was available on the Quick Reference Guides and Videos web page on the CAASPP website.

Accessibility resource videos were also linked within the Individual Student Assessment Accessibility Profile (ISAAP) Tool, increasing access to the demonstration videos. Educators using the ISAAP Tool to determine the student’s needs could view the corresponding demonstration video without having to navigate away from the tool.

A video on how to use the ISAAP Tool was also available to support educators in the process of creating an individual student profile and matching accessibility resources to student needs to ensure a fair and valid testing experience for all students.

For the 2020–2021 CAASPP administration, ETS introduced a new virtual training series, “Matching Accessibility Resources to Students’ Needs.” This training focused on providing participants with an understanding of the importance of accessibility resources, the categories of accessibility resources, and the process for matching students with appropriate accessibility resources for daily instruction and on assessments. The virtual training was originally intended as a one-time event but, because of overwhelming interest, the training was offered on four additional dates. The training was recorded and archived. LEA coordinators, test site coordinators, test administrators, and test examiners were notified via email when the recorded training was available, further extending its reach.

At the California Assessment Conference, SCOE offered three sessions on accessibility. A “Plenary Accessibility 101” session was available as a prerecorded session for all conference attendees and was intended to build a shared understanding of basic accessibility-related terms and considerations. The “Digging Deeper into Accessibility” breakout session focused on developing an equitable and systematic process for matching students with appropriate accessibility resources. “Universal Design for Learning and Accessibility Resources: A Pathway to Success for All Students” was another breakout session focused on providing an opportunity to practice appropriately matching student needs to the various accessibility resources.

#### *CAA for Science Administration Planning Guides*

The administration planning guides, posted prior to the annual launch of the embedded PTs, provided information about the embedded PTs that were to be administered in the coming school year (CDE, 2020a). The administration planning guides contained information to help test examiners understand how to plan for the administration of the embedded PTs throughout the school year, the version assignment, a testing schedule planner, and test security information. The administration planning guides also contained the following information:

* Questions and answers about administration
* PT standards table
* How mastery of the Science Connector is demonstrated

### Administering the CAA for Science

The CAA for Science 2020–2021 operational field test assessment was administered one-on-one by a test examiner familiar with the student being tested. The test examiner administered four embedded PTs to each student; these were administered online through the CAASPP TDS.

#### Orienting Activities

Each embedded PT had two orienting activities, one for each of the two Connector sets in an embedded PT. The orienting activities were administered one-on-one by the test examiner prior to presenting the first item in each Connector set to the student. The administration of the items in each Connector set in an embedded PT should directly follow the delivery of each orienting activity.

#### Embedded Performance Tasks

The embedded PTs were designed to be administered to students in conjunction with the normal course of instruction related to the Science Connector being assessed. The test examiner was instructed to administer the embedded PT shortly after the student received instruction related to the Science Connector.

#### Post–Performance Task Survey

During the 2020–2021 administration year, test examiners were asked to respond to a survey about their student. After the embedded PT was administered to the student, the test examiner was presented with two surveys, with the instruction to respond to only one of the surveys on the basis of whether or not the student had been responsive during the testing session. The purpose of the survey was to collect basic information about students’ experiences with the assessment process. The surveys were included in the last section of each embedded PT delivered through the TDS.

### Procedures to Maintain Standardization

The test administration and scoring procedures were designed so that the tests were administered and scored in a standardized manner. ETS took all necessary measures to ensure the standardization of test administration, as described in this subsection of the technical report.

#### Local Educational Agency CAASPP Coordinator

An LEA CAASPP coordinator was designated by the district superintendent at the beginning of the 2020–2021 school year. LEAs include public school districts, State Board of Education–authorized charter schools, county office of education programs, and direct funded charter schools.

LEA CAASPP coordinators were responsible for ensuring the proper and consistent administration of the assessments that are part of the CAASPP System, including the CAAs. In addition to the responsibilities set forth in the *California Code of Regulations*, Title 5 (5 *CCR*) Section 857, their responsibilities included

* adding CAASPP test site coordinators and test examiners into TOMS;
* training CAASPP test site coordinators and test examiners regarding state requirements and CAA administration, as well as security policies and procedures;
* reporting test security incidents (including testing irregularities) to the CDE using the online Security and Test Administration Incident Reporting System (STAIRS)/Appeals process;
* overseeing test administration activities;
* providing checklists for CAASPP test site coordinators and test examiners to review in preparation for administering the summative assessments;
* filing a report of a testing incident in the STAIRS; and
* requesting an Appeal (if indicated by TOMS prompts while reporting an incident using the STAIRS/Appeals process).

#### CAASPP Test Site Coordinator

A CAASPP test site coordinator was trained by the LEA CAASPP coordinator or LEA superintendent for each test site (5 *CCR* Section 857[f]). A test site coordinator must be an employee of the LEA and must sign a security agreement (5 *CCR* Section 859[a]).

A CAASPP test site coordinator was responsible for identifying test examiners and ensuring that they have signed CAASPP Test Security Affidavits (5 *CCR* Section 859[d]). CAASPP test site coordinators’ duties may have included

* adding test examiners into TOMS;
* entering test settings for students;
* creating testing schedules and procedures for a school consistent with state and LEA policies;
* working with technology staff to ensure secure browsers are installed and any technical issues are resolved;
* monitoring testing progress during the testing window and ensuring all students take the test, as appropriate;
* coordinating and verifying the correction of student data errors in the California Longitudinal Pupil Achievement Data System;
* ensuring a student’s test session is rescheduled, if necessary;
* addressing testing problems;
* reporting test security incidents (including testing irregularities) to the CDE using the online STAIRS/Appeals process;
* overseeing administration activities at a school site; and
* requesting an Appeal (if indicated by TOMS prompts while reporting an incident using the STAIRS/Appeals process).

#### Test Examiners

Test examiners were identified by CAASPP test site coordinators as individuals who would administer the CAASPP assessments, including the CAA for Science. A test examiner must be a certificated or licensed school staff member (5*CCR* Section 850[ag]) and sign a security affidavit (5 *CCR* Section 859[d]).

A test examiner’s duties may have included

* participating in training by either viewing the online test administration tutorial or attending any locally provided training;
* ensuring the physical conditions of the testing room meet the criteria for a secure test environment;
* administering the CAA for Science;
* reporting all test security incidents to the test site coordinator and LEA CAASPP coordinator in a manner consistent with state and LEA policies;
* viewing student information prior to testing to ensure that the correct student receives the proper test with appropriate resources and reporting potential data errors to test site coordinators and LEA CAASPP coordinators;
* monitoring student progress throughout the test session using the Test Administrator Interface; and
* complying fully with all directions provided in the *Directions for Administration (DFA)* for the CAA for Science.

#### Instructions for Test Examiners and Staff Involved in CAA for Science Administration

##### *CAASPP Online Test Administration Manual*

The *CAASPP Online Test Administration Manual* (CDE, 2021e) contained information and instructions on overall procedures and guidelines for all LEA and test site staff involved in the administration of computer-based assessments as well as for the CAA for Science. Sections included the following topics:

* Roles and responsibilities of those involved with CAASPP testing
* Test administration resources
* Test security
* Administration preparation and planning
* General test administration
* Instructions for steps to take before, during, and after testing
* Overview of the student testing interface

Appendices included definitions of common terms, item types, and descriptions of different aspects of the test and systems associated with the test.

##### *Directions for Administration*

Test examiners used the embedded PT *DFAs* for the CAA for Science to administer each separate embedded PT to students. The *DFAs* included the description of the orienting activity, a list of the exemplar materials, the exemplar script, and possible individualization options. Each of the four embedded PTs for a grade level was administered using a separate *DFA*.

Sample *DFAs* for the CAAs to be used in conjunction with the CAA practice and training tests were provided to LEAs as well (CDE, 2020c).

##### *CAASPP and English Language Proficiency Assessments for California Test Operations Management System User Guide*

TOMS is a web-based application that allows LEA CAASPP coordinators to set up test administrations, add and manage users, and submit computer-based student test settings. Test examiners accessed TOMS to retrieve CAA for Science *DFAs*.

TOMS modules described in the *TOMS User Guide* included the following (CDE, 2021d):

* **Test Administration Setup—**This module allowed LEAs to determine and calculate dates for the LEA’s 2020–2021 testing.
* **Adding and Managing Users—**This module allowed LEA CAASPP coordinators to add CAASPP test site coordinators and test examiners to TOMS so that the designated user could access the online embedded PT *DFAs*.
* **Reports—**This module allowed LEA CAASPP coordinators and CAASPP test site coordinators access to the various reports in TOMS.
* **STAIRS/Appeals—**This module allowed LEA CAASPP coordinators and CAASPP test site coordinators access to create new STAIRS cases or search for STAIRS/Appeals cases.
* **Student Profile—**This module allowed LEA CAASPP coordinators, CAASPP test site coordinators, and test administrators and test examiners to view and manage student test assignments and test settings.

##### Other System Manuals

Other manuals were created to assist LEA CAASPP coordinators and others with the technological components of the CAASPP System and are listed next:

* ***CAASPP and ELPAC Technical Specifications and Configuration Guide for Online Testing*—**This manual provided information, tools, and recommended configuration details to help technology staff prepare computers and install the secure browser to be used for the computer-based CAASPP assessments (CDE, 2021c).
* ***CAASPP and ELPAC Security Incidents and Appeals Procedure Guide*—**This manual provided information on how to report a testing incident and submit an Appeal to the CDE to reset, reopen, invalidate, or restore individual computer-based student assessments (CDE, 2021b).
* ***CAASPP and ELPAC Accessibility Guide for Online Testing*—**This manual provided descriptions of the accessibility features for computer-based tests as well as information about supported hardware and software requirements for administering tests to students using accessibility resources, including those with a braille accommodation using Job Access With Speech® (software) or a braille embosser (hardware) (CDE, 2021a).

### Accessibility Resources

The CAA for Science 2020–2021 operational field test assessment offered commonly used accessibility resources available through the CAASPP computer-based testing platform, where applicable for the tested construct.

#### Accessibility Features for the 2020–2021 Administration

##### Individualizations

A notable feature of the 2020–2021 embedded PTs was that test examiners had the option to individualize certain elements of the assessment. For the 2020–2021 assessment administration, test examiners were instructed to review the activities associated with each embedded PT and decide whether the exemplar activity met a student’s needs or if an individualized activity was appropriate. The test examiner documented the use of individualizations in the survey at the end of each embedded PT.

Potential individualizations were designed so that the premise of the item and the scientific principles tested would remain the same. Individualization options in embedded PTs sometimes involved the use of objects to make certain science concepts easier to understand for some students.

Table 5.2 through table 5.4 display the results of the survey regarding the kinds of individualization provided. The n-counts in these tables are based on students completing all three of the operational embedded PTs and are smaller than the typical n-counts for a CAA for Science administration. Although test examiners were permitted to individualize the administration of the CAA for Science, table 5.2 through table 5.4 indicate that few students received individualizations, meaning the majority of students were administered the embedded PTs as outlined in the *DFA*s.

Table 5.2 Individualizations**—Grade Five**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Individualization** | **PT 1 (Life Sciences), Activity 1—Number** | **PT 1 (Life Sciences), Activity 1—Percent of Total** | **PT 1 (Life Sciences), Activity 2—Number** | **PT 1 (Life Sciences), Activity 2—Percent of Total** | **PT 2 (Physical Sciences), Activity 1—Number** | **PT 2 (Physical Sciences), Activity 1—Percent of Total** | **PT 2 (Physical Sciences), Activity 2—Number** | **PT 2 (Physical Sciences), Activity 2—Percent of Total** | **PT 3 (Earth and Space Sciences), Activity 1—Number** | **PT 3 (Earth and Space Sciences), Activity 1—Percent of Total** | **PT 3 (Earth and Space Sciences), Activity 2—Number** | **PT 3 (Earth and Space Sciences), Activity 2—Percent of Total** |
| Using Standardized Scripts | 882 | 98% | 888 | 98% | 891 | 99% | 887 | 98% | 889 | 99% | 889 | 99% |
| Using Individualized Scripts | 20 | 2% | 14 | 2% | 11 | 1% | 15 | 2% | 13 | 1% | 13 | 1% |
| Using Standardized Materials | 883 | 98% | 895 | 99% | 891 | 99% | 900 | 100% | 897 | 99% | 894 | 99% |
| Using Individualized Materials | 19 | 2% | 7 | 1% | 11 | 1% | 2 | 0% | 5 | 1% | 8 | 1% |

Table 5.3  **Individualizations—Grade Eight**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Individualization** | **PT 1 (Life Sciences), Activity 1—Number** | **PT 1 (Life Sciences), Activity 1—Percent of Total** | **PT 1 (Life Sciences), Activity 2—Number** | **PT 1 (Life Sciences), Activity 2—Percent of Total** | **PT 2 (Physical Sciences), Activity 1—Number** | **PT 2 (Physical Sciences), Activity 1—Percent of Total** | **PT 2 (Physical Sciences), Activity 2—Number** | **PT 2 (Physical Sciences), Activity 2—Percent of Total** | **PT 3 (Earth and Space Sciences), Activity 1—Number** | **PT 3 (Earth and Space Sciences), Activity 1—Percent of Total** | **PT 3 (Earth and Space Sciences), Activity 2—Number** | **PT 3 (Earth and Space Sciences), Activity 2—Percent of Total** |
| Using Standardized Scripts | 806 | 98% | 811 | 98% | 809 | 98% | 812 | 98% | 814 | 99% | 817 | 99% |
| Using Individualized Scripts | 20 | 2% | 15 | 2% | 17 | 2% | 14 | 2% | 12 | 1% | 9 | 1% |
| Using Standardized Materials | 812 | 98% | 813 | 98% | 816 | 99% | 819 | 99% | 819 | 99% | 822 | 100% |
| Using Individualized Materials | 14 | 2% | 13 | 2% | 10 | 1% | 7 | 1% | 7 | 1% | 4 | 0% |

Table 5.4  **Individualizations—High School**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Individualization** | **PT 1 (Life Sciences), Activity 1—Number** | **PT 1 (Life Sciences), Activity 1—Percent of Total** | **PT 1 (Life Sciences), Activity 2—Number** | **PT 1 (Life Sciences), Activity 2—Percent of Total** | **PT 2 (Physical Sciences), Activity 1—Number** | **PT 2 (Physical Sciences), Activity 1—Percent of Total** | **PT 2 (Physical Sciences), Activity 2—Number** | **PT 2 (Physical Sciences), Activity 2—Percent of Total** | **PT 3 (Earth and Space Sciences), Activity 1—Number** | **PT 3 (Earth and Space Sciences), Activity 1—Percent of Total** | **PT 3 (Earth and Space Sciences), Activity 2—Number** | **PT 3 (Earth and Space Sciences), Activity 2—Percent of Total** |
| Using Standardized Scripts | 1,013 | 99% | 1,015 | 99% | 1,016 | 100% | 1,015 | 99% | 1,013 | 99% | 1,013 | 99% |
| Using Individualized Scripts | 8 | 1% | 6 | 1% | 5 | 0% | 6 | 1% | 8 | 1% | 8 | 1% |
| Using Standardized Materials | 1,013 | 99% | 1,013 | 99% | 998 | 98% | 1,009 | 99% | 1,000 | 98% | 1,014 | 99% |
| Using Individualized Materials | 8 | 1% | 8 | 1% | 23 | 2% | 12 | 1% | 21 | 2% | 7 | 1% |

##### Type and Level of Accommodations

For the administration of the embedded PTs, test examiners were guided to offer the same instructional supports and classroom accommodation(s) to each student customarily provided in accordance with the student’s IEP. These instructional supports and accommodations also applied to the collection of student responses for the CAA for Science.

#### Accessibility Resource Categories

The purpose of universal tools, designated supports, and accommodations in testing is to allow *all* students the opportunity to demonstrate what they know and what they are able to do, rather than giving students who use these resources an advantage over other students or artificially inflating their scores. Universal tools, designated supports, and accommodations minimize or remove barriers that could otherwise prevent students from demonstrating their knowledge, skills, and achievement in a specific content area.

##### Universal Tools

Universal toolswere available to all students by default, although they could be disabled if a student found them distracting. Each universal tool fell into one of two categories: embedded and non-embedded. Embedded universal tools were provided through the Student Testing Interface (through the CAASPP secure browser), although they could be turned off by a test administrator.

The resources in the following subsections were available in the 2020–2021 CAA for Science administration.

###### Embedded

* Breaks
* Digital notepad
* Expandable items
* Expandable passages
* Highlighter
* Keyboard navigation
* Line reader
* Mark for review
* Strikethrough
* Writing tools (e.g., bold, italic, bullets, undo or redo) (for specific items)
* Zoom (in or out)

###### Non-embedded

* Breaks
* Scratch paper

##### Designated Supports

Designated supports were available to all students through the test settings in TOMS. The designated supports each fell into one of two categories: embedded and non-embedded. Embedded designated supports were provided through the Student Testing Interface (through the CAASPP secure browser).

The resources in the following subsections were available in the 2020–2021 CAA for Science administration.

###### Embedded

* Color contrast
* Masking
* Mouse pointer (size and color)
* Permissive mode
* Print (font) size
* Streamline
* Turn off any universal tool(s)

###### Non-Embedded

* 100s number table
* Amplification
* Color contrast
* Color overlay
* Magnification
* Medical supports
* Multiplication table
* Noise buffers
* Read aloud (items)
* Scribe (nonwriting items)
* Separate setting (special lighting or acoustics, adaptive furniture, time of day)

##### Accommodations

Accommodations are changes in procedures or materials that increased equitable access during the CAASPP assessments. Assessment accommodations for students who needed them generated valid assessment results; they allowed these students to show what they know and can do. Accommodations did not compromise the learning expectations, construct, grade-level standard, or intended outcome of the assessments.

The resources in the following subsections were available in the 2020–2021 CAA for Science administration. Note there were no embedded accommodations for the CAA for Science.

###### Non-Embedded

* Abacus
* Additional instructional supports and resources for alternate assessments
* Alternate response options
* Print on demand
* Word prediction

##### Unlisted Resources

An unlisted resource is an instructional support, identified in the student’s IEP, that a student regularly uses in daily instruction, assessment, or both, and has not been previously identified as a universal tool, designated support, or accommodation. The Accessibility Matrix included an inventory of unlisted resources that were already identified and were preapproved (CDE, 2020). During the 2020–2021 CAASPP administration, an LEA CAASPP coordinator or a CAASPP test site coordinator would use TOMS to submit a request for use of an unlisted resource. A request for an unlisted resource that was not preidentified was sent to the CDE for review and adjudication.

If a student used an unlisted resource that changed the construct of the assessment, the student’s score was invalidated.

#### Identification

All public school students participate in the CAASPP System, including students with disabilities and English learner (EL) students. The *Smarter Balanced Assessment Consortium:* *Usability, Accessibility, and Accommodations Guidelines* (Smarter Balanced, 2020) and the CDE California Assessment Accessibility Resources Matrix(CDE, 2020d) are intended for school-level personnel and IEP and Section 504 plan teams to select and administer the appropriate universal tools, designated supports, and accommodations as deemed necessary for individual students. The CAA for Science assessments follow the Smarter Balanced recommendations for use (Smarter Balanced, 2020).

The *Guidelines* apply to all students and promote an individualized approach to the implementation of assessment practices. Another web document, the *Smarter Balanced Resources and Practices Comparison Crosswalk* (Smarter Balanced, 2018), connects the assessment resources described in the *Guidelines* with associated classroom practices.[[5]](#footnote-6)

Another manual, the *Smarter Balanced Usability, Accessibility, and Accommodations Implementation Guide* (Smarter Balanced, 2014),provides suggestions for implementation of these resources. Test administrators are given the opportunity to participate in the CAA for Science practice and training tests so that students have the opportunity to familiarize themselves with a designated support or accommodation prior to testing.

#### Assignment

Once the student’s IEP or Section 504 plan team decided which accessibility resource(s) the student should use, LEA CAASPP coordinators and CAASPP test site coordinators used TOMS to assign designated supports and accommodations to students prior to the start of a test session.

Student’s accessibility resource(s) could be assigned through one of the following methods:

1. Using the ISAAP Tool to identify the accessibility resource(s) and then uploading the spreadsheet it creates into TOMS (This process is discussed in more detail in subsection [*2.4.1.1 Selection*](#_Resources_for_Selection).)
2. Using the Online Student Test Settings template to enter students’ assignments and then uploading the spreadsheet into TOMS
3. Entering assignments for each student individually in TOMS

If a student’s IEP or Section 504 plan team identified and designated a resource not identified in the CDE Accessibility Matrix, the LEA CAASPP coordinator or CAASPP test site coordinator needed to submit a request for an unlisted resource to be approved by the CDE. The CDE then determined whether the requested unlisted resource changed the construct being measured before the student started testing.

#### Usage of Designated Supports and Accommodations

LEA CAASPP coordinators and CAASPP test site coordinators were responsible for assigning their students’ test settings in TOMS before testing occurred and providing the necessary resources during testing. If a test setting was not applied before testing, then a STAIRS incident was to be submitted to reset the test so the student could be retested with the correct accommodation or designated support. If a test setting was accidentally assigned to a student, then a STAIRS incident was also to be submitted to reset the test so the student could be retested without the accommodation or designated support.

After schools and LEAs assigned eligible students to accommodations or designated supports, Cambium Assessment, Inc.’s (CAI’s) TDS provided and captured whether a certain accommodation or designated support (or multiple accommodations or designated supports) was used by a student as the student progressed through the test.

Table 5.5 through table 5.7 report the number of students who, based on the availability of data, were assigned to a certain accommodation or designated support and actually used this accommodation or designated support.

Types of accommodations and designated supports—labeled “ACC” and “DS” in the *Resource Type* column—included in table 5.5 through table 5.7 are listed as follows:

* **Print on Demand:** Paper copies of passages and stimuli, items, or all of these are printed for students.
* **Masking:** This resource involves blocking off content that is not of immediate need or that may be distracting to the student.

The other types of accommodations and designated supports were not used during the 2020–2021 CAA for Science administration and, therefore, are not included in these tables.

Table 5.5 Summary of Accommodations and Designated Supports Used by Students, Grade Five

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Accessibility Resource** | **Resource Type** | **Students Assigned for LS** | **Students Used for LS** | **Students Assigned for PS** | **Students Used for PS** | **Students Assigned for ESS** | **Students Used for ESS** |
| Non-Embedded Print on Demand | ACC | 5 | 0 | 5 | 0 | 5 | 0 |
| Embedded Masking | DS | 32 | 0 | 34 | 0 | 32 | 0 |

**Note:** PS = Physical Sciences, LS = Life Sciences, ESS = Earth and Space Sciences.

Table 5.6 Summary of Accommodations and Designated Supports Used by Students, Grade Eight

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Accessibility Resource** | **Resource Type** | **Students Assigned for LS** | **Students Used for LS** | **Students Assigned for PS** | **Students Used for PS** | **Students Assigned for ESS** | **Students Used for ESS** |
| Non-Embedded Print on Demand | ACC | 3 | 0 | 3 | 0 | 3 | 0 |
| Embedded Masking | DS | 42 | 0 | 42 | 0 | 42 | 0 |

**Note:** PS = Physical Sciences, LS = Life Sciences, ESS = Earth and Space Sciences.

Table 5.7 Summary of Accommodations and Designated Supports Used by Students, High School

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Accessibility Resource** | **Resource Type** | **Students Assigned for LS** | **Students Used for LS** | **Students Assigned for PS** | **Students Used for PS** | **Students Assigned for ESS** | **Students Used for ESS** |
| Non-Embedded Print on Demand | ACC | 3 | 0 | 3 | 0 | 3 | 0 |
| Embedded Masking | DS | 13 | 0 | 13 | 0 | 10 | 1 |

**Note:** PS = Physical Sciences, LS = Life Sciences, ESS = Earth and Space Sciences.

### Processing and Scoring

The CAA for Science was administered as a computer-based assessment only and required two internet-connected devices: a student testing device and a separate device the test examiner used to start a test session through the Test Administrator Interface. Test examiners could also use their device to open a *DFA* document, with which the test examiner guided the student through the test. The CAA for Science required the installation of CAASPP secure browsers on student testing devices. These were the same secure browsers used for the other computer-based CAASPP assessments.

All item types were designed to be machine-scorable.

### Test Security and Confidentiality

For the CAA for Science administration, every person who worked with the assessments, communicated test results, or received testing information was responsible for maintaining the security and confidentiality of the tests, including CDE staff, ETS staff, ETS subcontractors, LEA assessment coordinators, school assessment coordinators, students, parents/‌guardians, teachers, and cooperative educational service agency staff. ETS’ Code of Ethics required that all test information, including tangible materials (such as test items), confidential files (such as those containing personally identifiable student information), processes related to test administration (such as the configurations of secure servers), and activities were kept secure. ETS had systems in place that maintained tight security for test items and test results, as well as for student data. To ensure security for all the tests that ETS develops or handles, ETS maintains an Office of Testing Integrity (OTI), which is described in the next subsection.

All tests within the CAASPP System, as well as the confidentiality of student information, should be protected to ensure the validity, reliability, and fairness of the results. As stated in *Standard 7.9* (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 2014), “The documentation should explain the steps necessary to protect test materials and to prevent inappropriate exchange of information during the test administration session” (p. 128).

This section of the *CAA for Science Technical Report* describes the measures intended to prevent potential test security incidents prior to testing and the actions that were taken to handle actual security incidents during or after testing using the STAIRS process.

#### ETS’ Office of Testing Integrity

The OTI is a division of ETS that provides quality-assurance services for all ETS-managed testing programs. This division resides in the ETS legal department. The Office of Professional Standards Compliance at ETS publishes and maintains the *ETS Standards for Quality and Fairness* (2014), which supports the OTI’s goals and activities. The *ETS Standards for Quality and Fairness* provides guidelines to help ETS staff design, develop, and deliver technically sound, fair, and beneficial products and services and help the public and auditors evaluate those products and services.

The OTI’s mission is to

* minimize any testing security violations that can impact the fairness of testing,
* minimize and investigate any security breach that threatens the validity of the interpretation of test scores, and
* report on security activities.

The OTI helps prevent misconduct on the part of students and administrators, detects potential misconduct through empirically established indicators, and resolves situations involving misconduct in a fair and balanced way that reflects the laws and professional standards governing the integrity of testing.

In an effort to enforce secure testing practices, the OTI strives to safeguard the various processes involved in a test development and administration cycle. For the CAA for Science, those processes included the following:

* Security of electronic files using a firewall
* Printing and publishing
* Test administration
* Test delivery
* Processing and scoring
* Data management
* Statistical analysis
* Student confidentiality

#### Procedures to Maintain Standardization of Test Security

Test security requires the accounting of all secure materials before, during, and after each test administration. The LEA CAASPP coordinator is responsible for keeping all test materials secure, keeping student information confidential, and making sure the CAASPP test site coordinators and test examiners are properly trained regarding security policies and procedures.

The CAASPP test site coordinator is responsible for mitigating test security incidents at the test site and for reporting incidents to the LEA CAASPP coordinator.

The test examiner is responsible for reporting testing incidents to the CAASPP test site coordinator and securely destroying printed *DFAs* that contain secure information from the embedded PTs (CDE, 2021b).

The following measures ensured the security of CAASPP System assessments administered in 2020–2021:

* LEA CAASPP coordinators and test site coordinators must have electronically signed and submitted a “CAASPP Test Security Agreement for LEA CAASPP coordinators and CAASPP test site coordinators” form in TOMS before ETS granted the coordinators access to TOMS (5 *CCR*, Section 859[a]).
* Anyone having access to the testing materials must have electronically signed and submitted a “Test Security Affidavit for Test Examiners, Test Administrators, Proctors, Translators, Scribes, and Any Other Person Having Access to CAASPP Tests” form in TOMS before receiving access to any testing materials (5*CCR*, Section 859[c]).

In addition, it was the responsibility of every participant in the CAASPP System to report immediately any violation or suspected violation of test security or confidentiality. The test examiner reported to the CAASPP test site coordinator or LEA CAASPP coordinator, who then submitted the incident using the STAIRS/Appeals process. Breach incidents were to be reported by the LEA CAASPP coordinator to the California Technical Assistance Center (CalTAC) and entered into STAIRS within 24 hours of the incident (5 *CCR*, Section 859[e]).

#### Test Security Monitoring

The LEA and school testing staff were responsible for maintaining the security and confidentiality of testing materials and devices during the testing window and reporting any irregularities or breaches that occur. Typically, ETS would perform site visits and testing procedure audits during the testing window; however, these visits were not made during the 2020–2021 CAA for Science administration because many schools and LEAs were not open for in-person instruction as a result of the COVID-19 pandemic. It is expected that these visits will resume in future administrations per state health and safety guidelines. However, selected LEAs were audited remotely, with LEA CAASPP coordinators or other LEA staff responding to a series of questions about test administration.

#### Security of Electronic Files Using a Firewall

A firewall is software that prevents unauthorized entry to files, email, and other organization-specific information. All ETS data exchanges and internal email remain within the ETS firewall at all ETS locations, ranging from Princeton, New Jersey; to San Antonio, Texas; to Sacramento, California.

All electronic applications that are included in TOMS remain protected by the ETS firewall software at all times. Because of the sensitive nature of the student information processed by TOMS, the firewall plays a significant role in maintaining assurance of confidentiality among the users of this information.

Refer to section [*1.10 Systems Overview and Functionality*](#_Systems_Overview_and_1) in [*Chapter 1: Introduction*](#_Introduction) for more information on TOMS.

#### Transfer of Scores via Secure Data Exchange

Because of the confidential nature of test results, ETS currently uses secure file transfer protocol (SFTP) and encryption for all data file transfers; test data is never sent via email. SFTP is a method for reliable and exclusive routing of files. Files reside on a password-protected server that only authorized users can access. ETS shares an SFTP server with the CDE. On that site, ETS posts Microsoft Word and Excel files, Adobe Acrobat PDFs, or other document files for the CDE to review; the CDE returns reviewed materials in the same manner. Files are deleted upon retrieval.

The SFTP server is used as a conduit for the transfer of files; secure test data is stored only temporarily on the shared SFTP server. Industry-standard secure protocols are used to transfer test content and student data from the ETS internal data center to any external systems.

Typically, ETS entered information about the deliverable into a web form on a SharePoint website when a file was posted. A CDE staff member monitored this log throughout the day for updates to the status of deliverables and downloaded and deleted the file from the SFTP server when its status showed it had been posted.

#### Data Management in the Secure Database

ETS currently maintains a secure database to house all student demographic data and assessment results. Information associated with each student has a database relationship to the LEA, school, and grade codes as data is collected during operational testing. Only individuals with the appropriate credentials can access the data. ETS builds all interfaces with the most stringent security considerations, including interfaces with data encryption for databases that store test items and student data. ETS applies best and up-to-date security practices, including system-to-system authentication and authorization, in all solution designs.

All stored test content and student data is encrypted. Industry-standard secure protocols are used to transfer test content and student data from the ETS internal data center to any external systems. ETS complies with the Family Educational Rights and Privacy Act (20 *United States Code [USC]* § 1232g; 34 *Code of Federal Regulations* Part 99) and the Children’s Online Privacy Protection Act (15 USC §§ 6501-6506, P.L. No. 105–277, 112 Stat. 2681–1728).

In TOMS, staff at LEAs and test sites have different levels of access appropriate to the role assigned to them (CDE, 2021d).

#### Statistical Analysis on Secure Servers

During CAASPP testing, ETS information technology staff members retrieve data files from CAI and load those files into a database. The ETS Data Quality Services staff extract the data from the database and perform quality control procedures (e.g., the values of all variables are as expected) before passing files to the ETS statistical analysis group (refer to section [*8.4 Quality Control of Psychometric Processes*](#_Quality_Control_of) for data validation processes undertaken by ETS Data Quality Services). The statistical analysis staff store the files on secure servers. All staff involved with the data adhere to the ETS Code of Ethics and the ETS Information Protection Policies to prevent any unauthorized access to data.

#### Student Confidentiality

To meet the requirements of the Every Student Succeeds Act, as well as state requirements, LEAs must collect demographic data about students’ ethnicity, disabilities, parent/guardian education, and so forth during the school year. ETS takes every precaution to prevent any of this information from becoming public or being used for anything other than for testing and score-reporting purposes. These procedures are applied to all documents in which student demographic data appears, such as technical reports.

#### Student Test Results

##### Types of Results

Research files—available on a public web reporting site—aggregated by content area and state, county, LEA, or test site are the primary reporting deliverable for the 2020–2021 CAA for Science.

##### Security of Results Files

ETS takes measures to protect files and reports that show students’ scores and achievement levels (when present). ETS is committed to safeguarding all secure information in its possession from unauthorized access, disclosure, modification, or destruction. ETS has strict information security policies in place to protect the confidentiality of both student and client data. ETS staff access to production databases is limited to personnel with a business need to access the data. User IDs for production systems must be person-specific or for systems use only.

ETS has implemented network controls for routers, gateways, switches, firewalls, network tier management, and network connectivity. Routers, gateways, and switches represent points of access between networks. However, these do not contain mass storage or represent points of vulnerability, particularly for unauthorized access or denial of service.

ETS has many facilities, policies, and procedures to protect computer files. Software and procedures such as firewalls, intrusion detection, and virus control are in place to provide for physical security, data security, and disaster recovery. ETS is certified in the BS 25999-2 standard for business continuity and conducts disaster recovery exercises annually. ETS routinely backs up all data to either disks through deduplication or to tapes, all of which are stored off site.

Access to the ETS Computer Processing Center is controlled by employee and visitor identification badges. The Center is secured by doors that can be unlocked only by the badges of personnel who have functional responsibilities within its secure perimeter. Authorized personnel accompany visitors to the ETS Computer Processing Center at all times. Extensive smoke detection and alarm systems, as well as a preaction fire-control system, are installed in the Center.

##### Security of Individual Results

ETS protects individual students’ results during the following events:

* Scoring
* Transfer of scores by means of secure data exchange
* Reporting
* Posting of aggregated data
* Storage

In addition to protecting the confidentiality of testing materials, ETS’ Code of Ethics further prohibits ETS employees from financial misuse, conflicts of interest, and unauthorized appropriation of ETS property and resources. Specific rules are also given to ETS employees and their immediate families who may take a test developed by ETS (e.g., a CAA). The ETS OTI verifies that these standards are followed throughout ETS. This verification is conducted, in part, by periodic on-site security audits of departments, with follow-up reports containing recommendations for improvement.

#### Security and Test Administration Incident Reporting System Process

Test security incidents, such as improprieties, irregularities, and breaches, are prohibited behaviors that give a student an unfair advantage or compromise the secure administration of the tests, which, in turn, compromises the reliability and validity of test results (CDE, 2021b). Whether intentional or unintentional, failure by staff or students to comply with security rules constitutes a test security incident. Test security incidents have impacts on scoring and affect students’ performance on the test.

LEA CAASPP coordinators and CAASPP test site coordinators ensured that all test security and summative administration incidents were documented by following the prompts in TOMS that guided coordinators in their submittal. An Appeal is a request to reset, restore, reopen, invalidate, or grant a grace period extension to a student’s test. If an Appeal to a student’s test was warranted, TOMS provided additional prompts to file the Appeal.

After a STAIRS case was submitted, an email containing a case number and next steps was sent to the submitter (and to the LEA CAASPP coordinator, if the case was submitted by the CAASPP test site coordinator). The STAIRS case in TOMS provided the LEA CAASPP coordinator, the CDE, and CalTAC with the opportunity to interact and communicate regarding the STAIRS process (CDE, 2021b).

Prior to the assessment administration, ETS and the CDE agreed that the following types of STAIRS cases, as applicable to the CAAs, were also forwarded to the CDE:

* Security breach (where a student exposed secure materials)
* Restoring a test that had been reset

Appeals requests were reviewed by the CDE. When a request to submit an Appeal was approved, the coordinator received a system-generated email with the Appeal type that was approved (CDE, 2021b).

Types of Appeals available during the 2020–2021 CAASPP administration are described in table 5.8.

Table 5.8 Types of Appeals in CAASPP Testing

|  |  |
| --- | --- |
| **Type of Appeal** | **Description** |
| Reset | Resetting a student’s summative assessment removed that assessment from the system and enabled the student to start a new assessment from the beginning. |
| Invalidate | Invalidated summative assessments were scored, and scores were provided on the Student Score Report with a note that an irregularity occurred. The student(s) was counted as participating in the calculation of the school’s participation rate for accountability purposes. |
| Re-open | Reopening a summative assessment allowed a student to access an assessment that had already been submitted. |
| Restore | Restoring a summative assessment returned an assessment from the Reset status to its prior status. This action could only be performed on assessments that had been previously reset. |

##### Impropriety

A testing impropriety is an unusual circumstance that has a low impact on the individual or group of students who are testing and has a low risk of potentially affecting student performance on the test, test security, or test validity. An impropriety can be corrected and contained at a local level. An impropriety should be reported to the LEA CAASPP coordinator and CAASPP test site coordinator immediately. The coordinator should report the incident within 24 hours, using the online STAIRS/Appeals process in TOMS.

##### Irregularity

A testing irregularity is an unusual circumstance that impacts an individual or a group of students who are testing and may potentially affect student performance on the test or impact test security or test validity. These circumstances can be corrected and contained at the local level and submitted using the online STAIRS/Appeals process in TOMS. An irregularity must be reported to the LEA CAASPP coordinator and CAASPP test site coordinator immediately. The coordinator must report the irregularity within 24 hours, using the online STAIRS/Appeals process in TOMS.

##### Breach

A testing breach is an event that poses a threat to the validity of the test. Breaches require immediate attention; a breach that was due to social media exposure on the part of a student or adult or due to media coverage of an administration was to be escalated to CalTAC via telephone. Following the call, the CAASPP test site coordinator or LEA CAASPP coordinator must report the incident using the online STAIRS/Appeals process in TOMS within 24 hours. All other breaches were to be entered into STAIRS directly.

Examples may include such situations as a release of secure materials or a security or system risk. These circumstances have external implications for the CDE and may result in a decision to remove the test item(s) from the available secure item bank. A breach incident must be reported to the LEA CAASPP coordinator immediately.

#### Appeals

For test security incidents reported in STAIRS that resulted in a need to invalidate, restore, or provide a grace period extension for individual computer-based student assessments, the request had to be approved by the CDE. Requests to reset and reopen assessments were processed by CalTAC.

In most instances, an Appeal was submitted to address a test security breach or irregularity. The LEA CAASPP coordinator or CAASPP test site coordinator submitted Appeals in TOMS. All submitted Appeals were available for retrieval and review by the appropriate credentialed users within a given organization. However, the view of Appeals was restricted according to the user role as established in TOMS. An Appeal could be requested only by the LEA CAASPP coordinator or CAASPP test site coordinator if prompted while filing a STAIRS case in TOMS (CDE, 2021b). Types of Appeals available during the 2020–‍2021 CAASPP administration are described in table 5.8.

Table 5.9 presents the number of Appeals approved and rejected, respectively, by Appeal type for the CAA for Science.

Table 5.9 Number of Appeals Requested in STAIRS in the 2020–2021 Administration

|  |  |  |
| --- | --- | --- |
| **Appeal Type** | **Number of Appeals Approved** | **Number of Appeals Rejected** |
| Reset | 14 | 1 |
| Invalidate | 0 | 0 |
| Re-open | 7 | 0 |
| Restore | 0 | 0 |
| Grace Period Extension | 0 | 0 |

Table 5.10 presents the number and types of incidents submitted in STAIRS in the 2020–‍2021 administration for the CAA for Science, as well as the number of Statewide Student Identifiers (SSIDs) submitted and approved.

Table 5.10 Number and Types of Incidents Submitted in STAIRS in the 2020–2021 Administration

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Description** | **Appeal Type** | **Number of Incidents** | **Total Number of SSIDs Submitted** | **Appeals SSIDs Approved** |
| Accessibility Issue | Reset | 7 | 7 | 7 |
| Administered Incorrect Assessment | Reset, Re-open, or No Appeal | 8 | 8 | 7 |
| Administration Error | No Appeal | 0 | 0 | 0 |
| Data Entry Issue | Reset, Re-open, Invalidate, or No Appeal | 0 | 0 | 0 |
| Expired or Accidentally Submitted Test | Re-open | 7 | 7 | 7 |

Table 5.10 *(continuation)*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Description** | **Appeal Type** | **Number of Incidents** | **Total Number of SSIDs Submitted** | **Appeals SSIDs Approved** |
| Exposing Secure Materials | Invalidate or No Appeal | 0 | 0 | 0 |
| Incorrect SSID Used | Reset or No Appeal | 0 | 0 | 0 |
| Restore from Reset | Restore | 0 | 0 | 0 |
| Student Cheating or Accessing Unauthorized Devices | Invalidate | 0 | 0 | 0 |
| Student Disruption | No Appeal | 2 | 0 | 0 |
| Technical Issues | Grace Period Extension or No Appeal | 0 | 0 | 0 |
| Validity Issue | Invalidate or Reset | 0 | 0 | 0 |

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### Appendix 5.A: Test-Taking Rates

Table 5.A.1 CAA for Science Test-Taking Rates by Student Group, Grade Five

|  |  |  |  |
| --- | --- | --- | --- |
| **Student Group** | **Number of Registered Students** | **Number of Test Takers** | **Test Takers as a Percent of Registered Students** |
| All students | 4,714 | 902 | 19.1 |
| Male | 3,206 | 623 | 19.4 |
| Female | 1,508 | 279 | 18.5 |
| Nonbinary | 0 | 0 | N/A |
| American Indian or Alaska Native | 29 | 8 | 27.6 |
| Asian | 404 | 59 | 14.6 |
| Native Hawaiian or Other Pacific Islander | 16 | 1 | 6.3 |
| Filipino | 117 | 17 | 14.5 |
| Hispanic or Latino | 2,626 | 496 | 18.9 |
| Black or African American | 408 | 50 | 12.3 |
| White | 892 | 220 | 24.7 |
| Two or more races | 222 | 51 | 23.0 |
| Ethnicity unknown | 0 | 0 | N/A |
| English only | 2,858 | 600 | 21.0 |
| Initial fluent English proficient (IFEP) | 40 | 8 | 20.0 |
| EL | 1,435 | 197 | 13.7 |
| Reclassified fluent English proficient (RFEP) | 377 | 96 | 25.5 |
| Adult English learner (ADEL) | 0 | 0 | N/A |
| To be determined | 4 | 1 | 25.0 |
| English proficiency unknown | 0 | 0 | N/A |
| Not economically disadvantaged | 1,650 | 336 | 20.4 |
| Economically disadvantaged | 3,064 | 566 | 18.5 |
| Migrant education | 24 | 6 | 25.0 |
| Not migrant education | 4,690 | 896 | 19.1 |
| Intellectual disability | 1,595 | 323 | 20.3 |
| Hearing impairment | 42 | 6 | 14.3 |
| Speech or language impairment | 54 | 10 | 18.5 |
| Visual impairment | 15 | 3 | 20.0 |
| Emotional impairment | 21 | 5 | 23.8 |
| Orthopedic impairment | 165 | 26 | 15.8 |
| Other health impairment | 235 | 49 | 20.9 |
| Specific learning disability | 254 | 47 | 18.5 |
| Deaf-blindness | 2 | 1 | 50.0 |

Table 5.A.1 *(continuation)*

|  |  |  |  |
| --- | --- | --- | --- |
| **Student Group** | **Number of Registered Students** | **Number of Test Takers** | **Test Takers as a Percent of Registered Students** |
| Multiple disabilities | 343 | 50 | 14.6 |
| Autism | 1,968 | 377 | 19.2 |
| Traumatic brain injury | 20 | 5 | 25.0 |

Table 5.A.2 CAA for Science Test-Taking Rates by Student Group, Grade Eight

|  |  |  |  |
| --- | --- | --- | --- |
| **Student Group** | **Number of Registered Students** | **Number of Test Takers** | **Test Takers as a Percent of Registered Students** |
| All students | 4,810 | 826 | 17.2 |
| Male | 3,240 | 571 | 17.6 |
| Female | 1,570 | 255 | 16.2 |
| Nonbinary | 0 | 0 | N/A |
| American Indian or Alaska Native | 25 | 8 | 32.0 |
| Asian | 393 | 61 | 15.5 |
| Native Hawaiian or Other Pacific Islander | 17 | 2 | 11.8 |
| Filipino | 118 | 18 | 15.3 |
| Hispanic or Latino | 2,788 | 458 | 16.4 |
| Black or African American | 339 | 43 | 12.7 |
| White | 944 | 206 | 21.8 |
| Two or more races | 186 | 30 | 16.1 |
| Ethnicity unknown | 0 | 0 | N/A |
| English only | 2,659 | 519 | 19.5 |
| IFEP | 36 | 5 | 13.9 |
| EL | 1,323 | 164 | 12.4 |
| RFEP | 789 | 138 | 17.5 |
| ADEL | 0 | 0 | N/A |
| To be determined | 3 | 0 | 0.0 |
| English proficiency unknown | 0 | 0 | N/A |
| Not economically disadvantaged | 1,711 | 319 | 18.6 |
| Economically disadvantaged | 3,099 | 507 | 16.4 |
| Migrant education | 10 | 3 | 30.0 |
| Not migrant education | 4,800 | 823 | 17.1 |
| Intellectual disability | 1,888 | 348 | 18.4 |
| Hearing impairment | 32 | 5 | 15.6 |
| Speech or language impairment | 41 | 8 | 19.5 |
| Visual impairment | 21 | 0 | 0.0 |
| Emotional impairment | 32 | 11 | 34.4 |
| Orthopedic impairment | 175 | 19 | 10.9 |
| Other health impairment | 223 | 41 | 18.4 |
| Specific learning disability | 265 | 48 | 18.1 |
| Deaf-blindness | 0 | 0 | N/A |
| Multiple disabilities | 366 | 49 | 13.4 |
| Autism | 1,740 | 292 | 16.8 |
| Traumatic brain injury | 27 | 5 | 18.5 |

Table 5.A.3 CAA for Science Test-Taking Rates by Student Group, High School

|  |  |  |  |
| --- | --- | --- | --- |
| **Student Group** | **Number of Registered Students** | **Number of Test Takers** | **Test Takers as a Percent of Registered Students** |
| All students | 5,783 | 1,021 | 17.7 |
| Male | 3,866 | 689 | 17.8 |
| Female | 1,916 | 332 | 17.3 |
| Nonbinary | 1 | 0 | 0.0 |
| American Indian or Alaska Native | 36 | 14 | 38.9 |
| Asian | 449 | 56 | 12.5 |
| Native Hawaiian or Other Pacific Islander | 32 | 4 | 12.5 |
| Filipino | 159 | 20 | 12.6 |
| Hispanic or Latino | 3,347 | 550 | 16.4 |
| Black or African American | 417 | 49 | 11.8 |
| White | 1,167 | 291 | 24.9 |
| Two or more races | 176 | 37 | 21.0 |
| Ethnicity unknown | 0 | 0 | N/A |
| English only | 3,057 | 642 | 21.0 |
| IFEP | 76 | 13 | 17.1 |
| EL | 1,482 | 169 | 11.4 |
| RFEP | 1,167 | 197 | 16.9 |
| ADEL | 0 | 0 | N/A |
| To be determined | 0 | 0 | N/A |
| English proficiency unknown | 1 | 0 | 0.0 |
| Not economically disadvantaged | 2,120 | 382 | 18.0 |
| Economically disadvantaged | 3,663 | 639 | 17.4 |
| Migrant education | 26 | 6 | 23.1 |
| Not migrant education | 5,757 | 1,015 | 17.6 |
| Intellectual disability | 2,312 | 454 | 19.6 |
| Hearing impairment | 54 | 9 | 16.7 |
| Speech or language impairment | 26 | 4 | 15.4 |
| Visual impairment | 26 | 4 | 15.4 |
| Emotional impairment | 60 | 10 | 16.7 |
| Orthopedic impairment | 241 | 30 | 12.4 |
| Other health impairment | 235 | 36 | 15.3 |
| Specific learning disability | 435 | 79 | 18.2 |
| Deaf-blindness | 5 | 0 | 0.0 |
| Multiple disabilities | 387 | 68 | 17.6 |
| Autism | 1,966 | 322 | 16.4 |
| Traumatic brain injury | 36 | 5 | 13.9 |

### Appendix 5.B: Completion Rates

Table 5.B.1 Percentage of Students in Each Grade Level or Grade Band Completing Embedded PTs

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Grade Level or Grade Band** | **No PTs Completed** | **1 PT Completed** | **2 PTs Completed** | **3 PTs Completed** | **4 PTs Completed** | **Number of Students Assigned** |
| Grade 5 | 81% | 1% | 0% | 1% | 17% | 4,714 |
| Grade 8 | 83% | 1% | 0% | 0% | 15% | 4,810 |
| High school | 83% | 1% | 0% | 0% | 16% | 5,783 |
| Grade 10 | 67% | 2% | 1% | 1% | 29% | 288 |
| Grade 11 | 85% | 1% | 0% | 1% | 14% | 2,693 |
| Grade 12 | 82% | 1% | 0% | 0% | 17% | 2,802 |

Table 5.B.2 Completion Rates by Grade Level or Grade Band for Each Embedded PT

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Grade Level or Grade Band** | **Embedded PT** | **Number of Students Registered** | **Number of Students Completing the PT** | **Percent Completing the PT** |
| Grade 5 | Life Sciences | 4,714 | 862 | 18% |
| Grade 5 | Physical Sciences | 4,714 | 821 | 17% |
| Grade 5 | Earth and Space Sciences | 4,714 | 879 | 19% |
| Grade 8 | Life Sciences | 4,810 | 770 | 16% |
| Grade 8 | Physical Sciences | 4,810 | 768 | 16% |
| Grade 8 | Earth and Space Sciences | 4,810 | 798 | 17% |
| High school | Life Sciences | 5,783 | 971 | 17% |
| High school | Physical Sciences | 5,783 | 933 | 16% |
| High school | Earth and Space Sciences | 5,783 | 982 | 17% |
| Grade 10 | Life Sciences | 288 | 88 | 31% |
| Grade 10 | Physical Sciences | 288 | 87 | 30% |
| Grade 10 | Earth and Space Sciences | 288 | 95 | 33% |
| Grade 11 | Life Sciences | 2,693 | 389 | 14% |
| Grade 11 | Physical Sciences | 2,693 | 374 | 14% |
| Grade 11 | Earth and Space Sciences | 2,693 | 386 | 14% |
| Grade 12 | Life Sciences | 2,802 | 494 | 18% |
| Grade 12 | Physical Sciences | 2,802 | 472 | 17% |
| Grade 12 | Earth and Space Sciences | 2,802 | 501 | 18% |

## Scoring and Reporting

This chapter summarizes the scoring approaches and type of scores that are reported for the 2020–2021 California Alternate Assessment (CAA) for Science administration.

### CAA for Science Scoring Process

Each student was administered three operational field test embedded performance tasks (PTs) and one field test embedded PT, each consisting of 10 items, for a total of 12 points. Two items in each embedded PT were worth two points. The field test items did not count toward the student’s total test score.

During the administration, the student’s answer to each item was entered into the California Assessment of Student Performance and Progress test delivery system (TDS). Instructions detailing how to administer the tests were provided in the secure *Embedded Performance Task Directions for Administration.* Refer to a nonsecure training test *Directions for Administration* for the type of information and instructions that were available to test examiners (California Department of Education [CDE], 2020).

Student responses to items were captured and scored in the TDS and then the data was passed directly from the quality monitoring system to the database of record to be transmitted to ETS. The percent correct and preliminary indicator were assigned to each student by ETS’ Enterprise Score Key Management System.

### Types of Scores

To provide a broad and early indication about a local educational agency’s (LEA’s) implementation of the Core Content Connectors (Science Connectors) on the CAA for Science, two types of scores were calculated: the percent-correct score that indicates the percentage of maximum points earned by a student; and a preliminary indicator category that indicates low, medium, or high performance (implying limited, moderate, or considerable understanding of the content tested).

#### Raw Scores

A student’s raw score is the sum of scores on the individual items presented to the student. Table 6.A.1 through table 6.A.21 in [appendix 6.A](#_Appendix_6.A:_Distribution) provide the distribution of the total raw score—the sum of scores on the individual items in the three operational embedded PTs—and the distribution of the total raw score for each operational embedded PT. The tables for grade ten versions two, three, and four are not provided because fewer than 10 students completed each of these three versions. Summary statistics (i.e., mean, standard deviation [SD], maximum, and minimum) of the total raw score for each operational embedded PT by version is displayed in table 6.A.22 through table 6.A.24.

#### Percent Correct

The percent-correct scores are calculated for operational items. The percent correct is calculated using equation 6.1. *Refer to the* [*Alternative Text for Equation 6.1*](#_Alternative_Text_for_10) *for a description of this equation.*

 (6.1)

If the student did not respond to at least one item for the embedded PT, a score of 0 (zero) was assigned for that embedded PT.

#### Preliminary Indicator Categories

The preliminary indicators are descriptive statements with corresponding threshold percent-correct scores used in reporting the CAA for Science results. Indicators are considered preliminary because they are available to parents/guardians and the public before the development of the operational reporting scale.

There were three preliminary indicator categories to indicate high (category 3), medium (category 2), or low (category 1) performance. A student’s preliminary indicator category provided a general indication of the student’s understanding of the Science Connectors. Table 6.1 provides the description of each indicator category.

Table 6.1 Indicator Categories

|  |  |
| --- | --- |
| **Category** | **Explanation** |
| 3 | Student performance suggests a considerable understanding of the Science Connectors. |
| 2 | Student performance suggests a *moderate* understanding of the Science Connectors. |
| 1 | Student performance suggests a limited understanding of the Science Connectors. |

Students who performed at or below the chance level—the average performance expected of students responding to each item at random—were assigned to the indicator category of 1. Students who performed exceedingly well (i.e., 90 percent correct or above) were assigned the indicator category of 3. Most students are in category 2.

A group of California science educators familiar with the eligible student population reviewed and provided feedback on plans and initial drafts of preliminary indicators on December 20, 2017. The threshold percent-correct scores for the three indicator categories are presented in table 6.2. Each threshold percent-correct score is expressed as a percentage of the maximum possible score.

Table 6.2 Threshold Percent-Correct Scores for Preliminary Categories

|  |  |  |
| --- | --- | --- |
| **Grade Level or Grade Band** | **Required for Category 2** | **Required for Category 3** |
| Grade 5 | 33% | 90% |
| Grade 8 | 33% | 90% |
| High school | 33% | 90% |

The preliminary indicator conversion table is shown for the CAA for Science in table 6.3. This table provides the percent-correct score and preliminary category for each possible raw score. The CAA for Science forms all have a total of 36 raw score points. Additionally, the threshold cut for preliminary category 2 and preliminary category 3 are the same across the CAA for Science forms. Therefore, table 6.3 applies to all three CAA for Science grade-level assessments.

Table 6.3 Preliminary Indicator Conversion Table

|  |  |  |
| --- | --- | --- |
| **Raw Score (# of points earned)** | **Percent Correct** | **Preliminary Category** |
| 0 | 0 | 1 |
| 1 | 3 | 1 |
| 2 | 6 | 1 |
| 3 | 8 | 1 |
| 4 | 11 | 1 |
| 5 | 14 | 1 |
| 6 | 17 | 1 |
| 7 | 19 | 1 |
| 8 | 22 | 1 |
| 9 | 25 | 1 |
| 10 | 28 | 1 |
| 11 | 31 | 1 |
| 12 | 33 | 2 |
| 13 | 36 | 2 |
| 14 | 39 | 2 |
| 15 | 42 | 2 |
| 16 | 44 | 2 |
| 17 | 47 | 2 |
| 18 | 50 | 2 |
| 19 | 53 | 2 |
| 20 | 56 | 2 |

Table 6.3 *(continuation)*

|  |  |  |
| --- | --- | --- |
| **Raw Score (# of points earned)** | **Percent Correct** | **Preliminary Category** |
| 21 | 58 | 2 |
| 22 | 61 | 2 |
| 23 | 64 | 2 |
| 24 | 67 | 2 |
| 25 | 69 | 2 |
| 26 | 72 | 2 |
| 27 | 75 | 2 |
| 28 | 78 | 2 |
| 29 | 81 | 2 |
| 30 | 83 | 2 |
| 31 | 86 | 2 |
| 32 | 89 | 2 |
| 33 | 92 | 3 |
| 34 | 94 | 3 |
| 35 | 97 | 3 |
| 36 | 100 | 3 |

Table 6.4 presents the numbers and percentages of students in the preliminary indicator categories among all students who completed all four embedded PTs and who had a valid test score. The majority of students with scores at all grade levels were classified as being in preliminary category 2.

Table 6.4 Numbers and Percentages of Students in the Preliminary Indicator Categories

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Grade Level or Grade Band** | **Preliminary Category 1 N** | **Preliminary Category 1 %** | **Preliminary Category 2 N** | **Preliminary Category 2 %** | **Preliminary Category 3 N** | **Preliminary Category 3 %** | **Total Number of Students** |
| Grade 5 | 121 | 15% | 648 | 79% | 47 | 6% | 816 |
| Grade 8 | 112 | 15% | 543 | 73% | 87 | 12% | 742 |
| High school | 161 | 17% | 713 | 77% | 53 | 6% | 927 |
| Grade 10 | 23 | 27% | 60 | 71% | 2 | 2% | 85 |
| Grade 11 | 82 | 22% | 272 | 74% | 15 | 4% | 369 |
| Grade 12 | 56 | 12% | 381 | 81% | 36 | 8% | 473 |

#### Aggregated Score Reporting

To provide meaningful results to interested educators, test scores for a given grade are aggregated at the school, LEA, county, and state levels. (A direct funded charter school is reported as a separate LEA.) The aggregated scores are generated for selected groups of interest to the CDE (e.g., gender, ethnicity, primary disability, etc.) and for the total population.

Statistics summarizing student performance by content area and grade for the selected groups of students are provided in [appendix 6.B](#_Appendix_6.B:_Demographic). In table 6.B.1 through table 6.B.3, students are grouped by demographic characteristics, including gender, ethnicity, English language fluency, economic status (disadvantaged or not), primary disability, and migrant status. For each demographic student group, the table shows the number of students with a valid raw score, the raw-score means and SDs, the percent-correct means and SDs, and the percentage of students in each preliminary indicator category. Note that the raw scores on the forms are not equated. They are aggregated in these tables to provide preliminary information about students’ performance for this administration while more sophisticated analyses were not available because of the sample size.

Table 6.5 lists the demographic student groups for which these statistics are reported. To protect students’ privacy, when the number of students in a student group is 10 or fewer, the summary statistics are not reported and are replaced in the table by “N/A.”

Table 6.5 Demographic Student Groups to Be Reported

|  |  |
| --- | --- |
| **Category** | **Student Groups** |
| **Economic Status** | * Not economically disadvantaged * Economically disadvantaged |
| **English Language Fluency** | * English only * Initial fluent English proficient (IFEP) * English learner (EL) * Reclassified fluent English proficient (RFEP) * Adult English learner (ADEL) * To be determined * English proficiency unknown |
| **Ethnicity** | * American Indian or Alaska Native * Asian * Native Hawaiian or Other Pacific Islander * Filipino * Hispanic or Latino * Black or African American * White * Two or more races |
| **Gender** | * Male * Female * Nonbinary |

Table 6.5 *(continuation)*

|  |  |
| --- | --- |
| **Category** | **Student Groups** |
| **Migrant Status** | * Eligible for the Title I Part C Migrant Program (Migrant education) * Not eligible for the Title I Part C Migrant Program (Not migrant education) |
| **Primary Disability Type** | * Intellectual disability * Hearing impairment * Speech or language impairment * Visual impairment * Emotional disturbance * Orthopedic impairment * Other health impairment * Specific learning disability * Deaf-blindness * Multiple disabilities * Autism * Traumatic brain injury |

### Reference

California Department of Education. (2020). *California Alternate Assessment for Science directions for administration, training performance task, fossils and plate tectonics.* Sacramento, CA: California Department of Education.

### Accessibility Information

#### Alternative Text for Equation 6.1

Percent correct equals the number of points earned for all items divided by the maximum number of points for all items.

### Appendix 6.A: Distribution of Raw Scores—Total Score for Each Embedded Performance Task

Table 6.A.1 Distribution of Total Score and PT Scores, Grade Five Version One

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 0 | 19 | 7% | 24 | 9% | 26 | 10% | 26 | 10% |
| 1 | 4 | 2% | 4 | 2% | 3 | 1% | 4 | 2% |
| 2 | 1 | 0% | 0 | 0% | 6 | 2% | 4 | 2% |
| 3 | 1 | 0% | 5 | 2% | 4 | 2% | 11 | 4% |
| 4 | 0 | 0% | 11 | 4% | 7 | 3% | 14 | 5% |
| 5 | 1 | 0% | 14 | 5% | 23 | 9% | 25 | 10% |
| 6 | 4 | 2% | 9 | 4% | 27 | 11% | 38 | 15% |
| 7 | 1 | 0% | 25 | 10% | 37 | 14% | 30 | 12% |
| 8 | 1 | 0% | 23 | 9% | 29 | 11% | 41 | 16% |
| 9 | 0 | 0% | 36 | 14% | 30 | 12% | 23 | 9% |
| 10 | 3 | 1% | 46 | 18% | 22 | 9% | 24 | 9% |
| 11 | 4 | 2% | 36 | 14% | 28 | 11% | 12 | 5% |
| 12 | 2 | 1% | 23 | 9% | 14 | 5% | 4 | 2% |
| 13 | 4 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 14 | 3 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 15 | 5 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 16 | 7 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 17 | 8 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 18 | 11 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 19 | 9 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 20 | 8 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 21 | 11 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 22 | 17 | 7% | N/A | N/A | N/A | N/A | N/A | N/A |
| 23 | 17 | 7% | N/A | N/A | N/A | N/A | N/A | N/A |
| 24 | 8 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.1 *(continuation)*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 25 | 6 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 26 | 16 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 27 | 17 | 7% | N/A | N/A | N/A | N/A | N/A | N/A |
| 28 | 8 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 29 | 9 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 30 | 12 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 31 | 13 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 32 | 14 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 33 | 6 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 34 | 4 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 35 | 2 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 36 | 0 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.2 Distribution of Total Score and PT Scores, Grade Five Version Two

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 0 | 11 | 7% | 13 | 8% | 16 | 10% | 14 | 9% |
| 1 | 2 | 1% | 3 | 2% | 2 | 1% | 3 | 2% |
| 2 | 0 | 0% | 2 | 1% | 4 | 3% | 3 | 2% |
| 3 | 0 | 0% | 1 | 1% | 8 | 5% | 12 | 8% |
| 4 | 2 | 1% | 8 | 5% | 7 | 4% | 8 | 5% |
| 5 | 0 | 0% | 8 | 5% | 15 | 10% | 22 | 14% |
| 6 | 4 | 3% | 8 | 5% | 13 | 8% | 21 | 13% |
| 7 | 0 | 0% | 14 | 9% | 11 | 7% | 16 | 10% |
| 8 | 1 | 1% | 23 | 15% | 20 | 13% | 14 | 9% |
| 9 | 1 | 1% | 12 | 8% | 10 | 6% | 14 | 9% |
| 10 | 0 | 0% | 18 | 11% | 18 | 11% | 14 | 9% |
| 11 | 2 | 1% | 27 | 17% | 17 | 11% | 10 | 6% |
| 12 | 6 | 4% | 20 | 13% | 16 | 10% | 6 | 4% |
| 13 | 3 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 14 | 3 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 15 | 5 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 16 | 4 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 17 | 6 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 18 | 8 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 19 | 4 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 20 | 5 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 21 | 5 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 22 | 2 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 23 | 7 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 24 | 8 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 25 | 7 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 26 | 8 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 27 | 5 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 28 | 4 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.2 *(continuation)*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 29 | 7 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 30 | 9 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 31 | 7 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 32 | 3 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 33 | 4 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 34 | 7 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 35 | 4 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 36 | 3 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.3 Distribution of Total Score and PT Scores, Grade Five Version Three

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 0 | 9 | 5% | 16 | 8% | 19 | 10% | 15 | 8% |
| 1 | 3 | 2% | 2 | 1% | 2 | 1% | 3 | 2% |
| 2 | 1 | 1% | 1 | 1% | 3 | 2% | 4 | 2% |
| 3 | 0 | 0% | 12 | 6% | 10 | 5% | 4 | 2% |
| 4 | 0 | 0% | 4 | 2% | 13 | 7% | 10 | 5% |
| 5 | 2 | 1% | 12 | 6% | 13 | 7% | 14 | 7% |
| 6 | 2 | 1% | 21 | 11% | 21 | 11% | 22 | 11% |
| 7 | 4 | 2% | 27 | 14% | 28 | 14% | 25 | 13% |
| 8 | 0 | 0% | 24 | 12% | 29 | 15% | 28 | 14% |
| 9 | 2 | 1% | 22 | 11% | 31 | 16% | 34 | 17% |
| 10 | 2 | 1% | 23 | 12% | 18 | 9% | 22 | 11% |
| 11 | 1 | 1% | 15 | 8% | 9 | 5% | 12 | 6% |
| 12 | 8 | 4% | 19 | 10% | 2 | 1% | 5 | 3% |
| 13 | 7 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 14 | 3 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 15 | 5 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 16 | 3 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 17 | 6 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 18 | 4 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 19 | 8 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 20 | 8 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 21 | 12 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 22 | 7 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 23 | 15 | 8% | N/A | N/A | N/A | N/A | N/A | N/A |
| 24 | 8 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 25 | 11 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 26 | 9 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 27 | 9 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 28 | 10 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.3 *(continuation)*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 29 | 7 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 30 | 13 | 7% | N/A | N/A | N/A | N/A | N/A | N/A |
| 31 | 10 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 32 | 5 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 33 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 34 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 35 | 2 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 36 | 0 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.4 Distribution of Total Score and PT Scores, Grade Five Version Four

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 0 | 11 | 5% | 18 | 9% | 22 | 11% | 15 | 7% |
| 1 | 6 | 3% | 2 | 1% | 3 | 1% | 4 | 2% |
| 2 | 3 | 1% | 6 | 3% | 4 | 2% | 6 | 3% |
| 3 | 0 | 0% | 6 | 3% | 6 | 3% | 8 | 4% |
| 4 | 0 | 0% | 10 | 5% | 12 | 6% | 8 | 4% |
| 5 | 1 | 0% | 8 | 4% | 10 | 5% | 14 | 7% |
| 6 | 2 | 1% | 10 | 5% | 20 | 10% | 16 | 8% |
| 7 | 2 | 1% | 24 | 12% | 28 | 14% | 18 | 9% |
| 8 | 2 | 1% | 32 | 16% | 23 | 11% | 20 | 10% |
| 9 | 1 | 0% | 25 | 12% | 44 | 21% | 27 | 13% |
| 10 | 3 | 1% | 26 | 13% | 16 | 8% | 33 | 16% |
| 11 | 2 | 1% | 20 | 10% | 12 | 6% | 24 | 12% |
| 12 | 4 | 2% | 18 | 9% | 5 | 2% | 12 | 6% |
| 13 | 3 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 14 | 2 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 15 | 3 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 16 | 5 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 17 | 4 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 18 | 7 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 19 | 6 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 20 | 7 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 21 | 6 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 22 | 9 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 23 | 10 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 24 | 10 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 25 | 10 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 26 | 13 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 27 | 10 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 28 | 10 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.4 *(continuation)*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 29 | 7 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 30 | 13 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 31 | 7 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 32 | 13 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 33 | 11 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 34 | 2 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 35 | 0 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |
| 36 | 0 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.5 Distribution of Total Score and PT Scores, Grade Eight Version One

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 0 | 23 | 9% | 29 | 11% | 28 | 11% | 29 | 11% |
| 1 | 0 | 0% | 1 | 0% | 2 | 1% | 5 | 2% |
| 2 | 1 | 0% | 4 | 2% | 2 | 1% | 8 | 3% |
| 3 | 3 | 1% | 9 | 3% | 7 | 3% | 14 | 5% |
| 4 | 2 | 1% | 20 | 8% | 11 | 4% | 16 | 6% |
| 5 | 3 | 1% | 27 | 10% | 14 | 5% | 30 | 11% |
| 6 | 0 | 0% | 27 | 10% | 33 | 12% | 22 | 8% |
| 7 | 0 | 0% | 40 | 15% | 27 | 10% | 23 | 9% |
| 8 | 2 | 1% | 32 | 12% | 27 | 10% | 22 | 8% |
| 9 | 3 | 1% | 31 | 12% | 26 | 10% | 28 | 11% |
| 10 | 4 | 2% | 16 | 6% | 23 | 9% | 23 | 9% |
| 11 | 4 | 2% | 21 | 8% | 37 | 14% | 24 | 9% |
| 12 | 5 | 2% | 9 | 3% | 29 | 11% | 22 | 8% |
| 13 | 3 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 14 | 12 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 15 | 5 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 16 | 11 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 17 | 11 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 18 | 11 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 19 | 14 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 20 | 7 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 21 | 8 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 22 | 10 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 23 | 10 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 24 | 9 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 25 | 11 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 26 | 9 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 27 | 12 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 28 | 7 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.5 *(continuation)*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 29 | 11 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 30 | 8 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 31 | 10 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 32 | 10 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 33 | 9 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 34 | 7 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 35 | 7 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 36 | 4 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.6 Distribution of Total Score and PT Scores, Grade Eight Version Two

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 0 | 12 | 9% | 13 | 9% | 14 | 10% | 13 | 9% |
| 1 | 0 | 0% | 0 | 0% | 1 | 1% | 2 | 1% |
| 2 | 1 | 1% | 2 | 1% | 2 | 1% | 4 | 3% |
| 3 | 0 | 0% | 4 | 3% | 2 | 1% | 4 | 3% |
| 4 | 1 | 1% | 4 | 3% | 10 | 7% | 3 | 2% |
| 5 | 1 | 1% | 19 | 13% | 8 | 6% | 9 | 6% |
| 6 | 0 | 0% | 21 | 15% | 9 | 6% | 13 | 9% |
| 7 | 1 | 1% | 16 | 11% | 7 | 5% | 18 | 13% |
| 8 | 1 | 1% | 22 | 16% | 18 | 13% | 17 | 12% |
| 9 | 0 | 0% | 16 | 11% | 10 | 7% | 18 | 13% |
| 10 | 1 | 1% | 13 | 9% | 14 | 10% | 12 | 9% |
| 11 | 2 | 1% | 9 | 6% | 21 | 15% | 16 | 11% |
| 12 | 1 | 1% | 2 | 1% | 25 | 18% | 12 | 9% |
| 13 | 2 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 14 | 3 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 15 | 6 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 16 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 17 | 4 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 18 | 3 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 19 | 7 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 20 | 6 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 21 | 5 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 22 | 5 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 23 | 8 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 24 | 6 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 25 | 4 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 26 | 11 | 8% | N/A | N/A | N/A | N/A | N/A | N/A |
| 27 | 5 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 28 | 7 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.6 *(continuation)*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 29 | 5 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 30 | 6 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 31 | 8 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 32 | 3 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 33 | 4 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 34 | 8 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 35 | 2 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 36 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.7 Distribution of Total Score and PT Scores, Grade Eight Version Three

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 0 | 22 | 11% | 23 | 12% | 24 | 12% | 24 | 12% |
| 1 | 1 | 1% | 0 | 0% | 4 | 2% | 2 | 1% |
| 2 | 0 | 0% | 3 | 2% | 1 | 1% | 4 | 2% |
| 3 | 1 | 1% | 5 | 3% | 5 | 3% | 9 | 5% |
| 4 | 0 | 0% | 10 | 5% | 7 | 4% | 14 | 7% |
| 5 | 2 | 1% | 16 | 8% | 19 | 10% | 12 | 6% |
| 6 | 1 | 1% | 20 | 10% | 16 | 8% | 18 | 9% |
| 7 | 0 | 0% | 33 | 17% | 12 | 6% | 15 | 8% |
| 8 | 1 | 1% | 20 | 10% | 20 | 10% | 18 | 9% |
| 9 | 1 | 1% | 16 | 8% | 16 | 8% | 19 | 10% |
| 10 | 0 | 0% | 17 | 9% | 22 | 11% | 15 | 8% |
| 11 | 3 | 2% | 22 | 11% | 22 | 11% | 29 | 15% |
| 12 | 3 | 2% | 14 | 7% | 31 | 16% | 20 | 10% |
| 13 | 4 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 14 | 6 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 15 | 4 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 16 | 6 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 17 | 7 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 18 | 8 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 19 | 7 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 20 | 7 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 21 | 8 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 22 | 2 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 23 | 8 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 24 | 14 | 7% | N/A | N/A | N/A | N/A | N/A | N/A |
| 25 | 5 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 26 | 7 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 27 | 4 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 28 | 9 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.7 *(continuation)*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 29 | 8 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 30 | 5 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 31 | 3 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 32 | 7 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 33 | 12 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 34 | 11 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 35 | 6 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 36 | 6 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.8 Distribution of Total Score and PT Scores, Grade Eight Version Four

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 0 | 9 | 7% | 10 | 7% | 9 | 7% | 12 | 9% |
| 1 | 1 | 1% | 0 | 0% | 4 | 3% | 1 | 1% |
| 2 | 0 | 0% | 3 | 2% | 3 | 2% | 4 | 3% |
| 3 | 2 | 1% | 4 | 3% | 4 | 3% | 0 | 0% |
| 4 | 0 | 0% | 6 | 4% | 10 | 7% | 11 | 8% |
| 5 | 0 | 0% | 12 | 9% | 10 | 7% | 18 | 13% |
| 6 | 0 | 0% | 13 | 10% | 15 | 11% | 7 | 5% |
| 7 | 0 | 0% | 20 | 15% | 13 | 10% | 11 | 8% |
| 8 | 0 | 0% | 22 | 16% | 17 | 13% | 17 | 13% |
| 9 | 2 | 1% | 19 | 14% | 20 | 15% | 8 | 6% |
| 10 | 1 | 1% | 12 | 9% | 17 | 13% | 16 | 12% |
| 11 | 0 | 0% | 8 | 6% | 12 | 9% | 13 | 10% |
| 12 | 1 | 1% | 7 | 5% | 2 | 1% | 18 | 13% |
| 13 | 2 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 14 | 7 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 15 | 4 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 16 | 8 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 17 | 7 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 18 | 3 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 19 | 4 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 20 | 6 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 21 | 9 | 7% | N/A | N/A | N/A | N/A | N/A | N/A |
| 22 | 4 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 23 | 5 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 24 | 9 | 7% | N/A | N/A | N/A | N/A | N/A | N/A |
| 25 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 26 | 8 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 27 | 3 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 28 | 5 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.8 *(continuation)*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 29 | 8 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 30 | 10 | 7% | N/A | N/A | N/A | N/A | N/A | N/A |
| 31 | 3 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 32 | 4 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 33 | 4 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 34 | 2 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 35 | 4 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 36 | 0 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.9 Distribution of Total Score and PT Scores, High School Version One

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 0 | 31 | 10% | 45 | 15% | 50 | 17% | 47 | 16% |
| 1 | 10 | 3% | 7 | 2% | 9 | 3% | 8 | 3% |
| 2 | 5 | 2% | 7 | 2% | 7 | 2% | 8 | 3% |
| 3 | 4 | 1% | 6 | 2% | 11 | 4% | 22 | 7% |
| 4 | 3 | 1% | 14 | 5% | 14 | 5% | 20 | 7% |
| 5 | 2 | 1% | 30 | 10% | 20 | 7% | 32 | 11% |
| 6 | 2 | 1% | 24 | 8% | 18 | 6% | 38 | 13% |
| 7 | 0 | 0% | 54 | 18% | 24 | 8% | 30 | 10% |
| 8 | 1 | 0% | 33 | 11% | 33 | 11% | 25 | 8% |
| 9 | 1 | 0% | 35 | 12% | 25 | 8% | 23 | 8% |
| 10 | 4 | 1% | 25 | 8% | 33 | 11% | 20 | 7% |
| 11 | 8 | 3% | 10 | 3% | 22 | 7% | 13 | 4% |
| 12 | 5 | 2% | 6 | 2% | 30 | 10% | 10 | 3% |
| 13 | 8 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 14 | 11 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 15 | 10 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 16 | 9 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 17 | 5 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 18 | 12 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 19 | 8 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 20 | 22 | 7% | N/A | N/A | N/A | N/A | N/A | N/A |
| 21 | 11 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 22 | 10 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 23 | 19 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 24 | 7 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 25 | 12 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 26 | 12 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 27 | 6 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 28 | 13 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.9 *(continuation)*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 29 | 11 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 30 | 8 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 31 | 4 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 32 | 7 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 33 | 6 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 34 | 6 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 35 | 2 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 36 | 1 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.10 Distribution of Total Score and PT Scores, High School Version Two

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 0 | 14 | 6% | 18 | 8% | 21 | 9% | 20 | 8% |
| 1 | 3 | 1% | 5 | 2% | 6 | 3% | 5 | 2% |
| 2 | 3 | 1% | 5 | 2% | 3 | 1% | 2 | 1% |
| 3 | 2 | 1% | 4 | 2% | 5 | 2% | 12 | 5% |
| 4 | 1 | 0% | 11 | 5% | 10 | 4% | 12 | 5% |
| 5 | 2 | 1% | 18 | 8% | 12 | 5% | 25 | 11% |
| 6 | 1 | 0% | 16 | 7% | 13 | 5% | 16 | 7% |
| 7 | 0 | 0% | 16 | 7% | 12 | 5% | 39 | 16% |
| 8 | 2 | 1% | 26 | 11% | 19 | 8% | 33 | 14% |
| 9 | 1 | 0% | 40 | 17% | 27 | 11% | 29 | 12% |
| 10 | 4 | 2% | 45 | 19% | 29 | 12% | 26 | 11% |
| 11 | 1 | 0% | 24 | 10% | 41 | 17% | 13 | 5% |
| 12 | 0 | 0% | 10 | 4% | 40 | 17% | 6 | 3% |
| 13 | 5 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 14 | 5 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 15 | 5 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 16 | 4 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 17 | 7 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 18 | 8 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 19 | 8 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 20 | 9 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 21 | 8 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 22 | 7 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 23 | 7 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 24 | 9 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 25 | 9 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 26 | 10 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 27 | 12 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 28 | 15 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.10 *(continuation)*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 29 | 20 | 8% | N/A | N/A | N/A | N/A | N/A | N/A |
| 30 | 13 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 31 | 19 | 8% | N/A | N/A | N/A | N/A | N/A | N/A |
| 32 | 10 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 33 | 6 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 34 | 4 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 35 | 2 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 36 | 2 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.11 Distribution of Total Score and PT Scores, High School Version Three

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 0 | 15 | 7% | 19 | 9% | 25 | 11% | 23 | 11% |
| 1 | 4 | 2% | 4 | 2% | 1 | 0% | 5 | 2% |
| 2 | 2 | 1% | 5 | 2% | 3 | 1% | 2 | 1% |
| 3 | 2 | 1% | 8 | 4% | 6 | 3% | 5 | 2% |
| 4 | 1 | 0% | 12 | 5% | 8 | 4% | 15 | 7% |
| 5 | 2 | 1% | 10 | 5% | 20 | 9% | 15 | 7% |
| 6 | 1 | 0% | 20 | 9% | 31 | 14% | 13 | 6% |
| 7 | 1 | 0% | 19 | 9% | 30 | 14% | 21 | 10% |
| 8 | 0 | 0% | 29 | 13% | 22 | 10% | 32 | 15% |
| 9 | 2 | 1% | 31 | 14% | 23 | 11% | 26 | 12% |
| 10 | 0 | 0% | 25 | 11% | 28 | 13% | 37 | 17% |
| 11 | 3 | 1% | 24 | 11% | 18 | 8% | 19 | 9% |
| 12 | 7 | 3% | 13 | 6% | 4 | 2% | 6 | 3% |
| 13 | 4 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 14 | 5 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 15 | 0 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |
| 16 | 4 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 17 | 10 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 18 | 7 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 19 | 8 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 20 | 11 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 21 | 7 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 22 | 14 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 23 | 6 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 24 | 9 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 25 | 13 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 26 | 7 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 27 | 9 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 28 | 16 | 7% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.11 *(continuation)*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 29 | 11 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 30 | 9 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 31 | 11 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 32 | 8 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 33 | 7 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 34 | 2 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 35 | 1 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |
| 36 | 0 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.12 Distribution of Total Score and PT Scores, High School Version Four

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 0 | 15 | 9% | 16 | 9% | 18 | 10% | 18 | 10% |
| 1 | 2 | 1% | 4 | 2% | 2 | 1% | 2 | 1% |
| 2 | 1 | 1% | 1 | 1% | 2 | 1% | 1 | 1% |
| 3 | 1 | 1% | 3 | 2% | 5 | 3% | 2 | 1% |
| 4 | 0 | 0% | 1 | 1% | 7 | 4% | 9 | 5% |
| 5 | 0 | 0% | 10 | 6% | 8 | 5% | 9 | 5% |
| 6 | 0 | 0% | 9 | 5% | 22 | 13% | 14 | 8% |
| 7 | 0 | 0% | 14 | 8% | 23 | 13% | 23 | 13% |
| 8 | 2 | 1% | 19 | 11% | 30 | 17% | 22 | 13% |
| 9 | 1 | 1% | 28 | 16% | 23 | 13% | 22 | 13% |
| 10 | 0 | 0% | 18 | 10% | 27 | 16% | 24 | 14% |
| 11 | 1 | 1% | 17 | 10% | 7 | 4% | 17 | 10% |
| 12 | 1 | 1% | 34 | 20% | 0 | 0% | 11 | 6% |
| 13 | 2 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 14 | 3 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 15 | 2 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 16 | 7 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 17 | 3 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 18 | 3 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 19 | 5 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 20 | 5 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 21 | 10 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 22 | 8 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 23 | 7 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 24 | 7 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 25 | 14 | 8% | N/A | N/A | N/A | N/A | N/A | N/A |
| 26 | 9 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 27 | 6 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 28 | 8 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.12 *(continuation)*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 29 | 9 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 30 | 10 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 31 | 13 | 7% | N/A | N/A | N/A | N/A | N/A | N/A |
| 32 | 5 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 33 | 6 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 34 | 7 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 35 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 36 | 0 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.13 Distribution of Total Score and PT Scores, Grade Ten Version One

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 0 | 6 | 8% | 13 | 17% | 10 | 13% | 11 | 15% |
| 1 | 3 | 4% | 1 | 1% | 4 | 5% | 1 | 1% |
| 2 | 1 | 1% | 1 | 1% | 2 | 3% | 4 | 5% |
| 3 | 0 | 0% | 3 | 4% | 2 | 3% | 6 | 8% |
| 4 | 1 | 1% | 4 | 5% | 8 | 11% | 8 | 11% |
| 5 | 1 | 1% | 11 | 15% | 7 | 9% | 12 | 16% |
| 6 | 0 | 0% | 7 | 9% | 5 | 7% | 13 | 17% |
| 7 | 0 | 0% | 14 | 19% | 8 | 11% | 8 | 11% |
| 8 | 1 | 1% | 9 | 12% | 8 | 11% | 4 | 5% |
| 9 | 0 | 0% | 5 | 7% | 7 | 9% | 3 | 4% |
| 10 | 2 | 3% | 4 | 5% | 4 | 5% | 3 | 4% |
| 11 | 3 | 4% | 2 | 3% | 6 | 8% | 2 | 3% |
| 12 | 4 | 5% | 1 | 1% | 4 | 5% | 0 | 0% |
| 13 | 2 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 14 | 6 | 8% | N/A | N/A | N/A | N/A | N/A | N/A |
| 15 | 3 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 16 | 5 | 7% | N/A | N/A | N/A | N/A | N/A | N/A |
| 17 | 3 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 18 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 19 | 2 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 20 | 4 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 21 | 4 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 22 | 5 | 7% | N/A | N/A | N/A | N/A | N/A | N/A |
| 23 | 2 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 24 | 3 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 25 | 3 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 26 | 2 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 27 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 28 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.13 *(continuation)*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 29 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 30 | 2 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 31 | 0 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |
| 32 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 33 | 2 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 34 | 0 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |
| 35 | 0 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |
| 36 | 0 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |

**Note:** The grade ten information for versions two, three, and four are suppressed because there were fewer than 10 students completing each of these versions.

Table 6.A.14 Distribution of Total Score and PT Scores, Grade Eleven Version One

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 0 | 11 | 12% | 16 | 17% | 23 | 25% | 20 | 22% |
| 1 | 5 | 5% | 4 | 4% | 2 | 2% | 4 | 4% |
| 2 | 2 | 2% | 6 | 6% | 3 | 3% | 2 | 2% |
| 3 | 4 | 4% | 0 | 0% | 5 | 5% | 4 | 4% |
| 4 | 2 | 2% | 5 | 5% | 4 | 4% | 7 | 8% |
| 5 | 1 | 1% | 11 | 12% | 4 | 4% | 12 | 13% |
| 6 | 2 | 2% | 5 | 5% | 3 | 3% | 12 | 13% |
| 7 | 0 | 0% | 15 | 16% | 6 | 6% | 7 | 8% |
| 8 | 0 | 0% | 11 | 12% | 11 | 12% | 6 | 6% |
| 9 | 1 | 1% | 8 | 9% | 7 | 8% | 8 | 9% |
| 10 | 0 | 0% | 10 | 11% | 8 | 9% | 6 | 6% |
| 11 | 1 | 1% | 2 | 2% | 8 | 9% | 2 | 2% |
| 12 | 1 | 1% | 0 | 0% | 9 | 10% | 3 | 3% |
| 13 | 3 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 14 | 2 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 15 | 2 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 16 | 3 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 17 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 18 | 6 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 19 | 3 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 20 | 2 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 21 | 3 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 22 | 3 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 23 | 10 | 11% | N/A | N/A | N/A | N/A | N/A | N/A |
| 24 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 25 | 3 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 26 | 3 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 27 | 0 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |
| 28 | 7 | 8% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.14 *(continuation)*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 29 | 2 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 30 | 2 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 31 | 2 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 32 | 3 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 33 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 34 | 0 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |
| 35 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 36 | 0 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.15 Distribution of Total Score and PT Scores, Grade Eleven Version Two

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 0 | 10 | 9% | 11 | 10% | 14 | 13% | 14 | 13% |
| 1 | 2 | 2% | 4 | 4% | 2 | 2% | 3 | 3% |
| 2 | 1 | 1% | 3 | 3% | 1 | 1% | 0 | 0% |
| 3 | 2 | 2% | 1 | 1% | 3 | 3% | 4 | 4% |
| 4 | 1 | 1% | 5 | 5% | 5 | 5% | 3 | 3% |
| 5 | 1 | 1% | 5 | 5% | 3 | 3% | 15 | 14% |
| 6 | 0 | 0% | 8 | 7% | 8 | 7% | 8 | 7% |
| 7 | 0 | 0% | 8 | 7% | 6 | 6% | 18 | 17% |
| 8 | 0 | 0% | 15 | 14% | 10 | 9% | 11 | 10% |
| 9 | 0 | 0% | 15 | 14% | 10 | 9% | 12 | 11% |
| 10 | 2 | 2% | 20 | 19% | 15 | 14% | 13 | 12% |
| 11 | 0 | 0% | 9 | 8% | 15 | 14% | 6 | 6% |
| 12 | 0 | 0% | 4 | 4% | 16 | 15% | 1 | 1% |
| 13 | 2 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 14 | 2 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 15 | 3 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 16 | 2 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 17 | 4 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 18 | 2 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 19 | 4 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 20 | 3 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 21 | 4 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 22 | 3 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 23 | 5 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 24 | 5 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 25 | 5 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 26 | 3 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 27 | 5 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 28 | 6 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.15 *(continuation)*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 29 | 6 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 30 | 8 | 7% | N/A | N/A | N/A | N/A | N/A | N/A |
| 31 | 9 | 8% | N/A | N/A | N/A | N/A | N/A | N/A |
| 32 | 2 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 33 | 3 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 34 | 3 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 35 | 0 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |
| 36 | 0 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.16 Distribution of Total Score and PT Scores, Grade Eleven Version Three

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 0 | 12 | 11% | 15 | 14% | 17 | 15% | 17 | 15% |
| 1 | 2 | 2% | 1 | 1% | 1 | 1% | 3 | 3% |
| 2 | 1 | 1% | 3 | 3% | 1 | 1% | 0 | 0% |
| 3 | 1 | 1% | 3 | 3% | 2 | 2% | 3 | 3% |
| 4 | 1 | 1% | 8 | 7% | 4 | 4% | 10 | 9% |
| 5 | 0 | 0% | 4 | 4% | 13 | 12% | 5 | 5% |
| 6 | 1 | 1% | 8 | 7% | 11 | 10% | 4 | 4% |
| 7 | 1 | 1% | 9 | 8% | 14 | 13% | 11 | 10% |
| 8 | 0 | 0% | 13 | 12% | 13 | 12% | 14 | 13% |
| 9 | 1 | 1% | 16 | 14% | 12 | 11% | 15 | 14% |
| 10 | 0 | 0% | 15 | 14% | 13 | 12% | 20 | 18% |
| 11 | 3 | 3% | 8 | 7% | 9 | 8% | 7 | 6% |
| 12 | 4 | 4% | 8 | 7% | 1 | 1% | 2 | 2% |
| 13 | 3 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 14 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 15 | 0 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |
| 16 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 17 | 3 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 18 | 3 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 19 | 4 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 20 | 6 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 21 | 3 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 22 | 6 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 23 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 24 | 4 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 25 | 7 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 26 | 5 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 27 | 7 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 28 | 7 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.16 *(continuation)*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 29 | 7 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 30 | 4 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 31 | 5 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 32 | 4 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 33 | 2 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 34 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 35 | 0 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |
| 36 | 0 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.17 Distribution of Total Score and PT Scores, Grade Eleven Version Four

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 0 | 8 | 14% | 8 | 14% | 9 | 16% | 9 | 16% |
| 1 | 0 | 0% | 0 | 0% | 0 | 0% | 0 | 0% |
| 2 | 0 | 0% | 1 | 2% | 2 | 4% | 1 | 2% |
| 3 | 0 | 0% | 1 | 2% | 0 | 0% | 1 | 2% |
| 4 | 0 | 0% | 1 | 2% | 3 | 5% | 4 | 7% |
| 5 | 0 | 0% | 5 | 9% | 2 | 4% | 4 | 7% |
| 6 | 0 | 0% | 5 | 9% | 8 | 14% | 4 | 7% |
| 7 | 0 | 0% | 4 | 7% | 8 | 14% | 5 | 9% |
| 8 | 1 | 2% | 6 | 11% | 10 | 18% | 9 | 16% |
| 9 | 1 | 2% | 11 | 19% | 5 | 9% | 7 | 12% |
| 10 | 0 | 0% | 2 | 4% | 6 | 11% | 5 | 9% |
| 11 | 1 | 2% | 5 | 9% | 4 | 7% | 4 | 7% |
| 12 | 0 | 0% | 8 | 14% | 0 | 0% | 4 | 7% |
| 13 | 1 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 14 | 2 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 15 | 0 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |
| 16 | 3 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 17 | 2 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 18 | 0 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |
| 19 | 2 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 20 | 2 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 21 | 4 | 7% | N/A | N/A | N/A | N/A | N/A | N/A |
| 22 | 4 | 7% | N/A | N/A | N/A | N/A | N/A | N/A |
| 23 | 0 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |
| 24 | 3 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 25 | 4 | 7% | N/A | N/A | N/A | N/A | N/A | N/A |
| 26 | 2 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 27 | 0 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |
| 28 | 4 | 7% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.17 *(continuation)*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 29 | 3 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 30 | 1 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 31 | 4 | 7% | N/A | N/A | N/A | N/A | N/A | N/A |
| 32 | 1 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 33 | 1 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 34 | 2 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 35 | 1 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 36 | 0 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.18 Distribution of Total Score and PT Scores, Grade Twelve Version One

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 0 | 14 | 11% | 16 | 13% | 17 | 13% | 16 | 13% |
| 1 | 2 | 2% | 2 | 2% | 3 | 2% | 3 | 2% |
| 2 | 2 | 2% | 0 | 0% | 2 | 2% | 2 | 2% |
| 3 | 0 | 0% | 3 | 2% | 4 | 3% | 12 | 9% |
| 4 | 0 | 0% | 5 | 4% | 2 | 2% | 5 | 4% |
| 5 | 0 | 0% | 8 | 6% | 9 | 7% | 8 | 6% |
| 6 | 0 | 0% | 12 | 9% | 10 | 8% | 13 | 10% |
| 7 | 0 | 0% | 25 | 20% | 10 | 8% | 15 | 12% |
| 8 | 0 | 0% | 13 | 10% | 14 | 11% | 15 | 12% |
| 9 | 0 | 0% | 22 | 17% | 11 | 9% | 12 | 9% |
| 10 | 2 | 2% | 11 | 9% | 21 | 16% | 11 | 9% |
| 11 | 4 | 3% | 6 | 5% | 8 | 6% | 9 | 7% |
| 12 | 0 | 0% | 5 | 4% | 17 | 13% | 7 | 5% |
| 13 | 3 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 14 | 3 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 15 | 5 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 16 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 17 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 18 | 5 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 19 | 3 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 20 | 16 | 13% | N/A | N/A | N/A | N/A | N/A | N/A |
| 21 | 4 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 22 | 2 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 23 | 7 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 24 | 3 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 25 | 6 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 26 | 7 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 27 | 5 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 28 | 5 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.18 *(continuation)*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 29 | 8 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 30 | 4 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 31 | 2 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 32 | 3 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 33 | 3 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 34 | 6 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 35 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 36 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.19 Distribution of Total Score and PT Scores, Grade Twelve Version Two

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 0 | 4 | 3% | 6 | 5% | 6 | 5% | 5 | 4% |
| 1 | 0 | 0% | 1 | 1% | 3 | 2% | 1 | 1% |
| 2 | 2 | 2% | 0 | 0% | 2 | 2% | 2 | 2% |
| 3 | 0 | 0% | 2 | 2% | 1 | 1% | 6 | 5% |
| 4 | 0 | 0% | 6 | 5% | 4 | 3% | 9 | 7% |
| 5 | 1 | 1% | 12 | 10% | 8 | 6% | 10 | 8% |
| 6 | 0 | 0% | 8 | 6% | 5 | 4% | 8 | 6% |
| 7 | 0 | 0% | 8 | 6% | 6 | 5% | 21 | 17% |
| 8 | 0 | 0% | 11 | 9% | 9 | 7% | 21 | 17% |
| 9 | 1 | 1% | 24 | 19% | 17 | 14% | 16 | 13% |
| 10 | 2 | 2% | 25 | 20% | 14 | 11% | 13 | 10% |
| 11 | 1 | 1% | 15 | 12% | 26 | 21% | 7 | 6% |
| 12 | 0 | 0% | 6 | 5% | 23 | 19% | 5 | 4% |
| 13 | 3 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 14 | 3 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 15 | 2 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 16 | 2 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 17 | 3 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 18 | 5 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 19 | 4 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 20 | 6 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 21 | 4 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 22 | 4 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 23 | 2 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 24 | 4 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 25 | 4 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 26 | 7 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 27 | 7 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 28 | 9 | 7% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.19 *(continuation)*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 29 | 13 | 10% | N/A | N/A | N/A | N/A | N/A | N/A |
| 30 | 5 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 31 | 10 | 8% | N/A | N/A | N/A | N/A | N/A | N/A |
| 32 | 8 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 33 | 3 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 34 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 35 | 2 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 36 | 2 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.20 Distribution of Total Score and PT Scores, Grade Twelve Version Three

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 0 | 3 | 3% | 4 | 4% | 7 | 7% | 6 | 6% |
| 1 | 2 | 2% | 3 | 3% | 0 | 0% | 2 | 2% |
| 2 | 1 | 1% | 2 | 2% | 2 | 2% | 2 | 2% |
| 3 | 1 | 1% | 5 | 5% | 4 | 4% | 1 | 1% |
| 4 | 0 | 0% | 4 | 4% | 4 | 4% | 5 | 5% |
| 5 | 2 | 2% | 6 | 6% | 7 | 7% | 10 | 9% |
| 6 | 0 | 0% | 12 | 11% | 20 | 19% | 9 | 8% |
| 7 | 0 | 0% | 10 | 9% | 16 | 15% | 10 | 9% |
| 8 | 0 | 0% | 16 | 15% | 9 | 8% | 18 | 17% |
| 9 | 1 | 1% | 14 | 13% | 11 | 10% | 11 | 10% |
| 10 | 0 | 0% | 10 | 9% | 15 | 14% | 17 | 16% |
| 11 | 0 | 0% | 16 | 15% | 9 | 8% | 12 | 11% |
| 12 | 2 | 2% | 5 | 5% | 3 | 3% | 4 | 4% |
| 13 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 14 | 4 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 15 | 0 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |
| 16 | 3 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 17 | 7 | 7% | N/A | N/A | N/A | N/A | N/A | N/A |
| 18 | 4 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 19 | 4 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 20 | 5 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 21 | 4 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 22 | 8 | 7% | N/A | N/A | N/A | N/A | N/A | N/A |
| 23 | 5 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 24 | 5 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 25 | 6 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 26 | 2 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 27 | 2 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 28 | 9 | 8% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.20 *(continuation)*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 29 | 4 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 30 | 5 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 31 | 6 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 32 | 4 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 33 | 5 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 34 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 35 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 36 | 0 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.21 Distribution of Total Score and PT Scores, Grade Twelve Version Four

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 0 | 7 | 6% | 7 | 6% | 8 | 7% | 9 | 8% |
| 1 | 1 | 1% | 4 | 4% | 2 | 2% | 1 | 1% |
| 2 | 1 | 1% | 0 | 0% | 0 | 0% | 0 | 0% |
| 3 | 1 | 1% | 2 | 2% | 5 | 4% | 1 | 1% |
| 4 | 0 | 0% | 0 | 0% | 4 | 4% | 5 | 4% |
| 5 | 0 | 0% | 5 | 4% | 5 | 4% | 5 | 4% |
| 6 | 0 | 0% | 4 | 4% | 13 | 11% | 10 | 9% |
| 7 | 0 | 0% | 10 | 9% | 15 | 13% | 17 | 15% |
| 8 | 1 | 1% | 11 | 10% | 20 | 18% | 12 | 11% |
| 9 | 0 | 0% | 17 | 15% | 18 | 16% | 15 | 13% |
| 10 | 0 | 0% | 16 | 14% | 21 | 18% | 19 | 17% |
| 11 | 0 | 0% | 12 | 11% | 3 | 3% | 13 | 11% |
| 12 | 1 | 1% | 26 | 23% | 0 | 0% | 7 | 6% |
| 13 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 14 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 15 | 2 | 2% | N/A | N/A | N/A | N/A | N/A | N/A |
| 16 | 4 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 17 | 1 | 1% | N/A | N/A | N/A | N/A | N/A | N/A |
| 18 | 3 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 19 | 3 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 20 | 3 | 3% | N/A | N/A | N/A | N/A | N/A | N/A |
| 21 | 4 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 22 | 4 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 23 | 7 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 24 | 4 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 25 | 10 | 9% | N/A | N/A | N/A | N/A | N/A | N/A |
| 26 | 7 | 6% | N/A | N/A | N/A | N/A | N/A | N/A |
| 27 | 6 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 28 | 4 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.21 *(continuation)*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Raw Score** | **Number of Students (Total Test Score)** | **Percentage of Students (Total Test Score)** | **Number of Students (PT 1, Life Sciences)** | **Percentage of Students (PT 1, Life Sciences)** | **Number of Students (PT 2, Physical Sciences)** | **Percentage of Students (PT 2, Physical Sciences)** | **Number of Students (PT 3, Earth and Space Sciences)** | **Percentage of Students (PT 3, Earth and Space Sciences)** |
| 29 | 6 | 5% | N/A | N/A | N/A | N/A | N/A | N/A |
| 30 | 9 | 8% | N/A | N/A | N/A | N/A | N/A | N/A |
| 31 | 9 | 8% | N/A | N/A | N/A | N/A | N/A | N/A |
| 32 | 4 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 33 | 5 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 34 | 5 | 4% | N/A | N/A | N/A | N/A | N/A | N/A |
| 35 | 0 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |
| 36 | 0 | 0% | N/A | N/A | N/A | N/A | N/A | N/A |

Table 6.A.22 Raw Score Summary for Each Embedded PT**—Grade Five**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Module** | **Number of Students** | **Number of Items** | **Maximum Number of Points** | **Mean Raw Score** | **Standard Deviation Raw Score** | **Minimum Raw Score** | **Maximum Raw Score** | **Mean Raw Score as a Percentage** |
| PT 1 Version 1 (Life Sciences) | 256 | 10 | 12 | 7.8 | 3.5 | 0 | 12 | 65.2 |
| PT 2 Version 1 (Physical Sciences) | 256 | 10 | 12 | 7.0 | 3.4 | 0 | 12 | 58.2 |
| PT 3 Version 1 (Earth and Space Sciences) | 256 | 10 | 12 | 6.3 | 3.1 | 0 | 12 | 52.7 |
| PT 1 Version 2 (Life Sciences) | 157 | 10 | 12 | 7.9 | 3.6 | 0 | 12 | 65.7 |
| PT 2 Version 2 (Physical Sciences) | 157 | 10 | 12 | 7.0 | 3.7 | 0 | 12 | 58.4 |
| PT 3 Version 2 (Earth and Space Sciences) | 157 | 10 | 12 | 6.3 | 3.3 | 0 | 12 | 52.3 |
| PT 1 Version 3 (Life Sciences) | 198 | 10 | 12 | 7.3 | 3.3 | 0 | 12 | 60.8 |
| PT 2 Version 3 (Physical Sciences) | 198 | 10 | 12 | 6.5 | 3.1 | 0 | 12 | 54.3 |
| PT 3 Version 3 (Earth and Space Sciences) | 198 | 10 | 12 | 7.0 | 3.1 | 0 | 12 | 58.2 |
| PT 1 Version 4 (Life Sciences) | 205 | 10 | 12 | 7.4 | 3.5 | 0 | 12 | 61.7 |
| PT 2 Version 4 (Physical Sciences) | 205 | 10 | 12 | 6.7 | 3.3 | 0 | 12 | 55.9 |
| PT 3 Version 4 (Earth and Space Sciences) | 205 | 10 | 12 | 7.3 | 3.4 | 0 | 12 | 61.2 |

Table 6.A.23 Raw Score Summary for Each Embedded PT**—Grade Eight**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Module** | **Number of Students** | **Number of Items** | **Maximum Number of Points** | **Mean Raw Score** | **Standard Deviation Raw Score** | **Minimum Raw Score** | **Maximum Raw Score** | **Mean Raw Score as a Percentage** |
| PT 1 Version 1 (Life Sciences) | 266 | 10 | 12 | 6.5 | 3.3 | 0 | 12 | 54.1 |
| PT 2 Version 1 (Physical Sciences) | 266 | 10 | 12 | 7.4 | 3.6 | 0 | 12 | 61.5 |
| PT 3 Version 1 (Earth and Space Sciences) | 266 | 10 | 12 | 6.6 | 3.7 | 0 | 12 | 55.0 |
| PT 1 Version 2 (Life Sciences) | 141 | 10 | 12 | 6.7 | 3.0 | 0 | 12 | 55.4 |
| PT 2 Version 2 (Physical Sciences) | 141 | 10 | 12 | 7.8 | 3.8 | 0 | 12 | 65.0 |
| PT 3 Version 2 (Earth and Space Sciences) | 141 | 10 | 12 | 7.2 | 3.5 | 0 | 12 | 60.3 |
| PT 1 Version 3 (Life Sciences) | 199 | 10 | 12 | 6.9 | 3.5 | 0 | 12 | 57.6 |
| PT 2 Version 3 (Physical Sciences) | 199 | 10 | 12 | 7.3 | 3.9 | 0 | 12 | 61.2 |
| PT 3 Version 3 (Earth and Space Sciences) | 199 | 10 | 12 | 7.0 | 3.8 | 0 | 12 | 58.2 |
| PT 1 Version 4 (Life Sciences) | 136 | 10 | 12 | 7.1 | 3.0 | 0 | 12 | 58.8 |
| PT 2 Version 4 (Physical Sciences) | 136 | 10 | 12 | 6.9 | 3.2 | 0 | 12 | 57.3 |
| PT 3 Version 4 (Earth and Space Sciences) | 136 | 10 | 12 | 7.3 | 3.6 | 0 | 12 | 60.6 |

Table 6.A.24 Raw Score Summary for Each Embedded PT**—High School**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Module** | **Number of Students** | **Number of Items** | **Maximum Number of Points** | **Mean Raw Score** | **Standard Deviation Raw Score** | **Minimum Raw Score** | **Maximum Raw Score** | **Mean Raw Score as a Percentage** |
| PT 1 Version 1 (Life Sciences) | 296 | 10 | 12 | 6.0 | 3.4 | 0 | 12 | 50.1 |
| PT 2 Version 1 (Physical Sciences) | 296 | 10 | 12 | 6.4 | 4.0 | 0 | 12 | 53.7 |
| PT 3 Version 1 (Earth and Space Sciences) | 296 | 10 | 12 | 5.5 | 3.5 | 0 | 12 | 46.1 |
| PT 1 Version 2 (Life Sciences) | 238 | 10 | 12 | 7.4 | 3.3 | 0 | 12 | 62.0 |
| PT 2 Version 2 (Physical Sciences) | 238 | 10 | 12 | 8.0 | 3.8 | 0 | 12 | 66.7 |
| PT 3 Version 2 (Earth and Space Sciences) | 238 | 10 | 12 | 6.7 | 3.1 | 0 | 12 | 55.6 |
| PT 1 Version 3 (Life Sciences) | 219 | 10 | 12 | 7.2 | 3.4 | 0 | 12 | 59.7 |
| PT 2 Version 3 (Physical Sciences) | 219 | 10 | 12 | 6.7 | 3.3 | 0 | 12 | 55.6 |
| PT 3 Version 3 (Earth and Space Sciences) | 219 | 10 | 12 | 7.0 | 3.4 | 0 | 12 | 58.0 |
| PT 1 Version 4 (Life Sciences) | 174 | 10 | 12 | 8.0 | 3.6 | 0 | 12 | 67.0 |
| PT 2 Version 4 (Physical Sciences) | 174 | 10 | 12 | 6.8 | 3.1 | 0 | 11 | 56.3 |
| PT 3 Version 4 (Earth and Space Sciences) | 174 | 10 | 12 | 7.3 | 3.4 | 0 | 12 | 60.8 |

### Appendix 6.B: Demographic Summaries of Preliminary Categories

Table 6.B.1 Demographic Summary for Grade Five

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Student Group** | **Number Tested** | **Mean Raw Score** | **Standard Deviation of Raw Scores** | **Percent in Preliminary Category 1** | **Percent in Preliminary Category 2** | **Percent in Preliminary Category 3** |
| All students with valid scores | 816 | 21 | 9 | 15% | 79% | 6% |
| Male | 560 | 21 | 9 | 14% | 79% | 7% |
| Female | 256 | 20 | 9 | 16% | 80% | 4% |
| Nonbinary | 0 | N/A | N/A | N/A | N/A | N/A |
| American Indian or Alaska Native | 8 | N/A | N/A | N/A | N/A | N/A |
| Asian | 56 | 20 | 9 | 20% | 79% | 2% |
| Native Hawaiian or Other Pacific Islander | 1 | N/A | N/A | N/A | N/A | N/A |
| Filipino | 15 | 16 | 10 | 27% | 73% | N/A |
| Hispanic or Latino | 447 | 22 | 9 | 12% | 82% | 6% |
| Black or African American | 46 | 21 | 10 | 13% | 76% | 11% |
| White | 197 | 20 | 10 | 18% | 76% | 6% |
| Two or more races | 46 | 20 | 10 | 20% | 74% | 7% |
| English only | 542 | 21 | 10 | 16% | 79% | 5% |
| IFEP | 7 | N/A | N/A | N/A | N/A | N/A |
| EL | 172 | 22 | 9 | 12% | 79% | 9% |
| RFEP | 94 | 22 | 8 | 11% | 87% | 2% |
| ADEL | 0 | N/A | N/A | N/A | N/A | N/A |
| To be determined | 1 | N/A | N/A | N/A | N/A | N/A |
| English proficiency unknown | 0 | N/A | N/A | N/A | N/A | N/A |
| Intellectual disability | 289 | 21 | 8 | 11% | 84% | 5% |
| Hearing impairment | 5 | N/A | N/A | N/A | N/A | N/A |
| Speech or language impairment | 9 | N/A | N/A | N/A | N/A | N/A |
| Visual impairment | 3 | N/A | N/A | N/A | N/A | N/A |
| Emotional disturbance | 4 | N/A | N/A | N/A | N/A | N/A |
| Orthopedic impairment | 24 | 18 | 13 | 33% | 63% | 4% |
| Other health impairment | 47 | 27 | 6 | 2% | 87% | 11% |
| Specific learning disability | 43 | 29 | 4 | 81% | 19% | N/A |
| Deaf-blindness | 1 | N/A | N/A | N/A | N/A | N/A |
| Multiple disabilities | 42 | 13 | 11 | 45% | 55% | N/A |

Table 6.B.1 *(continuation)*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Student Group** | **Number Tested** | **Mean Raw Score** | **Standard Deviation of Raw Scores** | **Percent in Preliminary Category 1** | **Percent in Preliminary Category 2** | **Percent in Preliminary Category 3** |
| Autism | 344 | 20 | 9 | 17% | 79% | 4% |
| Traumatic brain injury | 5 | N/A | N/A | N/A | N/A | N/A |
| Not economically disadvantaged | 302 | 20 | 10 | 18% | 77% | 5% |
| Economically disadvantaged | 514 | 22 | 9 | 13% | 81% | 6% |
| Migrant education | 5 | N/A | N/A | N/A | N/A | N/A |
| Not migrant education | 811 | 21 | 9 | 15% | 80% | 5% |
| American Indian or Alaska Native—Not economically disadvantaged | 2 | N/A | N/A | N/A | N/A | N/A |
| American Indian or Alaska Native—Economically disadvantaged | 6 | N/A | N/A | N/A | N/A | N/A |
| Asian—Not economically disadvantaged | 35 | 19 | 10 | 23% | 74% | 3% |
| Asian—Economically disadvantaged | 21 | 22 | 7 | 14% | 86% | N/A |
| Native Hawaiian or Other Pacific Islander—Not economically disadvantaged | 0 | N/A | N/A | N/A | N/A | N/A |
| Native Hawaiian or Other Pacific Islander—Economically disadvantaged | 1 | N/A | N/A | N/A | N/A | N/A |
| Filipino—Not economically disadvantaged | 9 | N/A | N/A | N/A | N/A | N/A |
| Filipino—Economically disadvantaged | 6 | N/A | N/A | N/A | N/A | N/A |
| Hispanic or Latino—Not economically disadvantaged | 115 | 21 | 9 | 15% | 80% | 5% |
| Hispanic or Latino—Economically disadvantaged | 332 | 22 | 9 | 11% | 82% | 6% |
| Black or African American—Not economically disadvantaged | 12 | 21 | 12 | 17% | 67% | 17% |
| Black or African American—Economically disadvantaged | 34 | 21 | 10 | 12% | 79% | 9% |
| White—Not economically disadvantaged | 103 | 19 | 10 | 19% | 77% | 4% |
| White—Economically disadvantaged | 94 | 22 | 10 | 17% | 76% | 7% |
| Two or more races—Not economically disadvantaged | 26 | 19 | 9 | 19% | 77% | 4% |
| Two or more races—Economically disadvantaged | 20 | 22 | 10 | 20% | 70% | 10% |

Table 6.B.2 Demographic Summary for Grade Eight

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Student Group** | **Number Tested** | **Mean Raw Score** | **Standard Deviation of Raw Scores** | **Percent in Preliminary Category 1** | **Percent in Preliminary Category 2** | **Percent in Preliminary Category 3** |
| All students with valid scores | 742 | 21 | 10 | 15% | 73% | 12% |
| Male | 517 | 21 | 10 | 15% | 73% | 12% |
| Female | 225 | 21 | 10 | 16% | 73% | 11% |
| Nonbinary | 0 | N/A | N/A | N/A | N/A | N/A |
| American Indian or Alaska Native | 7 | N/A | N/A | N/A | N/A | N/A |
| Asian | 55 | 17 | 9 | 20% | 80% | N/A |
| Native Hawaiian or Other Pacific Islander | 1 | N/A | N/A | N/A | N/A | N/A |
| Filipino | 17 | 20 | 9 | 12% | 82% | 6% |
| Hispanic or Latino | 411 | 21 | 10 | 16% | 72% | 12% |
| Black or African American | 38 | 21 | 10 | 13% | 76% | 11% |
| White | 187 | 22 | 10 | 12% | 73% | 14% |
| Two or more races | 26 | 23 | 10 | 15% | 69% | 15% |
| English only | 477 | 21 | 10 | 16% | 72% | 12% |
| IFEP | 5 | N/A | N/A | N/A | N/A | N/A |
| EL | 136 | 21 | 10 | 15% | 74% | 10% |
| RFEP | 124 | 22 | 9 | 11% | 77% | 11% |
| ADEL | 0 | N/A | N/A | N/A | N/A | N/A |
| To be determined | 0 | N/A | N/A | N/A | N/A | N/A |
| English proficiency unknown | 0 | N/A | N/A | N/A | N/A | N/A |
| Intellectual disability | 313 | 21 | 10 | 15% | 76% | 9% |
| Hearing impairment | 5 | N/A | N/A | N/A | N/A | N/A |
| Speech or language impairment | 7 | N/A | N/A | N/A | N/A | N/A |
| Visual impairment | 0 | N/A | N/A | N/A | N/A | N/A |
| Emotional disturbance | 9 | N/A | N/A | N/A | N/A | N/A |
| Orthopedic impairment | 16 | 19 | 10 | 19% | 75% | 6% |
| Other health impairment | 37 | 25 | 10 | 11% | 70% | 19% |
| Specific learning disability | 44 | 31 | 4 | 55% | 45% | N/A |
| Deaf-blindness | 0 | N/A | N/A | N/A | N/A | N/A |
| Multiple disabilities | 43 | 12 | 11 | 42% | 53% | 5% |
| Autism | 264 | 20 | 9 | 15% | 76% | 9% |
| Traumatic brain injury | 4 | N/A | N/A | N/A | N/A | N/A |

Table 6.B.2 *(continuation)*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Student Group** | **Number Tested** | **Mean Raw Score** | **Standard Deviation of Raw Scores** | **Percent in Preliminary Category 1** | **Percent in Preliminary Category 2** | **Percent in Preliminary Category 3** |
| Not economically disadvantaged | 284 | 20 | 10 | 17% | 75% | 8% |
| Economically disadvantaged | 458 | 22 | 10 | 14% | 72% | 14% |
| Migrant education | 3 | N/A | N/A | N/A | N/A | N/A |
| Not migrant education | 739 | 21 | 10 | 15% | 73% | 12% |
| American Indian or Alaska Native—Not economically disadvantaged | 2 | N/A | N/A | N/A | N/A | N/A |
| American Indian or Alaska Native—Economically disadvantaged | 5 | N/A | N/A | N/A | N/A | N/A |
| Asian—Not economically disadvantaged | 35 | 18 | 9 | 20% | 80% | N/A |
| Asian—Economically disadvantaged | 20 | 17 | 8 | 20% | 80% | N/A |
| Native Hawaiian or Other Pacific Islander—Not economically disadvantaged | 0 | N/A | N/A | N/A | N/A | N/A |
| Native Hawaiian or Other Pacific Islander—Economically disadvantaged | 1 | N/A | N/A | N/A | N/A | N/A |
| Filipino—Not economically disadvantaged | 11 | 19 | 9 | 9% | 82% | 9% |
| Filipino—Economically disadvantaged | 6 | N/A | N/A | N/A | N/A | N/A |
| Hispanic or Latino—Not economically disadvantaged | 101 | 20 | 11 | 19% | 70% | 11% |
| Hispanic or Latino—Economically disadvantaged | 310 | 21 | 10 | 15% | 72% | 13% |
| Black or African American—Not economically disadvantaged | 15 | 18 | 11 | 20% | 73% | 7% |
| Black or African American—Economically disadvantaged | 23 | 23 | 8 | 9% | 78% | 13% |
| White—Not economically disadvantaged | 110 | 21 | 9 | 14% | 76% | 10% |
| White—Economically disadvantaged | 77 | 23 | 10 | 10% | 69% | 21% |
| Two or more races—Not economically disadvantaged | 10 | N/A | N/A | N/A | N/A | N/A |
| Two or more races—Economically disadvantaged | 16 | 27 | 9 | 6% | 69% | 25% |

Table 6.B.3 Demographic Summary for High School

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Student Group** | **Number Tested** | **Mean Raw Score** | **Standard Deviation of Raw Scores** | **Percent in Preliminary Category 1** | **Percent in Preliminary Category 2** | **Percent in Preliminary Category 3** |
| All students with valid scores | 927 | 20 | 10 | 17% | 77% | 6% |
| Male | 630 | 20 | 10 | 19% | 75% | 7% |
| Female | 297 | 21 | 9 | 15% | 82% | 3% |
| Nonbinary | 0 | N/A | N/A | N/A | N/A | N/A |
| American Indian or Alaska Native | 14 | 22 | 8 | 7% | 93% | N/A |
| Asian | 53 | 18 | 11 | 30% | 64% | 6% |
| Native Hawaiian or Other Pacific Islander | 4 | N/A | N/A | N/A | N/A | N/A |
| Filipino | 19 | 21 | 10 | 16% | 79% | 5% |
| Hispanic or Latino | 499 | 21 | 10 | 16% | 77% | 7% |
| Black or African American | 44 | 19 | 11 | 23% | 70% | 7% |
| White | 258 | 21 | 10 | 17% | 79% | 5% |
| Two or more races | 36 | 19 | 10 | 22% | 78% | N/A |
| English only | 586 | 20 | 10 | 19% | 76% | 5% |
| IFEP | 12 | 15 | 9 | 25% | 75% | N/A |
| EL | 151 | 19 | 11 | 23% | 74% | 3% |
| RFEP | 178 | 23 | 8 | 8% | 83% | 10% |
| ADEL | 0 | N/A | N/A | N/A | N/A | N/A |
| To be determined | 0 | N/A | N/A | N/A | N/A | N/A |
| English proficiency unknown | 0 | N/A | N/A | N/A | N/A | N/A |
| Intellectual disability | 405 | 21 | 9 | 14% | 83% | 3% |
| Hearing impairment | 8 | N/A | N/A | N/A | N/A | N/A |
| Speech or language impairment | 4 | N/A | N/A | N/A | N/A | N/A |
| Visual impairment | 3 | N/A | N/A | N/A | N/A | N/A |
| Emotional disturbance | 9 | N/A | N/A | N/A | N/A | N/A |
| Orthopedic impairment | 26 | 13 | 12 | 38% | 62% | N/A |
| Other health impairment | 32 | 25 | 6 | 3% | 84% | 13% |
| Specific learning disability | 77 | 28 | 5 | 1% | 84% | 14% |
| Deaf-blindness | 0 | N/A | N/A | N/A | N/A | N/A |
| Multiple disabilities | 61 | 11 | 11 | 52% | 43% | 5% |
| Autism | 297 | 20 | 10 | 19% | 74% | 7% |
| Traumatic brain injury | 5 | N/A | N/A | N/A | N/A | N/A |

Table 6.B.3 *(continuation)*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Student Group** | **Number Tested** | **Mean Raw Score** | **Standard Deviation of Raw Scores** | **Percent in Preliminary Category 1** | **Percent in Preliminary Category 2** | **Percent in Preliminary Category 3** |
| Not economically disadvantaged | 352 | 19 | 11 | 23% | 72% | 5% |
| Economically disadvantaged | 575 | 21 | 9 | 14% | 80% | 6% |
| Migrant education | 6 | N/A | N/A | N/A | N/A | N/A |
| Not migrant education | 921 | 20 | 10 | 17% | 77% | 6% |
| American Indian or Alaska Native—Not economically disadvantaged | 4 | N/A | N/A | N/A | N/A | N/A |
| American Indian or Alaska Native—Economically disadvantaged | 10 | N/A | N/A | N/A | N/A | N/A |
| Asian—Not economically disadvantaged | 27 | 17 | 11 | 33% | 59% | 7% |
| Asian—Economically disadvantaged | 26 | 19 | 10 | 27% | 69% | 4% |
| Native Hawaiian or Other Pacific Islander—Not economically disadvantaged | 1 | N/A | N/A | N/A | N/A | N/A |
| Native Hawaiian or Other Pacific Islander—Economically disadvantaged | 3 | N/A | N/A | N/A | N/A | N/A |
| Filipino—Not economically disadvantaged | 12 | 18 | 12 | 25% | 67% | 8% |
| Filipino—Economically disadvantaged | 7 | N/A | N/A | N/A | N/A | N/A |
| Hispanic or Latino—Not economically disadvantaged | 129 | 18 | 11 | 25% | 71% | 5% |
| Hispanic or Latino—Economically disadvantaged | 370 | 22 | 9 | 13% | 80% | 8% |
| Black or African American—Not economically disadvantaged | 18 | 16 | 13 | 33% | 56% | 11% |
| Black or African American—Economically disadvantaged | 26 | 20 | 9 | 15% | 81% | 4% |
| White—Not economically disadvantaged | 143 | 20 | 10 | 20% | 77% | 3% |
| White—Economically disadvantaged | 115 | 22 | 10 | 13% | 81% | 6% |
| Two or more races—Not economically disadvantaged | 18 | 20 | 10 | 22% | 78% | N/A |
| Two or more races—Economically disadvantaged | 18 | 18 | 10 | 22% | 78% | N/A |

## Psychometric Analyses

Because of the impact of the novel coronavirus disease 2019 (COVID-19) pandemic—the number of students who tested during the 2020–2021 administration was insufficient to form a sample representative of the CAA for Science’s target population—no classical item analyses or item response theory (IRT) analyses were conducted, because performing psychometric analyses based on a small sample may potentially bias the results of such analyses.

This chapter summarizes the process of the analyses that ETS will typically conduct for the psychometric analyses. Text will be included to indicate which analyses were not run for this administration because of the small sample sizes.

### Overview

This section describes the data samples typically used for the statistical analyses and provides explanations for all statistical procedures implemented in the psychometric analyses. Those procedures typically include item analyses, differential item functioning (DIF) analyses, IRT calibration, computation of reliability, and standard errors of measurement. The procedures are designed to ensure the validity of score uses.

#### Summary of the Analyses

ETS typically conducts the following analyses for the California Alternate Assessment (CAA) for Science. However, these analyses were not conducted in 2020–2021 because of the impact of the COVID‑19 pandemic. Each analysis is described in the body of this chapter.

1. **Classical Item Analyses—**Classical item analysis for the CAA for Science is discussed in section [*7.2 Classical Item Analyses*](#_Classical_Item_Analyses).
2. **Omission and Completion Analyses—**The omit rate and item difficulty information for the CAA for Science are described in subsection [*7.2.4 Omission Rates*](#_Omission_Rates).
3. **DIF Analyses—**DIF analysis for the CAA for Science is described in section [*7.3 Differential Item Functioning Analyses*](#_Differential_Item_Functioning).
4. **IRT Analyses—**IRT calibration analyses for the CAA for Science are described in section [*7.4 Item Response Theory Analyses*](#_Item_Response_Theory).
5. **Testing Time Analyses—**Testing time analyses for the CAA for Science are described in section [*7.5 Testing Time Analyses*](#_Testing_Time_Analyses).
6. **Reliability Analyses—**Reliability estimation for the CAA for Science is illustrated in section [*7.6 Reliability Analyses*](#_Reliability_Analyses).
7. **Validity Evidence—**Validity evidence related to the CAA for Science is discussed in section [*7.7 Validity Evidence*](#_Validity_Evidence).

#### Sample Used for the Analyses

In general, analyses included in a CAA for Science technical report are based on all students in the tested population with valid scores available at the time of the analysis. The actual data sample used depends on both the time the data became available as well as the information (e.g., student demographic information, scores for each embedded performance task [PT], etc.) contained in that data at the time of the analyses.

For a typical administration of the CAA for Science, a small number of student scores are excluded from the final production data as a result of the data validation process. Students who do not answer at least one item for each of the three operational embedded PTs are excluded from the analysis sample for the classical item analysis, DIF analyses, and IRT calibrations.

Table 5.1 provides the number of students assigned to take the CAA for Science and the number of students who started the tests and completed all four embedded PTs. Except for grade ten, less than 20 percent of the registered students started the CAA for Science and even fewer students completed the assessment.

### Classical Item Analyses

No classical item analyses were conducted for the 2020–2021 CAA for Science administration because of an insufficient number of students tested during the administration. This section describes the classical item analysis procedures typically conducted for a standard test administration.

After a typical administration, classical item analyses are used to evaluate the performance of all test items with respect to item difficulty, item discrimination, and student performance on the embedded PT items.

The classical item analyses include the computation of item difficulty indices and item-total correlations. The omit rate of each item and the distribution of scores on each polytomous item are also included in the classical item analyses. There are item flagging rules based on these statistics to identify items not performing as expected.

#### Classical Item Difficulty Indices (*p*-value and Average Item Score)

For dichotomous items, item difficulty is indicated by the *p*-value, which is the proportion of students who answer an item correctly. The range of possible *p*-values is from 0.00 to 1.00. Items with higher *p*-values are easier items; those with lower *p*-values are more difficult items. Dichotomous items are flagged for review if their *p*-values are above 0.95 (i.e., too easy). Items with two response choices are flagged if their *p*-values are below 0.50, three-choice items are flagged if their *p*-values are below 0.30, and four-choice items are flagged if their *p*-values are below 0.20 (i.e., too difficult).

The formula for *p*-value for a dichotomous item is presented in equation 7.1. *Refer to the* [*Alternative Text for Equation 7.1*](#_Alternative_Text_for) *for a description of this equation.*

 (7.1)

where,

*Xij* is the score (1 or 0) received for a given dichotomous item *i* for student *j*, and

*Ni* is the total number of students who were presented with item *i*.

For polytomous items, difficulty is indicated by the average item score (AIS). The AIS can range from 0.00 to the maximum total possible points for an item. Desired AIS values for polytomous items generally fall within the range of 30 percent to 80 percent of the maximum obtainable item score; items with values outside this range are flagged for review. To facilitate interpretation, the AIS values for polytomous items are often expressed as a proportion of the maximum possible score, which is analogous to the *p-*values of dichotomous items.

For polytomous items, the *p-value* is defined as presented in equation 7.2. *Refer to the* [*Alternative Text for Equation 7.2*](#_Alternative_Text_for_1) *for a description of this equation.*

, (7.2)

where,

*Xij* is the score received for a given polytomous item *i* for student *j*,

*Ni* is the total number of students who were presented with item *i*, and

*Max (Xi)* is the maximum score on item *i*.

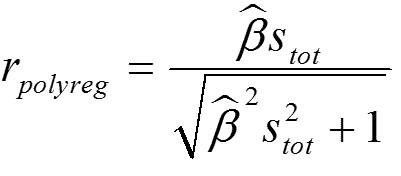
#### Item Discrimination (Item-Total Correlation)

An item-total correlation describes the relationship between students’ performance on a specific item and their performance on the total test.

In general, the possible range of the item-total correlation is from -1.0 (for a perfect negative relationship) to 1.0 (for a perfect positive relationship). A relatively high positive item-total correlation is desired, as it indicates that students with higher scores on the assessment tended to perform better on the item than students with lower test scores. A negative item‑total correlation, which indicates that students with low scores on the assessment are more likely to get higher scores on the item than students with high scores on the assessment, typically signifies a problem with the item.

Because the product-moment correlation is limited by the distributions of the variables being correlated, the item discrimination index used in these analyses is a variation of the biserial correlation for dichotomous items or the polyserial correlation for polytomous items. This statistic is an estimate of the correlation between the criterion and an unobservable continuous variable assumed to determine performance on the item. The criterion is, in this case, the student’s total raw score from the three operational embedded PTs.

The estimation formula is presented in equation 7.3. *Refer to the* [*Alternative Text for Equation 7.3*](#_Alternative_Text_for_2) *for a description of this equation.*

 (7.3)

where,

 is the estimated slope of the linear regression of the unobservable continuous variable (assumed to account for the item response) on the criterion, and

*Stot* is the standard deviation (SD) of the criterion (the students’ total raw score).

For a polytomous item, there is a regression for each boundary between item scores, with all regressions for the same item sharing a common slope, *β*. For a polytomous item with *k* possible score values, there are *k*-1 regressions. Beta (*β*) is the common slope for all *k*-1 regressions.

Desired values for this correlation are positive and larger than 0.20. Negative item-total correlations indicate that low-ability students tend to obtain higher scores on the item than high-ability students, an indication that the scoring key may be incorrect, or the item did not function as intended for the students taking the CAA for Science. Therefore, items with item-total correlations below 0.20 are flagged for review.

#### Distribution of Item Scores

For polytomous items, examination of the distribution of scores helps to show how well the items performed. If no students receive the highest possible score, the item may not be functioning as expected. The item may be confusing, poorly worded, or just unexpectedly difficult; the scoring rubric may be flawed; or students may not have had the opportunity to learn the content tested by the item. If all or most students score at the extreme ends of the distribution—that is, students receive either full credit or zero credit, but no partial credit—there may be problems with the item or the rubric.

Items with a low percentage (i.e., less than 3 percent) of students obtaining any possible item score are flagged for further review. Such items may pose problems during the IRT calibrations. They need to be carefully reviewed and may need to be excluded from the item calibration analyses.

#### Omission Rates

##### Omit Rate

For both dichotomous and polytomous items, examining the omit rate is useful for identifying potential problems with test features such as testing time and item or test layout. An item is considered “omitted” when the item has been presented to the student but has not been answered (i.e., left blank) in the middle of an administered assessment wherein the student has been presented with, and responded to, successive items.

##### No-Response Rate

The *Mark as No Response* option is a specific case of an omitted item. The *Mark as No Response* option should be used when the item was presented to the student and the student did not provide a response despite the test examiner’s best efforts to elicit a response. Similar to the omit rate, the *Mark as No Response* information is useful for identifying potential problems with an item.

#### Distractor Analyses

##### The Proportion of Students Choosing Each Distractor

For the CAA for Science, distractor analyses are typically conducted on selected-response (SR) items. The statistics for each item include the proportion of students selecting each distractor (incorrect response), computed for the group of all students in the analysis sample, and also computed separately for the highest-performing 20 percent of students. Items are flagged for review if more high-performing students chose any distractor rather than the key. Such a result indicates that the item may have multiple correct answers or have the wrong key (i.e., the item was miskeyed).

##### Distractor-Total Correlation

For SR items, the distractor-total correlation describes the relationship between selecting a distractor for a specific item and performance on the total test. The polyserial correlation is typically calculated for the distractors, like the item-total correlation described previously, except that the regressions are implemented on the distractors rather than the keys. Items with positive distractor-total correlations are flagged for review, as these items may have multiple correct answers, be miskeyed, or have other content issues.

#### Summary of Classical Item Analysis Flagging Criteria

Items are flagged for review if the item analysis yields any of the seven following results:

1. The *p-*value is above 0.95 for dichotomous items or above 0.80 for polytomous items.
2. The *p-*value is below 0.50 for two-choice dichotomous items, 0.30 for three-choice dichotomous items, 0.20 for four-choice dichotomous items, or 0.30 for polytomous items.
3. Item-total correlation (polyserial) is below 0.20.
4. Among the highest-performing students (the top 20 percent), the number of students choosing any distractor is greater than the number of those choosing the key.
5. The omit rate is above 5 percent for dichotomous items or above 15 percent for polytomous items.
6. Any of the possible scores on a polytomous item is earned by less than 3 percent of the students.
7. Any distractor shows a positive correlation (either point-biserial, r-biserial, or polyserial) with the criterion score.

In a typical administration, ETS’ psychometric staff and content assessment development staff review each of the flagged items and summarize the classical item results for the California Department of Education (CDE), with recommendations for subsequent analyses of the items. The classical item statistics are entered into the item bank for use by the assessment development team for test assembly for future operational administrations.

### Differential Item Functioning Analyses

DIF analyses were not conducted for the 2020–2021 CAA for Science administration. This section details the DIF analyses typically conducted for each administration.

In a typical CAA for Science administration, DIF analyses are conducted on the CAA for Science items with sufficient sample sizes. The minimum sample size requirements for the DIF analyses are 400 in the combined focal and reference groups and 100 in the smaller of the two groups. These sample sizes are based on standard operating procedures for DIF analyses at ETS.

If an item performs differentially across identifiable student groups (e.g., gender or ethnicity) when students are matched on ability, then the item may be measuring something other than the intended construct. It is important, however, to recognize that item performance differences flagged for DIF might be related to actual differences in relevant knowledge or skills between student groups (i.e., impact) or statistical Type I error, which might falsely find DIF in an item. As a result, DIF analysis is used mainly as a statistical tool to identify *potential* item bias. Subsequent reviews by content experts and bias and sensitivity experts are required to determine the source and meaning of performance differences.

#### Differential Item Functioning Procedure for Dichotomous Items

The Mantel-Haenszel (MH) DIF statistic is calculated for dichotomous items (Mantel & Haenszel, 1959; Holland & Thayer, 1985). Using the total raw score as the criterion score, students at each raw score level in the focal group (e.g., Hispanic students) are compared with examinees at the same raw score level in the reference group (e.g., non-Hispanic White students). The common odds ratio is estimated across the total raw score using the formula in equation 7.4 (Dorans & Holland, 1993). The resulting estimate is interpreted as the relative likelihood of success on a particular item for members of two groups when matched on ability. *Refer to the* [*Alternative Text for Equation 7.4*](#_Alternative_Text_for_3) *for a description of this equation.*

Equation 7.4; a link to the long description for this equation is found in the preceding paragraph. (7.4)

where,

*m* indexes the score categories,

*Rrm* is the number of students in the reference group who answer the item correctly,

*Wrm* is the number of students in the reference group who answer the item incorrectly,

*Ntm* is the total number of students,

*Rfm* is the number of students in the focal group who answer the item correctly, and

*Wfm* is the number of students in the focal group who answer the item incorrectly.

To facilitate the interpretation of MH results, the common odds ratio is transformed to the delta scale using equation 7.5 (Holland & Thayer, 1988). *Refer to the* [*Alternative Text for Equation 7.5*](#_Alternative_Text_for_4) *for a description of this equation.*

 (7.5)

Positive values indicate DIF in favor of the focal group (i.e., positive DIF items are differentially easier for the focal group) whereas negative values indicate DIF in favor of the reference group (i.e., negative DIF items are differentially easier for the reference group).

#### Differential Item Functioning Procedure for Polytomous Items

The standardization DIF (Dorans & Schmitt, 1993; Zwick, Thayer, & Mazzeo, 1997; Dorans, 2013) is used in conjunction with the Mantel chi-square statistic (Mantel, 1963; Mantel & Haenszel, 1959) to identify polytomous items with DIF; the former measures the size of the DIF while the latter indicates the significance level of the DIF. The standardized mean difference (SMD) compares the item means of the two groups after adjusting for differences in the distribution of students across the values of the matching variable and is calculated using equation 7.6. *Refer to the* [*Alternative Text for Equation 7.6*](#_Alternative_Text_for_5) *for a description of this equation.*

 (7.6)

where,

*X* isthe criterion score,

*Y* isthe item score,

*M* is the number of score categories on *X*,

*Nfm* is the number of students in the focal group in score category *m*,

*Er* is the expected item score in the reference group, and

*Ef* is the expected item score in the focal group.

A positive SMDvalue means that after statistically matching on the criterion score, the focal group has a higher mean item score than the reference group. A negative SMD value means that after statistically matching on the criterion score, the focal group has a lower mean item score than the reference group.

#### Differential Item Functioning Categories and Definitions

Based on the DIF statistics and significance tests, items are classified into three categories, labeled A, B, and C. Category A items contain negligible DIF, Category B items exhibit slight to moderate DIF, and Category C items possess moderate to large DIF values.

The categorization rules for dichotomous items are presented in table 7.1; the categorization rules for polytomous items are presented in table 7.2.

Table 7.1 DIF Categories for Dichotomous Items

|  |  |
| --- | --- |
| **DIF Category** | **Criteria** |
| A (negligible) | * Absolute value of MH D-DIF is not significantly different from zero or is less than one. * Positive values are classified as “A+” and negative values as “A-.” |
| B (moderate) | * Absolute value of MH D-DIF is significantly different from zero but not from one and is at least one; *or* absolute value of MH D-DIF is significantly different from one but is less than 1.5. * Positive values are classified as “B+” and negative values as “B-.” |
| C (large) | * Absolute value of MH D-DIF is significantly different from one and is at least 1.5. * Positive values are classified as “C+” and negative values as “C-.” |

Table 7.2 DIF Categories for Polytomous Items

|  |  |
| --- | --- |
| **DIF Category** | **Criteria** |
| A (negligible) | * Mantel Chi-square *p-*value≥ 0.05 or |SMD/SD| ≤ 0.17 |
| B (moderate) | * Mantel Chi-square *p-*value< 0.05 and 0.17 < |SMD/SD| ≤ 0.25 |
| C (large) | * Mantel Chi-square *p-*value< 0.05 and |SMD/SD| > 0.25 |

After a typical test administration, DIF analyses are conducted on each item for designated comparison groups, if the number of students in the group is sufficient. Groups are defined on the basis of demographic variables, including gender, race or ethnicity, and primary disability, if the number of students in the group is sufficient. These comparison groups are specified in table 7.3. An asterisk (\*) indicates DIF analyses are not typically performed on these student groups because of insufficient sample sizes for the CAA for Science.

Table 7.3 Student Groups for DIF Comparison

|  |  |  |
| --- | --- | --- |
| **DIF Type** | **Reference Group** | **Focal Group** |
| **Gender** | Male | * Female |
| **Race or Ethnicity** | White | * American Indian or Alaska Native\* * Asian * Black or African American * Filipino * Hispanic or Latino * Native Hawaiian or Other Pacific Islander\* * Two or more races |
| **Disability** | Intellectual disability | * Autism * Deaf-blindness\* * Emotional disturbance\* * Hearing impairment\* * Multiple disabilities * Orthopedic impairment * Other health impairment * Specific learning disability * Speech or language impairment * Traumatic brain injury\* * Visual impairment\* |
| **High School Grade Level** | Grade eleven | * Grade ten * Grade twelve |
| **Intellectual Disability Group Versus Autism** | Intellectual Disability Group, which includes the following:   * Intellectual disability * Multiple disabilities * Traumatic brain injury | * Autism |

Table 7.3 *(continuation)*

|  |  |  |
| --- | --- | --- |
| **DIF Type** | **Reference Group** | **Focal Group** |
| **Intellectual Disability Group Versus Other Learning Disability** | Intellectual Disability Group, which includes the following:   * Intellectual disability * Multiple disabilities * Traumatic brain injury | Other Learning Disability Group, which includes the following:   * Emotional disturbance * Orthopedic impairment * Other health impairment * Specific learning disability * Speech or language impairment |

### Item Response Theory Analyses

IRT is built upon the item response function, which describes the probability of a given response as a function of a person’s true ability. IRT can be used to implement item calibrations, link item parameters, scale test scores across different forms or test administrations, evaluate item performance, build an item bank, and assemble test forms.

This section describes how IRT models are used in CAA tests for calibrating items. IRT data file preparation and IRT models are also covered in this section.

#### Models

The one-parameter logistic (1PL) IRT model (1PL-IRT) is used for the CAA for Science item calibration and was selected after consultation with the CDE. The generalized partial credit model (GPCM) (Muraki, 1992) restricted for 1PL-IRT, which is essentially the partial credit model (PCM) (Masters, 1982), is applied to both dichotomous and polytomous items.

The mathematical form of the GPCM is presented in equation 7.7. *Refer to the* [*Alternative Text for Equation 7.7*](#_Alternative_Text_for_6) *for a description of this equation.*

 (7.7)

where,

*Pih(θj)* is the probability of student with proficiency *θj* obtaining score *h* on item *i*,

*ni* is the maximum number of score points for item *i*,

*ai* is the discrimination parameter and is fixed to 0.588 for every item,

*bi* is the location (difficulty) parameter for item *i*,

*div* is the category difficulty parameter for item *i* on score *v*, and

*D* is a scaling constant of 1.7 that makes the logistic model approximate the normal ogive model.

When *ni* = 1, equation 7.7 becomes an expression of the 1PL model for dichotomous items. Essentially, the 1PL model (Hambleton, Swaminathan, & Rogers, 1991) and the PCM (Masters, 1982) were used for dichotomous items and polytomous items, respectively.

#### Calibration

After a CAA for Science administration, all the items within each grade-level assessment were calibrated concurrently, using all available data. Previous studies show that compared with separate calibration, concurrent calibration is more accurate when the data fits the IRT model (Kim & Cohen, 1998; Hanson & Béguin, 2002). After consultation with the CDE, a single-group concurrent calibration approach was used for item calibration of the CAA for Science. As stated in subsection [*7.4.1 Models*](#_Item_Response_Theory_1)*,* the 1PL model (Hambleton, Swaminathan, & Rogers, 1991) and the corresponding PCM were jointly used to concurrently calibrate dichotomously and polytomously scored items*.* The software flexMIRT® (Cai, 2017) version 3.51 was used for calibration.

##### Data Preparation

Prior to IRT calibration analyses, ETS psychometricians review the results of the classical item analyses to decide whether any items are of poor quality and need to be removed from calibration. The results are also reviewed by ETS content experts and the CDE. Decisions to remove items from calibration are made in consultation with the CDE.

For IRT calibration, scored item response data is used to create the IRT analysis input data files for each grade and content area, including responses to items for all versions of the CAA for Science grade-level assessments. The IRT analysis input data file is a sparse matrix because each student completed only one of the versions. Similar to the classical item analyses, “omit” items are treated as incorrect and “not-presented” items are treated as blank.

##### Description of the Calibration Procedure

FlexMIRT (Cai, 2017), a multilevel and multiple-group IRT software package for item analysis and test scoring, is used for CAA for Science item calibration analysis. This software can fit a variety of IRT models to both single-level and multilevel data that are dichotomous, polytomous, or both.

The evaluation of the calibration results includes the following steps:

1. Reviewing the item parameter estimates:
   1. At the test level, the summary statistics for the *b*-parameter estimates (location difficulty) and *d*-parameter estimates (step difficulty) were examined, including the mean, SD, median, minimum, maximum, and model-fit. The model-fit was evaluated using the root mean square error of approximation (RMSEA). RMSEA values less than 0.05 indicate good fit while RMSEA values greater than 0.10 indicate poor fit (Browne & Cudeck, 1993). The *b*-parameters were correlated with the *p*-values.
   2. At the item level, statistics of individual items were examined, including item difficulty estimates (*b*-parameters and *d*-parameters) and item-fit statistics using the marginal chi-square statistic. The *b*-parameters and the *d*-parameters should be in the range of -4.0 to +4.0 with a standard error of 0.10 or less.
2. Flagging items that did not perform as expected:
3. All flagged items were discussed thoroughly with the CDE to decide whether those items should be removed from calibration or whether the scoring categories need to be collapsed.

The calibration process is conducted independently by two ETS psychometricians to ensure quality and accuracy of results. The two psychometricians independently create flexMIRT control files and run the same input data files and then compare the calibration results. Any differences in the output are investigated. Refer to section [*8.4 Quality Control of Psychometric Processes*](#_Quality_Control_of)for more details of this procedure.

### Testing Time Analyses

The CAA for Science includes four embedded PTs: three operational embedded PTs and one field test embedded PT. The CAA for Science is an untimed assessment.

When analyzing the testing time, the students with no item response and students who did not answer at least one item from each of the three operational embedded PTs are removed from these analyses. The remaining testing population is partitioned into quartiles based on raw scores. These quartile groupings are not the same as achievement levels.

Descriptive statistics of the time required to complete the total test are typically computed for each of the four quartile groups for each assessment. Additionally, the medians (50th percentile) are used to interpret the results because medians are less impacted by the extreme values and therefore are more meaningful.

Testing time analyses were not conducted following the 2020–2021 administration because of small sample sizes.

### Reliability Analyses

Reliability analyses were not conducted for the 2020–2021 CAA for Science administration. This section describes the reliability analyses conducted typically for each administration.

Reliability is the extent to which differences in test scores reflect true differences in the knowledge, ability, or skill being tested rather than fluctuations due to measurement error. Thus, reliability is the consistency of scores across conditions that do not differ systematically and only contain random measurement errors. In statistical terms, the variance in the distributions of test scores—essentially, the differences among individuals—is due partly to real differences in the knowledge, skill, or ability being tested (true variance) and due partly to measurement error inherent in the measurement process (error variance). The reliability coefficient is an estimate of the proportion of the total variance that is true variance.

Reliability coefficients can possibly range from 0 to 1. The higher the reliability coefficient for a set of scores, the more likely that the students would obtain very similar scores upon repeated testing occasions (assuming there is no memory or practice effect) if the students did not change in their level of the knowledge or skills measured by the test.

There are several different ways of estimating reliability. Stratified Alpha is computed for the reliability estimates for each version of the CAA for Science for the student groups after a typical CAA administration. More details can be found in the next subsection, [*7.6.1 Internal Consistency Reliability*](#_Internal_Consistency_Reliability).

The standard error of measurement (SEM) is a measure of the extent to which students’ scores tend to differ from their true scores. A student’s true score can be thought of as the mean observed scores a student would earn over an infinite number of independent administrations of the test. The larger the SEM, the more the variability of a student’s observed scores across repeated testing. Observed scores with large SEMs pose a challenge to the valid interpretation of test scores.

#### Internal Consistency Reliability

In classical test theory, the reliability coefficient can be defined as the squared correlation between the observed score and the true score, which is equal to the correlation between parallel observed scores (Lord and Novick, 1968, p.61). In applied settings, the requirement of repeated administrations is impractical, and methodologies estimating reliability from relationships among student performances on items within a single test form are often used. Coefficient alpha (Cronbach, 1951) is among the most common of these methodologies.

The formula for the internal consistency reliability as measured by Cronbach’s Alpha (Cronbach, 1951) is shown in equation 7.8. *Refer to the* [*Alternative Text for Equation 7.8*](#_Alternative_Text_for_7) *for a description of this equation.*

Equation 7.8; a link to the long description for this equation is found in the preceding paragraph. (7.8)

where,

*n* is the number of items,

sigma sub i, squared is the variance of scores on the *i*-th item, and

sigma sub x, squared is the variance of the total score (sum of scores on the individual items).

Since the CAA for Science has a mix of item types (both dichotomous and polytomous items), it is more appropriate to report stratified Alpha (Feldt & Brennan, 1989). The stratified Alpha is a weighted average of Cronbach’s Alpha for item sets with different maximum score points or “strata.” The item sets used when calculating the stratified Alpha are dichotomous and polytomous items for each of the three tests.

The formula for calculating the stratified Alpha is shown in equation 7.9. *Refer to the* [*Alternative Text for Equation 7.9*](#_Alternative_Text_for_8) *for a description of this equation.*

Equation 7.9; a link to the long description for this equation is found in the preceding paragraph. (7.9)

where,

 is the variance for stratum *j* of the test,

 is the total variance of the test, and

 is the Cronbach’s Alpha for stratum *j* of the test.

#### Standard Error of Measurement

The SEM provides a measure of score instability on the raw score metric. The SEM is the square root of the error variance in the scores (i.e., the SD of the distribution of the differences between students’ observed scores and their true scores). The SEM is calculated using equation 7.10. *Refer to the* [*Alternative Text for Equation 7.10*](#_Alternative_Text_for_9) *for a description of this equation.*

 (7.10)

where,

 is the reliability estimated in equation 7.9, and

*st* is the SD of the total score (raw score).

The SEM is useful in determining the confidence interval that likely captures a student’s true score. A student’s true score can be thought of as the mean of observed scores a student would earn over an infinite number of independent administrations of the assessment. Approximately 95 percent of the students will have scores within the range of their true scores: -1.96 SEMs to their true scores +1.96 SEMs (Crocker & Algina, 1986). For example, if a student’s observed score on a given test equals 345 points, and the SEM equals five, one can be 95 percent confident that the student’s true score lies between 335 and 355 points (i.e., 345 ± 10).

### Validity Evidence

Validity refers to the degree to which each interpretation or use of a test score is supported by the accumulated evidence (American Educational Research Association [AERA], American Psychological Association [APA], & National Council on Measurement in Education [NCME], 2014; ETS, 2014). It constitutes the central notion underlying the development, administration, and scoring of tests and the uses and interpretations of test scores.

The validation process does not rely on a single study or gathering only one type of evidence. Rather, validation involves multiple investigations and different kinds of supporting evidence (AERA, APA, & NCME, 2014; Cronbach, 1971; ETS, 2014; Kane, 2006). It begins with the test design and is implicit throughout the entire assessment process, which includes item development and field testing, analyses of items, test scaling and linking, scoring, reporting, and score usage.

In this section, the evidence gathered is presented to support the intended uses and interpretations of scores for the CAA for Science. This section is organized primarily around the principles prescribed by AERA, APA, and NCME’s *Standards for Educational and Psychological Testing* (2014). These *Standards* require a clear definition of the purpose of the test, a description of the constructs to be assessed, and the population to be assessed, as well as how the scores are to be interpreted and used.

The *Standards* identify five kinds of evidence that can provide support for score interpretations and uses:

1. Evidence based on test content
2. Evidence based on relations to other variables
3. Evidence based on response processes
4. Evidence based on internal structure
5. Evidence based on the consequences of testing

The next subsection defines the purpose of the CAA for Science, followed by a description and discussion of different kinds of validity evidence that are typically gathered.

#### Evidence in the Design of the CAA for Science

##### Purpose

The CAA for Science is designed to assess students with the most significant cognitive disabilities whose individualized education program (IEP) teams have designated the use of an alternate assessment on the statewide summative assessments.

The CAA for Science is designed to show how well students perform relative to the Core Content Connectors (Science Connectors), which were developed by the National Center and State Collaborative, California educators, and EdCount. These Science Connectors are content targets linked to the California Next Generation Science Standards (CA NGSS) and yet are less complex than the CA NGSS, while focusing on the main academic content at each subject and grade level.

##### The Constructs to Be Measured

The Science Connectors provide learning goals aligned appropriately with the needs of students with the most significant cognitive disabilities and serve as the basis for the state’s CA NGSS alternate summative assessments for students who are eligible to take them. The Science Connectors identify priorities in each content area to guide instruction for students in this population and for the alternate assessment.

The CAA for Science test blueprint is used to define the measurement of the Science Connectors (CDE, 2018a). They also provide an operational definition of the construct to which each set of standards refers and define the following for each content area:

* Subject to be assessed
* Tasks to be presented
* Administration instructions to be given
* Rules used to score student responses

The test blueprint controls as many aspects of the measurement procedure as possible so that the testing conditions will remain the same over test administrations (Cronbach, 1971) to minimize construct-irrelevant score variance (Messick, 1989).

ETS developed all CAA for Science test items to conform to the State Board of Education–approved Science Connectors and test blueprint.

##### The Intended Test Population

Only eligible students may participate in the administration of the CAA for Science, as described in [*5.1 Student Test-Taking Requirements*](#_Student_Test-Taking_Requirements). Any student identified for alternate testing in grades five and eight and in high school (grade ten, eleven, or twelve, as long as the student is not repeating grade twelve) takes the CAA for Science. IEP teams “shall determine when a child with a significant cognitive disability shall participate in an alternate assessment aligned with the alternate academic achievement standards.”[[6]](#footnote-7)

#### Evidence Based on Test Content

Evidence based on test content refers to traditional forms of content validity evidence, such as the rating of test specifications and test items (Crocker, Miller, & Franks, 1989; Sireci, 1998), as well as alignment methods for educational tests that evaluate the interactions between curriculum frameworks, testing, and instruction (Rothman, Slattery, Vranek, & Resnick, 2002; Bhola, Impara, & Buckendahl, 2003; Martone & Sireci, 2009).

*[Chapter 4: Test Assembly](#_Test_Assembly)* contains information on which the test forms administered in 2020–2021 were built.

##### Description of the State Alternate Standards

The CAA for Science is aligned with the Science Connectors. The Science Connectors illustrate the necessary knowledge and skills needed to reach the learning targets for each grade. They also identify priorities in each content area to guide the instruction for students in this population and for the alternate assessment (CDE, 2018b).

##### Embedded Performance Task and Item Specifications

Item specifications describe the characteristics of items that are written to measure each content standard. The specifications for science are described in [*Chapter 3: Embedded Performance Task Item Development Process*](#_Embedded_Performance_Task_1).

##### Assessment Blueprint

The CAA for Science test blueprint describes the content of the CAA for Science for all grades tested and how that content is assessed (CDE, 2018a). The test blueprint addresses the basic core content domains, the Science Connectors, as derived from the CA NGSS, and the essential understanding for each standard. A description of the test blueprint is provided in [*Chapter 4: Test Assembly*](#_Test_Assembly).

##### Form Assembly Process

The content standards and blueprint are the basis for choosing items for each assessment. Additionally, item difficulty and the content complexity of items are provided to evaluate the statistical characteristics of test forms. Refer to [*Chapter 4: Test Assembly*](#_Test_Assembly) for information on the test assembly process.

#### Evidence Based on Response Processes

Validity evidence based on response processes refers to “evidence concerning the fit between the construct and the detailed nature of performance or response actually engaged in by students” (AERA et al., 2014, p. 12). This type of evidence generally includes documentation of activities such as

* systematic observations of test response behavior;
* showing the relationships of items intended to require demonstrations or applications of knowledge and skills to other measures that require similar levels of cognitive complexity in the content (i.e., teacher ratings of student performance); and
* evaluation of the reasoning processes students employ when solving test items (Embretson, 1983; Messick, 1989).

This type of evidence is used to confirm that the CAA for Science is measuring the cognitive skills that are intended as the objects of measurement and that these skills are used by students to respond to the items. For example, the survey questions administered after each embedded PT are typically analyzed as part of the research agenda, with the goal of understanding the CAA for Science embedded PTs.

This subsection describes analyses performed after typical CAA for Science administrations.

##### Testing Time Analyses

Testing time for each administration can be evaluated for consistency by examining the expected response processes for the items presented to students. The length of time it takes students to complete a test is collected and analyzed to build a profile describing what a typical testing event looks like for each content area and grade. In addition, variability in testing time is investigated to determine whether a student’s testing time should be viewed as unusual or irregular. It should be noted that the CAA for Science is an untimed test.

The results of average response time should be interpreted with caution. Some cases of extremely long testing time may be attributed to assessments that have taken longer to complete, and others may be attributed to a system-enforced pause that occurs when a test has been improperly closed or has been idle for 20 minutes. The medians (50th percentile) are more meaningful in the interpretation of the time comparisons because medians are less impacted by extreme values than means.

Testing time analyses were not conducted following the 2020–2021 administration because of small sample sizes.

##### Analysis of Student Engagement

The relationship between test engagement (as reported by test examiners in the post–performance task survey) and students’ performance on the CAA for Science can provide additional information on the students’ testing experience. The minimal levels of engagement for some students could be related to whether students could access the test content while testing or whether the students had the opportunity to learn the content prior to testing. The students’ familiarity with the content or tasks would also impact the students’ level of engagement. Some students might be more engaged with familiar content, while other students might be more engaged when the content or task is unique (i.e., a novel experience).

#### Evidence Based on Internal Structure

Internal structure evidence evaluates the strength or salience of the major dimensions underlying an assessment using indices of measurement precision such as DIF analyses, test reliability, and SEMs.

##### Differential Item Functioning

DIF analyses are conducted to assess differences in the item performance of groups of students who differ in their demographic characteristics. Refer to section [*7.3 Differential Item Functioning Analyses*](#_Differential_Item_Functioning) for a description of the DIF analyses.

##### Overall Reliability Estimates

The description of reliability analyses is provided in section [*7.6 Reliability Analyses*](#_Reliability_Analyses). However, because an insufficient number of students completed an assessment during the administration, a sample representative of the target population could not be formed, so no reliability analyses were conducted for the 2020–2021 CAA for Science administration.

##### Student Group Reliability Estimates

The reliabilities are typically examined for various student groups that differ in their demographic characteristics within the student population. The characteristics considered are gender, ethnicity, economic status, special education services status, migrant status, English language fluency, parent/guardian military status, homeless status, and ethnicity by economic status (refer to table 6.5 for the demographic student groups reported).

Because an insufficient number of students tested during the 2020–2021 administration to form a sample representative of the population, no student group reliability analyses were conducted for the 2020–2021 CAA for Science administration.

#### Evidence Based on Relationship to Other Variables

Evidence based on *relations to other variables* can be evaluated using the correlation between the CAA for Science assessment results and variables related to students. Two variables often analyzed related to the students’ results include the CAAs for English language arts/literacy and mathematics and the level of student engagement while taking the embedded PTs. However, because of the small number of students tested during the 2020–2021 administration, the analyses with other variables were not conducted after the 2020–2021 administration.

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### Accessibility Information

#### Alternative Text for Equation 7.1

P value sub dich equals the fraction with the numerator the sum of X sub ij and the denominator N sub I end fraction.

#### Alternative Text for Equation 7.2

P value sub poly equals the fraction with the numerator X sub ij and the denominator N sub i times Max of X sub I end fraction.

#### Alternative Text for Equation 7.3

r sub polyreg equals the fraction beta sub hat times S tot divided by the square root of Beta sub hat squared times s sub tot squared plus 1.

#### Alternative Text for Equation 7.4

Alpha sub MH equals the numerator open parenthesis the sum sub m of R sub rm times W sub fm divided by N sub tm close parenthesis divided by the denominator open parenthesis the sum sub m of R sub fm times W sub rm divided by N sub tm closed parenthesis.

#### Alternative Text for Equation 7.5

MH D-DIF equals negative 2.35 times the natural logarithm open bracket alpha sub MH close bracket.

#### Alternative Text for Equation 7.6

SMD equals the fraction with numerator the sum from m equals 1 to M of N sub fm times E sub f of Y from X equals m and denominator the sum from m equals 1 to M of N sub fm end fraction minus the fraction with numerator the sum from m equals 1 to M of N sub fm times E sub r of Y from X equals m and denominator the sum from m equals 1 to M of N sub fm end fraction equals the fraction with the numerator the sum from m equals 1 to M of D sub fm and the denominator m equals1 to M of N sub fm end fraction.

#### Alternative Text for Equation 7.7

P sub ih of theta sub j equals:

The numerator exp open parenthesis the sum from v equals 1 to h of Da sub i open parenthesis theta sub j minus b sub I plus d sub iv close parenthesis close parenthesis divided by the denominator open parenthesis 1 plus the sum from c equals 1 to n sub I exp open parenthesis the sum from v equals 1 to c of Da sub I open parenthesis theta sub j minus b sub I plus d sub iv close parenthesis close parenthesis close parenthesis, if score h equals 1, 2, …, n sub i.

P sub ih of theta sub j equals:

1 divided by the denominator open parenthesis 1 plus the sum from c equals 1 to n sub I exp open parenthesis the sum from v equals 1 to c of Da sub I open parenthesis theta sub j minus b sub I plus d sub iv close parenthesis close parenthesis close parenthesis, if score h equals 0.

#### Alternative Text for Equation 7.8

alpha equals the fraction n over n minus one, times one minus the fraction the sum from i equals one to n, of sigma sub i, squared, over sigma sub x, squared.

#### Alternative Text for Equation 7.9

stratified alpha equals one minus the fraction of the sum sigma sub xj, squared times one minus the alpha sub j over sigma sub x, squared.

#### Alternative Text for Equation 7.10

SEM equals s sub t times the square root of 1 minus rho of theta hat theta hat prime.

## Quality Control Procedures

The California Department of Education (CDE) and ETS implemented rigorous quality control procedures throughout the test development, administration, scoring, analyses, and reporting processes associated with the California Alternate Assessment (CAA) for Science. As part of this effort, ETS staff worked with the ETS Office of Professional Standards Compliance, which publishes and maintains the *ETS Standards for Quality and Fairness* (ETS, 2014). These *Standards* support the goals of delivering technically sound, fair, and useful products and services; and assisting the public and auditors evaluating those products and services. Quality control procedures are outlined in this chapter.

### Quality Control of Embedded Performance Task Development

ETS’ goal is to provide the best standards-based embedded performance tasks (PTs) for the CAA for Science. Embedded PTs developed for the CAA for Science underwent an extensive embedded PT review process. The item writers hired to develop CAA items were trained in California Assessment of Student Performance and Progress (CAASPP) and ETS policies on quality control of item content, sensitivity, and bias guidelines, as well as on guidelines for accessibility, to ensure that the items allow the widest possible range of students to demonstrate their content knowledge.

Once a written item was accepted for authoring—that is, once it was entered into ETS’ item bank and formatted for use in an assessment—ETS employed a series of internal and external reviews. These reviews used established criteria and specifications to judge the quality of items and to ensure that each item measured what it was intended to measure. These reviews also examined the overall quality of the test items before they were presented to the CDE and item reviewers. Finally, a group of California educators reviewed the items for accessibility, bias and sensitivity, and content prior to their administration to students. The details on quality control of item development are described in section [*3.2 ETS Item Review Process*](#_ETS_Item_Review).

### Quality Control of Test Assembly and Delivery

The assembly of all test forms must conform to the mutually agreed-upon test design that represents a set of constraints and specifications. These constraints are critical to the formation of valid assessments. The blueprint for the CAA for Science was approved in January 2018 and test forms were assembled following the approved blueprint (CDE, 2018).

#### Quality Control of Test Form Development

ETS conducted multiple levels of quality assurance (QA) checks on each constructed test form to ensure it met defined statistical criteria. For the 2020–2021 CAA for Science, both ETS Assessment and Learning Technology Research & Development (ALTRD) and psychometric staff reviewed and signed off on the accuracy of forms before the test forms were put into production. Detailed information related to test assembly can be found in [*Chapter 4: Test Assembly*](#_Test_Assembly).

In particular, the assembly of all test forms went through a certification process that included various checks to verify that

* all keys were correct;
* items were scored correctly in the item bank and incorrect answers were scored as incorrect;
* all embedded PTs assessed with the standard;
* all content in the embedded PT was correct;
* distractors were plausible;
* multiple-choice item options were parallel in structure;
* language was grade-level appropriate;
* no more than three multiple-choice items in a row had the same key;
* all graphics were correct (copyright, spelling, relevance, etc.);
* there were no errors in grammar, spelling, punctuation, and the like; and
* embedded PTs adhered to the approved style guide.

Reviews were also conducted for functionality and sequencing during the user acceptance testing (UAT) process to ensure all items functioned as expected.

#### Quality Control of Test Assignment

Test assignment for the CAASPP, including the CAA for Science, is controlled by the Test Operations Management System (TOMS) using student information received from the California Longitudinal Pupil Achievement Data System (CALPADS) (CDE, 2021). The two systems are kept in sync during the testing window.

Students at eligible grade levels were assigned to the Smarter Balanced assessments (in grades three through eight and grade eleven) and the California Science Test (CAST) for grades five and eight and high school (grade ten, eleven, or twelve [as long as the student is not repeating grade twelve]) by default. For students eligible for the CAA for Science—that is, grades five and eight and high school (grade ten, eleven, or twelve)—local educational agencies (LEAs) logged on to TOMS and assigned students to take the alternate assessment, which automatically unassigned those students from taking the CAST.

The quality of test assignment for the CAA for Science was monitored and controlled through several strategies. TOMS enforced preconditions for eligibility for the CAAs by permitting assignment only for students with an Individuals with Disabilities Education Act (IDEA)[[7]](#footnote-8) indicator of “Yes” as sent by CALPADS.

Additionally, TOMS prevented the prohibited “mixing and matching” of assessments. For example, a student assigned to take an alternate assessment for any content area will automatically be prevented from assignment to a general assessment for another content area.

#### Quality Control of Test Administration

The quality of test administration is managed through comprehensive rules and guidelines for maintaining the security and standardization of CAASPP assessments, including the CAA for Science. LEAs received training on these topics and were provided with tools to report security incidents and resolve testing discrepancies for specific testing sessions.

Several strategies are utilized to monitor and control the quality of test administration for the CAA for Science as well as all assessments administered as part of the CAASPP System. A fully staffed support center, the California Technical Assistance Center (CalTAC), supported all LEAs in the administration of all CAASPP assessments. CalTAC was guided by a core group of LEA outreach and advocacy staff who managed communications to LEAs, regional and web-based trainings, and a website that houses a full range of manuals, videos, and other instructional and support materials. In addition to providing guidance and answering questions, CalTAC regularly conducted outreach campaigns on particular administration topics to ensure all LEAs understood correct test administration procedures.

The ETS Office of Testing Integrity (OTI) reinforced the quality control procedures for test administration, providing QA services for all testing programs managed by ETS. The OTI’s detailed quality control procedures are described in subsection [*5.8.1. ETS’ Office of Testing Integrity*](#_ETS’_Office_of_1).

#### Quality Control of Machine-Scoring Procedures

To ensure valid item-level scoring for the CAA for Science, quality control procedures were employed by Cambium Assessment, Inc. (CAI), the CAASPP subcontractor responsible for providing the CAASPP test delivery system (TDS) and scoring machine-scorable items. A final comparison of the test map to each computer-based form as configured in the UAT environment ensured that no changes to the form were introduced prior to operational deployment.

A real-time, quality-monitoring component was built into the TDS. After a test was administered to a student, the TDS passed the resulting data to the QA system. QA conducted a series of data integrity checks, ensuring, for example, that the record for each test contained information for each item, keys for multiple-choice items, score points in each item, and the total number of operational items. In addition, QA also checked to ensure that the test record contained no data from items that had been invalidated.

Data passed directly from the quality monitoring system to the database of record, which served as the repository for all test information, and from which all test information for reporting was pulled and transmitted to ETS in a predetermined results format.

### Quality Control of Test Materials

Brief descriptions of other types of materials used for and during testing appear in the following subsections.

#### Developing Computer-based Assessments

The steps taken to develop and ensure the quality of the computer-based assessments are described in [*Chapter 3: Embedded Performance Task Item Development Process*](#_Embedded_Performance_Task_1).

#### Test Administration Manuals

ETS staff consulted with internal subject matter experts and conducted validation checks to verify that test directions and administration manuals accurately matched the test materials and testing processes. Copy editors and content editors reviewed each document for spelling, grammar, accuracy, and adherence to CDE style. Each document was required to be approved by the CDE before it could be published to the CAASPP website; only nonsecure documents were posted to this website. Secure materials, such as the *CAA for Science Embedded Performance Task Directions for Administration*, were made available to designated LEA staff through TOMS, which required a secure logon.

The manuals used in the administration of the CAA are listed in subsection [*5.5.4 Instructions for Test Examiners and Staff Involved in CAA for Science Administration*](#_Instructions_for_Test).

#### Processing Test Materials

The following information was entered into the TDS by the student or the test examiner and transmitted from CAI to ETS each day:

* Student’s first name
* Statewide Student Identifier
* Any individualized scripts and materials used
* Responses for each item
* Results of the post-PT student responsiveness survey

The CAI and ETS systems checked for the completeness of the student record and stopped records identified as having an error. For example, the system would identify a test module that was missing a content registration ID, a unique identifier that matched the student’s opportunity in the final scoring.

### Quality Control of Psychometric Processes

#### Development of Scoring Specifications

ETS scoring specifications for the CAA for Science were completed, approved, and checked well in advance of the receipt of student response data. These specifications contained detailed scoring procedures, as well as the procedures for determining whether a student attempted a test and whether that student’s response data should be included in the statistical analyses and calculations for computing summary data.

#### Development of Scoring Procedures

ETS’ Enterprise Score Key Management (eSKM) system used scoring procedures specified by psychometricians and provides scoring services. ETS psychometricians carried out a series of quality control checks after scoring to ensure the accuracy of each score.

##### Enterprise Score Key Management System Processing

Prior to the test administration, ETS ALTRD staff reviewed and verified the keys for all items. These keys were then provided to CAI for its machine-scoring implementation. After CAI finished machine-scoring, those scores and responses were delivered to ETS. CAI quality control of the machine-scoring procedure is described in subsection [*8.2.3 Quality Control of Test Administration*](#_Quality_Control_of_1).

ETS’ Centralized Repository Distribution System and Enterprise Service Bus departments collected and parsed .xml files that contained student response data from CAI. ETS’ eSKM system collected and calculated individual students’ overall scores (total raw scores) in the approved statistical extract format. These data extracts were sent to ETS’ Data Quality Services for data validation. Following successful validation, the student response statistical extracts were made available to the psychometric team.

ETS developed two parallel scoring systems to produce and verify student scores:

1. The eSKM scoring system received an individual student’s item scores and item responses from CAI for ETS’ reporting systems.
2. The ETS Psychometric Analysis & Research team computed individual percent correct and preliminary indicators based on item scores delivered by CAI.

The scores from the two sources were then compared for internal quality control. Any differences in the scores were discussed and resolved. All scores complied with the ETS scoring specifications and passed the parallel scoring process to ensure the quality and accuracy of scoring and to support the transfer of scores into TOMS, the database of the student records scoring system.

##### Psychometric Processing

No psychometric analyses were conducted on the data from the 2020–2021 administration. In a typical year, when the psychometric analyses are conducted at ETS, the psychometric analyses undergo comprehensive quality checks by a team of psychometricians and data analysts. Detailed checklists are developed by members of the team for each statistical procedure performed on the CAA for Science.

The ETS psychometrics team reviews the data files before conducting the statistical analyses to ensure the quality of the data. The classical item analyses and differential item functioning analyses are run by one data analyst and checked by a second data analyst. Results are then reviewed by the psychometricians to compile a list of flagged items for ETS ALTRD staff for review. ALTRD comments are reviewed by the psychometricians before items are approved for inclusion in additional analyses and before the data review meetings with the CDE and educators.

During the calibration process, checks are made to ascertain that the input files are established accurately. Checks are also made on the number of items, number of examinees with valid scores, item response theory (IRT) item difficulty estimates, and standard errors for the item difficulty estimates. Two psychometricians conduct parallel calibration processing and compare the results to check for any inconsistencies. Psychometricians also perform detailed reviews of relevant statistics to determine whether the chosen IRT model fits the data. In addition, the results of the calibration procedures are reviewed by a psychometric manager.

### Quality Control of Reporting

A data file summarizing the results of the 2020–2021 administration for the CAA for Science was provided to the CDE. This file included the percent correct and preliminary indicator category for students who completed the CAA for Science. To ensure the quality of the data file, two members of the ETS psychometrics team individually reviewed the files and worked with ETS Information Technology to resolve any discrepancies before the files were posted to the CDE.

### Quality Control of End-to-End Testing

ETS conducted end-to-end testing prior to the start of the test administration. The purpose of this testing was to verify that all systems, processes, and resources were ready for the operational field test administration. ETS employed a number of approaches to verify ongoing systems performance, including monitoring of system availability and system usage. Time was allotted for UAT to confirm that the systems met requirements and to make identified corrections before final deployment. To accomplish system acceptance and sign off, ETS deployed systems to a staging area, which mirrored the final production environment, for operational testing and UAT. Final approval by the CDE triggered the final deployment of the system.

### References

California Department of Education. (2018). *California Alternate Assessment for Science blueprint*. California Department of Education website.

California Department of Education. (2021). *CAASPP and ELPAC Test Operations Management System user guide*. Sacramento, CA: California Department of Education.

Educational Testing Service. (2014). *ETS standards for quality and fairness*. Princeton, NJ: Educational Testing Service.

## Post–Performance Task Survey

This chapter describes the development and administration of the survey questionnaires for test examiners to complete for each embedded performance task (PT) and the results from the analyses of their responses.

### Survey Design and Development

The surveys were designed and developed by members of the ETS validity research team, whose members have extensive experience in designing and developing surveys.

#### Survey on the Test Administration

Survey responses, which were provided by the test examiner, were collected from local educational agencies via the California Assessment of Student Performance and Progress test delivery system (TDS) for every embedded PT administered to every student. The survey was included in the last section of the embedded PT delivered through the TDS. The purpose of the survey was to collect basic information about students’ experiences with the assessment process.

After the embedded PT was administered to the student, the test examiner was asked to state whether the student had been responsive during the testing session. Depending on the student’s responsiveness level, the test examiner was then presented one of two surveys about the student. Table 9.1 summarizes, by embedded PT, the numbers and the percentages of students who were responsive and nonresponsive. A vast majority of students were responsive.

Table 9.1 Numbers and Percentages of Students Responsive and Nonresponsive by Embedded PT

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Grade Level or Grade Band** | **Number of Responses—Life Science PT** | **Responsive—Life Sciences PT** | **Nonresponsive—Life Sciences PT** | **Number of Responses—Physical Science PT** | **Responsive—Physical Sciences PT** | **Nonresponsive—Physical Sciences PT** | **Number of Responses—Earth and Space Sciences PT** | **Responsive—Earth and Space Sciences PT** | **Nonresponsive—Earth and Space Sciences PT** |
| Grade five | 862 | 90% | 10% | 821 | 89% | 11% | 879 | 89% | 11% |
| Grade eight | 770 | 89% | 11% | 768 | 88% | 12% | 798 | 88% | 12% |
| High school | 971 | 88% | 12% | 933 | 88% | 12% | 983 | 87% | 13% |

##### Survey for Students Who Were Responsive

The survey for students who were responsive consisted of the following four questions:

1. Using a scale from 1 to 5, rate your student’s level of engagement for this performance task (1 = minimally engaged; 5 = fully engaged) based on the following questions.
2. How engaged was your student during the administration of orienting activities?
3. How engaged was your student when answering questions that included pictures?
4. How engaged was your student when answering questions that included videos?
5. How engaged was your student when answering questions that consisted of text only?
6. How engaged was your student when answering questions that consisted of multiple-choice style questions?
7. How engaged was your student when answering questions that consisted of technology enhanced formats, such as drag and drop, grid-type, etc.?
8. During classroom instruction, which mode or modes of communication does your student use? (Select all that apply)
   1. Eye gaze
   2. Verbal response
   3. Written response
   4. Gestures or pointing
   5. Augmentative and alternative communication device
   6. Mouse, touch screen, computer keyboard, or any combination of these
   7. Nonresponsive
   8. Other (please enter additional information)
9. Did you individualize any aspect of Orienting Activity #1 and the first five test questions, where permitted? If yes, and you used specific materials, briefly describe the materials used to individualize the activity.
10. Did you individualize any aspect of Orienting Activity #2 and the last five test questions, where permitted? If yes, and you used specific materials, briefly describe the materials used to individualize the activity.

##### Survey for Students Who Were Nonresponsive

The survey for the students who were nonresponsive consisted of the following four questions:

1. In your best judgment, which of the following statements best explains why your student did not provide any response?
   1. No established mode of communication
   2. No observable engagement with the performance task
   3. Test questions seemed too complex
   4. Scientific concepts seemed too complex
   5. Other (please enter additional information)
2. During classroom instruction, which mode or modes of communication does your student use? Select all that apply.
   1. Eye gaze
   2. Verbal response
   3. Written response
   4. Gestures or pointing
   5. Augmentative and alternative communication device
   6. Mouse, touchscreen, computer keyboard, or any combination of these
   7. Nonresponsive
   8. Other (please enter additional information)
3. What method(s) did you use to elicit a response from your student?
4. How might this embedded performance task be changed so your student could be successful in showing what they know and can do?

### Survey Results for Students Who Were Responsive

Across all embedded PTs and grade levels, students who were responsive accounted for approximately 90 percent of the testing population. Table 9.A.1 through table 9.A.9 in [appendix 9.A](#_Appendix_9.A:_Distribution) summarize the responses to six survey items measuring the students’ level of engagement during various portions of the embedded PT’s administration. For each portion of an embedded PT’s administration examined by the survey, a plurality of students who were responsive were reported to be fully engaged, across all grade levels. Students were more likely to be fully engaged when answering questions that included either pictures or videos than when answering questions that included only text or when answering questions that consisted of either multiple-choice style questions or technology-enhanced formats.

The number and percentage of students who were responsive and used each mode of communication during classroom instruction for each domain is summarized in table 9.A.10 through table 9.A.12. The most common modes of communication across grades were verbal responses, the use of gestures or pointing, and a combination of either a mouse, touch screen, or computer keyboard. Overall, the use of these modes of communication was fairly consistent across embedded PTs and grades. Note that in these tables, the total number of students does not equal the sum of the number of survey responses because a student can have multiple modes of communication.

Table 5.2 through table 5.4 display the results of the survey regarding the kinds of individualization provided. Although test examiners were permitted to individualize the administration of the CAA for Science, table 5.2 through table 5.4 indicate that few students received individualizations, meaning most students were administered the embedded PTs as outlined in the *DFA*s.

### Survey Results for Students Who Were Nonresponsive

Across all embedded PTs and grade levels, students who were nonresponsive accounted for approximately 10 percent of the testing population. As presented in table 9.B.1 through table 9.B.3 in [appendix 9.B](#_Appendix_9.B:_Distribution), the most common explanation for why the test examiner indicated the student was nonresponsive during the administration of the embedded PT was that the student exhibited no observable engagement with the embedded PT. The test examiner also more commonly cited the complexity of the test questions as an explanation. Additionally, for the grade eight Physical Sciences embedded PT, some of the test examiners indicated that the scientific concepts seemed too complex.

The number and percentage of students who were nonresponsive and who used each mode of communication during classroom instruction for each domain are summarized in table 9.B.4 through table 9.B.6. Among the students who were nonresponsive, the most common mode of communication during classroom instruction was the use of gestures or pointing. For grade eight and high school, using an eye gaze was the second most common mode of communication. Students who were nonresponsive rarely used a written response as a mode of communication during classroom instruction. Note that in these tables, the total number of students does not equal the sum of the number of survey responses because a student can have multiple modes of communication.

The five most common methods used to elicit a response from the students who were nonresponsive are listed in table 9.B.7 through table 9.B.15. To elicit a response from their student, the test examiners preferred either using a verbal prompt or the use of gestures or pointing. Other common methods include using an augmentative or alternative communication device, repeating the instructions, prompting the student physically, and using materials.

Table 9.B.16 through table 9.B.24 list the changes to the embedded PTs suggested most to allow the student to successfully show what they know and can do. Across all grade levels, the most common request was to reduce the complexity of the content. Other common requests included reducing the complexity of the items’ wording and a greater use of pictures.

### Appendix 9.A: Distribution of Survey Responses for Students Who Were Responsive

**Notes:**

* The denominator for each percentage in table 9.A.1 through table 9.A.12 is the number of responses.
* Percentages for table 9.A.1 through table 9.A.9 may not sum up to 100, because “N/A” was considered a response and because of rounding.
* In table 9.A.10 through table 9.A.12, the total number of students does not equal the sum of the number of responses for each mode of communication because a student can have multiple modes of communication.

Table 9.A.1 “How engaged was the student with this performance task?”—Grade Five, Life Sciences Embedded PT

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Survey Question** | **Number of Responses** | **5 (Fully Engaged)** | **4** | **3** | **2** | **1 (Minimally Engaged)** |
| During the administration of orienting activities? | 760 | 52% | 17% | 13% | 7% | 9% |
| When answering questions that included pictures? | 761 | 56% | 19% | 11% | 7% | 7% |
| When answering questions that included videos? | 757 | 35% | 13% | 8% | 5% | 7% |
| When answering questions that consisted of text only? | 759 | 35% | 13% | 10% | 12% | 17% |
| When answering questions that consisted of multiple-choice style questions? | 757 | 45% | 18% | 13% | 11% | 11% |
| When answering questions that consisted of technology enhanced formats, such as drag and drop, grid type, etc.? | 756 | 32% | 11% | 10% | 5% | 12% |

Table 9.A.2 “How engaged was the student with this performance task?”—Grade Five, Physical Sciences Embedded PT

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Survey Question** | **Number of Responses** | **5 (Fully Engaged)** | **4** | **3** | **2** | **1 (Minimally Engaged)** |
| During the administration of orienting activities? | 714 | 55% | 16% | 14% | 7% | 8% |
| When answering questions that included pictures? | 716 | 55% | 19% | 13% | 7% | 6% |
| When answering questions that included videos? | 715 | 55% | 17% | 11% | 7% | 7% |
| When answering questions that consisted of text only? | 714 | 40% | 14% | 15% | 11% | 16% |
| When answering questions that consisted of multiple-choice style questions? | 715 | 47% | 16% | 17% | 8% | 12% |
| When answering questions that consisted of technology enhanced formats, such as drag and drop, grid type, etc.? | 712 | 49% | 16% | 13% | 9% | 11% |

Table 9.A.3 “How engaged was the student with this performance task?”—Grade Five, Earth and Space Sciences Embedded PT

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Survey Question** | **Number of Responses** | **5 (Fully Engaged)** | **4** | **3** | **2** | **1 (Minimally Engaged)** |
| During the administration of orienting activities? | 772 | 49% | 16% | 15% | 8% | 10% |
| When answering questions that included pictures? | 771 | 52% | 20% | 13% | 7% | 7% |
| When answering questions that included videos? | 771 | 34% | 12% | 8% | 5% | 7% |
| When answering questions that consisted of text only? | 768 | 33% | 14% | 13% | 12% | 20% |
| When answering questions that consisted of multiple-choice style questions? | 768 | 41% | 18% | 16% | 9% | 15% |
| When answering questions that consisted of technology enhanced formats, such as drag and drop, grid type, etc.? | 762 | 29% | 12% | 11% | 6% | 11% |

Table 9.A. “How engaged was the student with this performance task?”—Grade Eight, Life Sciences Embedded PT

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Survey Question** | **Number of Responses** | **5 (Fully Engaged)** | **4** | **3** | **2** | **1 (Minimally Engaged)** |
| During the administration of orienting activities? | 677 | 62% | 12% | 13% | 5% | 6% |
| When answering questions that included pictures? | 673 | 64% | 16% | 11% | 5% | 4% |
| When answering questions that included videos? | 671 | 53% | 13% | 7% | 5% | 5% |
| When answering questions that consisted of text only? | 670 | 50% | 12% | 11% | 9% | 14% |
| When answering questions that consisted of multiple-choice style questions? | 668 | 54% | 15% | 13% | 9% | 8% |
| When answering questions that consisted of technology enhanced formats, such as drag and drop, grid type, etc.? | 668 | 56% | 13% | 10% | 7% | 10% |

Table 9.A. “How engaged was the student with this performance task?”—Grade Eight, Physical Sciences Embedded PT

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Survey Question** | **Number of Responses** | **5 (Fully Engaged)** | **4** | **3** | **2** | **1 (Minimally Engaged)** |
| During the administration of orienting activities? | 668 | 61% | 14% | 10% | 9% | 6% |
| When answering questions that included pictures? | 666 | 64% | 17% | 9% | 6% | 4% |
| When answering questions that included videos? | 665 | 64% | 16% | 9% | 5% | 5% |
| When answering questions that consisted of text only? | 665 | 50% | 12% | 11% | 12% | 14% |
| When answering questions that consisted of multiple-choice style questions? | 666 | 53% | 14% | 15% | 9% | 9% |
| When answering questions that consisted of technology enhanced formats, such as drag and drop, grid type, etc.? | 665 | 47% | 10% | 8% | 6% | 10% |

Table 9.A. “How engaged was the student with this performance task?”—Grade Eight, Earth and Space Sciences Embedded PT

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Survey Question** | **Number of Responses** | **5 (Fully Engaged)** | **4** | **3** | **2** | **1 (Minimally Engaged)** |
| During the administration of orienting activities? | 695 | 60% | 12% | 12% | 7% | 8% |
| When answering questions that included pictures? | 693 | 64% | 15% | 9% | 6% | 5% |
| When answering questions that included videos? | 693 | 62% | 13% | 10% | 7% | 6% |
| When answering questions that consisted of text only? | 690 | 48% | 13% | 13% | 9% | 16% |
| When answering questions that consisted of multiple-choice style questions? | 693 | 53% | 14% | 14% | 9% | 10% |
| When answering questions that consisted of technology enhanced formats, such as drag and drop, grid type, etc.? | 686 | 47% | 11% | 9% | 6% | 11% |

Table 9.A. “How engaged was the student with this performance task?”—High School, Life Sciences Embedded PT

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Survey Question** | **Number of Responses** | **5 (Fully Engaged)** | **4** | **3** | **2** | **1 (Minimally Engaged)** |
| During the administration of orienting activities? | 822 | 63% | 10% | 11% | 7% | 7% |
| When answering questions that included pictures? | 822 | 65% | 13% | 10% | 6% | 6% |
| When answering questions that included videos? | 813 | 57% | 9% | 9% | 5% | 6% |
| When answering questions that consisted of text only? | 818 | 53% | 9% | 11% | 10% | 12% |
| When answering questions that consisted of multiple-choice style questions? | 820 | 58% | 10% | 12% | 10% | 9% |
| When answering questions that consisted of technology enhanced formats, such as drag and drop, grid type, etc.? | 818 | 58% | 10% | 11% | 8% | 10% |

Table 9.A. “How engaged was the student with this performance task?”—High School, Physical Sciences Embedded PT

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Survey Question** | **Number of Responses** | **5 (Fully Engaged)** | **4** | **3** | **2** | **1 (Minimally Engaged)** |
| During the administration of orienting activities? | 783 | 63% | 11% | 11% | 7% | 6% |
| When answering questions that included pictures? | 781 | 64% | 12% | 11% | 7% | 5% |
| When answering questions that included videos? | 782 | 65% | 11% | 11% | 7% | 5% |
| When answering questions that consisted of text only? | 780 | 55% | 8% | 13% | 10% | 11% |
| When answering questions that consisted of multiple-choice style questions? | 782 | 58% | 10% | 13% | 9% | 9% |
| When answering questions that consisted of technology enhanced formats, such as drag and drop, grid type, etc.? | 775 | 55% | 9% | 11% | 6% | 10% |

Table 9.A. “How engaged was the student with this performance task?”—High School, Earth and Space Sciences Embedded PT

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Survey Question** | **Number of Responses** | **5 (Fully Engaged)** | **4** | **3** | **2** | **1 (Minimally Engaged)** |
| During the administration of orienting activities? | 835 | 63% | 11% | 11% | 6% | 7% |
| When answering questions that included pictures? | 832 | 65% | 12% | 11% | 5% | 6% |
| When answering questions that included videos? | 831 | 62% | 12% | 10% | 6% | 6% |
| When answering questions that consisted of text only? | 829 | 52% | 10% | 13% | 10% | 12% |
| When answering questions that consisted of multiple-choice style questions? | 831 | 57% | 10% | 13% | 10% | 9% |
| When answering questions that consisted of technology enhanced formats, such as drag and drop, grid type, etc.? | 824 | 50% | 8% | 9% | 8% | 9% |

Table 9.A. “During classroom instruction, which mode or modes of communication does your student use?” (Select all that apply)—Grade Five

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Mode of Communication** | **Number of Responses—Life Sciences** | **Percent of Responses—Life Sciences** | **Number of Responses—Physical Sciences** | **Percent of Responses—Physical Sciences** | **Number of Responses—Earth and Space Sciences** | **Percent of Responses—Earth and Space Sciences** |
| Eye gaze | 177 | 24% | 175 | 25% | 179 | 24% |
| Verbal response | 542 | 74% | 532 | 76% | 558 | 75% |
| Written response | 132 | 18% | 145 | 21% | 141 | 19% |
| Gestures or pointing | 513 | 70% | 485 | 70% | 496 | 67% |
| Augmentative and alternative communication device | 75 | 10% | 70 | 10% | 72 | 10% |
| Mouse, touch screen, computer keyboard, or any combination of these | 371 | 51% | 368 | 53% | 378 | 51% |
| Nonresponsive | 28 | 4% | 19 | 3% | 31 | 4% |
| Other | 16 | 2% | 14 | 2% | 23 | 3% |
| **Total number of students** | **731** | **N/A** | **696** | **N/A** | **740** | **N/A** |

Table 9.A. “During classroom instruction, which mode or modes of communication does your student use?” (Select all that apply)—Grade Eight

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Mode of Communication** | **Number of Responses—Life Sciences** | **Percent of Responses—Life Sciences** | **Number of Responses—Physical Sciences** | **Percent of Responses—Physical Sciences** | **Number of Responses—Earth and Space Sciences** | **Percent of Responses—Earth and Space Sciences** |
| Eye gaze | 113 | 17% | 119 | 18% | 121 | 18% |
| Verbal response | 493 | 76% | 489 | 76% | 505 | 76% |
| Written response | 209 | 32% | 209 | 32% | 215 | 32% |
| Gestures or pointing | 393 | 60% | 378 | 59% | 394 | 59% |
| Augmentative and alternative communication device | 54 | 8% | 52 | 8% | 55 | 8% |
| Mouse, touch screen, computer keyboard, or any combination of these | 356 | 55% | 340 | 53% | 345 | 52% |
| Nonresponsive | 13 | 2% | 11 | 2% | 22 | 3% |
| Other | 12 | 2% | 12 | 2% | 16 | 2% |
| **Total number of students** | **650** | **N/A** | **646** | **N/A** | **664** | **N/A** |

Table 9.A.12 “During classroom instruction, which mode or modes of communication does your student use?” (Select all that apply)—High School

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Mode of Communication** | **Number of Responses—Life Sciences** | **Percent of Responses—Life Sciences** | **Number of Responses—Physical Sciences** | **Percent of Responses—Physical Sciences** | **Number of Responses—Earth and Space Sciences** | **Percent of Responses—Earth and Space Sciences** |
| Eye gaze | 162 | 21% | 149 | 20% | 165 | 21% |
| Verbal response | 505 | 65% | 475 | 63% | 519 | 66% |
| Written response | 208 | 27% | 218 | 29% | 210 | 27% |
| Gestures or pointing | 407 | 52% | 376 | 50% | 403 | 51% |
| Augmentative and alternative communication device | 60 | 8% | 59 | 8% | 64 | 8% |
| Mouse, touch screen, computer keyboard, or any combination of these | 400 | 51% | 392 | 52% | 403 | 51% |
| Nonresponsive | 24 | 3% | 17 | 2% | 23 | 3% |
| Other | 12 | 2% | 15 | 2% | 17 | 2% |
| **Total number of students** | **781** | **N/A** | **750** | **N/A** | **787** | **N/A** |

### Appendix 9.B: Distribution of Survey Responses for Students Who Were Nonresponsive

**Notes:**

* The denominator for each percentage in table 9.B.1 through table 9.B.12 is the number of responses.
* In table 9.B.4 through table 9.B.6, the total number of students does not equal to the sum of the number of responses for each mode of communication because a student can have multiple modes of communication.
* In table 9.B.7 through table 9.B.24, the total number of students is not equal to the sum of the number of responses because a student can have multiple responses.

Table 9.B.1 “In your best judgment, which of the following statements best explains why your student did not provide any responses?”—Grade Five

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Mode of Communication** | **Number of Responses—Life Sciences** | **Percent of Responses—Life Sciences** | **Number of Responses—Physical Sciences** | **Percent of Responses—Physical Sciences** | **Number of Responses—Earth and Space Sciences** | **Percent of Responses—Earth and Space Sciences** |
| No established mode of communication | 7 | 8% | 5 | 6% | 9 | 10% |
| No observable engagement with the PT | 55 | 63% | 59 | 66% | 46 | 49% |
| Test questions seemed too complex | 12 | 14% | 10 | 11% | 17 | 18% |
| Scientific concepts seemed too complex | 3 | 3% | 5 | 6% | 9 | 10% |
| Other | 10 | 11% | 10 | 11% | 12 | 13% |
| **Total number of students** | **87** | **N/A** | **89** | **N/A** | **93** | **N/A** |

Table 9.B.2 “In your best judgment, which of the following statements best explains why your student did not provide any responses?”—Grade Eight

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Mode of Communication** | **Number of Responses—Life Sciences** | **Percent of Responses—Life Sciences** | **Number of Responses—Physical Sciences** | **Percent of Responses—Physical Sciences** | **Number of Responses—Earth and Space Sciences** | **Percent of Responses—Earth and Space Sciences** |
| No established mode of communication | 5 | 6% | 5 | 6% | 11 | 13% |
| No observable engagement with the PT | 46 | 60% | 47 | 58% | 42 | 48% |
| Test questions seemed too complex | 12 | 16% | 9 | 11% | 18 | 20% |
| Scientific concepts seemed too complex | 6 | 8% | 14 | 17% | 10 | 11% |
| Other | 8 | 10% | 6 | 7% | 7 | 8% |
| **Total number of students** | **77** | **N/A** | **81** | **N/A** | **88** | **N/A** |

Table 9.B.3 “In your best judgment, which of the following statements best explains why your student did not provide any responses?”—High School

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Mode of Communication** | **Number of Responses—Life Sciences** | **Percent of Responses—Life Sciences** | **Number of Responses—Physical Sciences** | **Percent of Responses—Physical Sciences** | **Number of Responses—Earth and Space Sciences** | **Percent of Responses—Earth and Space Sciences** |
| No established mode of communication | 12 | 11% | 12 | 12% | 9 | 8% |
| No observable engagement with the PT | 53 | 49% | 50 | 49% | 55 | 49% |
| Test questions seemed too complex | 15 | 14% | 19 | 19% | 23 | 20% |
| Scientific concepts seemed too complex | 17 | 16% | 10 | 10% | 13 | 12% |
| Other | 11 | 10% | 11 | 11% | 13 | 12% |
| **Total number of students** | **108** | **N/A** | **102** | **N/A** | **113** | **N/A** |

Table 9.B.4 “During classroom instruction, which mode or modes of communication does your student use?” (Select all that apply)—Grade Five

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Mode of Communication** | **Number of Responses—Life Sciences** | **Percent of Responses—Life Sciences** | **Number of Responses—Physical Sciences** | **Percent of Responses—Physical Sciences** | **Number of Responses—Earth and Space Sciences** | **Percent of Responses—Earth and Space Sciences** |
| Eye gaze | 8 | 28% | 6 | 18% | 7 | 25% |
| Verbal response | 9 | 31% | 12 | 36% | 8 | 29% |
| Written response | 0 | 0% | 0 | 0% | 0 | 0% |
| Gestures or pointing | 14 | 48% | 20 | 61% | 18 | 64% |
| Augmentative and alternative communication device | 8 | 28% | 10 | 30% | 7 | 25% |
| Mouse, touch screen, computer keyboard, or any combination of these | 4 | 14% | 5 | 15% | 2 | 7% |
| Nonresponsive | 7 | 24% | 10 | 30% | 8 | 29% |
| Other | 3 | 10% | 4 | 12% | 2 | 7% |
| **Total number of students** | **29** | **N/A** | **33** | **N/A** | **28** | **N/A** |

Table 9.B.5 “During classroom instruction, which mode or modes of communication does your student use?” (Select all that apply)—Grade Eight

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Mode of Communication** | **Number of Responses—Life Sciences** | **Percent of Responses—Life Sciences** | **Number of Responses—Physical Sciences** | **Percent of Responses—Physical Sciences** | **Number of Responses—Earth and Space Sciences** | **Percent of Responses—Earth and Space Sciences** |
| Eye gaze | 10 | 30% | 10 | 27% | 15 | 38% |
| Verbal response | 6 | 18% | 9 | 24% | 8 | 20% |
| Written response | 1 | 3% | 3 | 8% | 6 | 15% |
| Gestures or pointing | 27 | 82% | 30 | 81% | 26 | 65% |
| Augmentative and alternative communication device | 14 | 42% | 11 | 30% | 10 | 25% |
| Mouse, touch screen, computer keyboard, or any combination of these | 6 | 18% | 7 | 19% | 9 | 23% |
| Nonresponsive | 9 | 27% | 10 | 27% | 10 | 25% |
| Other | 2 | 6% | 3 | 8% | 1 | 3% |
| **Total number of students** | **33** | **N/A** | **37** | **N/A** | **40** | **N/A** |

Table 9.B.6 “During classroom instruction, which mode or modes of communication does your student use?” (Select all that apply)—High School

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Mode of Communication** | **Number of Responses—Life Sciences** | **Percent of Responses—Life Sciences** | **Number of Responses—Physical Sciences** | **Percent of Responses—Physical Sciences** | **Number of Responses—Earth and Space Sciences** | **Percent of Responses—Earth and Space Sciences** |
| Eye gaze | 19 | 34% | 16 | 38% | 20 | 43% |
| Verbal response | 12 | 21% | 9 | 21% | 9 | 19% |
| Written response | 8 | 14% | 2 | 5% | 2 | 4% |
| Gestures or pointing | 32 | 57% | 19 | 45% | 29 | 62% |
| Augmentative and alternative communication device | 11 | 20% | 10 | 24% | 10 | 21% |
| Mouse, touch screen, computer keyboard, or any combination of these | 12 | 21% | 5 | 12% | 10 | 21% |
| Nonresponsive | 15 | 27% | 11 | 26% | 13 | 28% |
| Other | 10 | 18% | 6 | 14% | 9 | 19% |
| **Total number of students** | **56** | **N/A** | **42** | **N/A** | **47** | **N/A** |

Table 9.B.7 “What method(s) did you use to elicit a response from your student?”—Grade Five, Life Sciences

|  |  |  |
| --- | --- | --- |
| **Response** | **Number of Responses** | **Percent of Responses** |
| Gestures | 9 | 45% |
| Verbal prompt | 8 | 40% |
| Accommodation or designated support | 6 | 30% |
| Repeated instructions | 3 | 15% |
| Material | 1 | 5% |
| Simplified language | 1 | 5% |
| Modeled behavior | 1 | 5% |
| **Total number of students** | **20** | **N/A** |

Table 9.B.8 “What method(s) did you use to elicit a response from your student?”—Grade Five, Physical Sciences

|  |  |  |
| --- | --- | --- |
| **Response** | **Number of Responses** | **Percent of Responses** |
| Gestures | 7 | 41% |
| Verbal prompt | 6 | 35% |
| Accommodation or designated support | 4 | 24% |
| Material | 2 | 12% |
| Physical prompt | 1 | 6% |
| Repeated instructions | 1 | 6% |
| Simplified language | 1 | 6% |
| Modeled behavior | 1 | 6% |
| **Total number of students** | **17** | **N/A** |

Table 9.B.9 “What method(s) did you use to elicit a response from your student?”—Grade Five, Earth and Space Sciences

|  |  |  |
| --- | --- | --- |
| **Response** | **Number of Responses** | **Percent of Responses** |
| Verbal prompt | 11 | 65% |
| Gestures | 9 | 53% |
| Repeated instructions | 4 | 24% |
| Physical prompt | 2 | 12% |
| Accommodation or designated support | 1 | 6% |
| **Total number of students** | **17** | **N/A** |

Table 9.B.10 “What method(s) did you use to elicit a response from your student?”—Grade Eight, Life Sciences

|  |  |  |
| --- | --- | --- |
| **Response** | **Number of Responses** | **Percent of Responses** |
| Verbal prompt | 7 | 37% |
| Gestures | 7 | 37% |
| Accommodation or designated support | 7 | 37% |
| Material | 5 | 26% |
| Physical prompt | 1 | 5% |
| **Total number of students** | **19** | **N/A** |

Table 9.B.11 “What method(s) did you use to elicit a response from your student?”—Grade Eight, Physical Sciences

|  |  |  |
| --- | --- | --- |
| **Response** | **Number of Responses** | **Percent of Responses** |
| Verbal prompt | 13 | 50% |
| Gestures | 10 | 38% |
| Accommodation or designated support | 6 | 23% |
| Material | 6 | 23% |
| Physical prompt | 2 | 8% |
| **Total number of students** | **26** | **N/A** |

Table 9.B.12 “What method(s) did you use to elicit a response from your student?”—Grade Eight, Earth and Space Sciences

|  |  |  |
| --- | --- | --- |
| **Response** | **Number of Responses** | **Percent of Responses** |
| Gestures | 14 | 64% |
| Verbal prompt | 6 | 27% |
| Accommodation or designated support | 5 | 23% |
| Material | 3 | 14% |
| Physical prompt | 1 | 5% |
| Repeated instructions | 1 | 5% |
| **Total number of students** | **22** | **N/A** |

Table 9.B.13 “What method(s) did you use to elicit a response from your student?”—High School, Life Sciences

|  |  |  |
| --- | --- | --- |
| **Response** | **Number of Responses** | **Percent of Responses** |
| Verbal prompt | 16 | 53% |
| Gestures | 13 | 43% |
| Accommodation or designated support | 8 | 27% |
| Repeated instructions | 4 | 13% |
| Physical prompt | 3 | 10% |
| **Total number of students** | **30** | **N/A** |

Table 9.B.14 “What method(s) did you use to elicit a response from your student?”—High School, Physical Sciences

|  |  |  |
| --- | --- | --- |
| **Response** | **Number of Responses** | **Percent of Responses** |
| Verbal prompt | 9 | 41% |
| Gestures | 6 | 27% |
| Accommodation or designated support | 6 | 27% |
| Physical prompt | 5 | 23% |
| Repeated instructions | 4 | 18% |
| **Total number of students** | **22** | **N/A** |

Table 9.B.15 “What method(s) did you use to elicit a response from your student?”—High School, Earth and Space Sciences

|  |  |  |
| --- | --- | --- |
| **Response** | **Number of Responses** | **Percent of Responses** |
| Verbal prompt | 16 | 59% |
| Gestures | 14 | 52% |
| Physical prompt | 6 | 22% |
| Repeated instructions | 5 | 19% |
| Accommodation or designated support | 4 | 15% |
| **Total number of students** | **27** | **N/A** |

Table 9.B.16 “How might this embedded performance task be changed so your student could be successful in showing what they know and can do?”—Grade Five, Life Sciences

|  |  |  |
| --- | --- | --- |
| **Response** | **Number of Responses** | **Percent of Responses** |
| More technological support for responses | 4 | 31% |
| More physical tasks | 3 | 23% |
| Lack of engagement | 2 | 15% |
| Less complex content | 2 | 15% |
| Greater use of pictures | 1 | 8% |
| Less complex wording | 1 | 8% |
| More audio | 1 | 8% |
| More physical objects | 1 | 8% |
| More visuals | 1 | 8% |
| **Total number of students** | **13** | **N/A** |

Table 9.B.17 “How might this embedded performance task be changed so your student could be successful in showing what they know and can do?”—Grade Five, Physical Sciences

|  |  |  |
| --- | --- | --- |
| **Response** | **Number of Responses** | **Percent of Responses** |
| Less complex content | 5 | 38% |
| Lack of engagement | 3 | 23% |
| Less complex wording | 3 | 23% |
| Change item type | 1 | 8% |
| Greater use of pictures | 1 | 8% |
| More audio | 1 | 8% |
| More physical objects | 1 | 8% |
| More physical prompts | 1 | 8% |
| Printed material | 1 | 8% |
| **Total number of students** | **13** | **N/A** |

Table 9.B.18 “How might this embedded performance task be changed so your student could be successful in showing what they know and can do?”—Grade Five, Earth and Space Sciences

|  |  |  |
| --- | --- | --- |
| **Response** | **Number of Responses** | **Percent of Responses** |
| Less complex content | 5 | 29% |
| Less complex wording | 5 | 29% |
| More physical objects | 4 | 24% |
| Greater use of pictures | 2 | 12% |
| More interactive videos | 2 | 12% |
| **Total number of students** | **17** | **N/A** |

Table 9.B.19 “How might this embedded performance task be changed so your student could be successful in showing what they know and can do?”—Grade Eight, Life Sciences

|  |  |  |
| --- | --- | --- |
| **Response** | **Number of Responses** | **Percent of Responses** |
| Less complex content | 7 | 35% |
| Greater use of pictures | 6 | 30% |
| Less complex wording | 4 | 20% |
| Printed material | 3 | 15% |
| Change item type | 2 | 10% |
| **Total number of students** | **20** | **N/A** |

Table 9.B.20 “How might this embedded performance task be changed so your student could be successful in showing what they know and can do?”—Grade Eight, Physical Sciences

|  |  |  |
| --- | --- | --- |
| **Response** | **Number of Responses** | **Percent of Responses** |
| Less complex content | 6 | 32% |
| Greater use of pictures | 5 | 26% |
| Less complex wording | 4 | 21% |
| More visuals | 3 | 16% |
| Change item type | 1 | 5% |
| Less complex tasks | 1 | 5% |
| More audio | 1 | 5% |
| **Total number of students** | **19** | **N/A** |

Table 9.B.21 “How might this embedded performance task be changed so your student could be successful in showing what they know and can do?”—Grade Eight, Earth and Space Sciences

|  |  |  |
| --- | --- | --- |
| **Response** | **Number of Responses** | **Percent of Responses** |
| Less complex content | 6 | 35% |
| Greater use of pictures | 5 | 29% |
| Less complex wording | 3 | 18% |
| More audio | 2 | 12% |
| More visuals | 2 | 12% |
| **Total number of students** | **17** | **N/A** |

Table 9.B.22 “How might this embedded performance task be changed so your student could be successful in showing what they know and can do?”—High School, Life Sciences

|  |  |  |
| --- | --- | --- |
| **Response** | **Number of Responses** | **Percent of Responses** |
| Less complex content | 15 | 83% |
| Greater use of pictures | 3 | 17% |
| Change item type | 2 | 11% |
| Change to vocal-only test | 2 | 11% |
| Animation | 1 | 6% |
| Lack of engagement | 1 | 6% |
| More physical tasks | 1 | 6% |
| **Total number of students** | **18** | **N/A** |

Table 9.B.23 “How might this embedded performance task be changed so your student could be successful in showing what they know and can do?”—High School, Physical Sciences

|  |  |  |
| --- | --- | --- |
| **Response** | **Number of Responses** | **Percent of Responses** |
| Less complex content | 12 | 71% |
| Greater use of pictures | 2 | 12% |
| Change item type | 1 | 6% |
| Lack of engagement | 1 | 6% |
| More interactive videos | 1 | 6% |
| More technological support for responses | 1 | 6% |
| **Total number of students** | **17** | **N/A** |

Table 9.B.24 “How might this embedded performance task be changed so your student could be successful in showing what they know and can do?”—High School, Earth and Space Sciences

|  |  |  |
| --- | --- | --- |
| **Response** | **Number of Responses** | **Percent of Responses** |
| Less complex content | 12 | 71% |
| Allow for more test examiner guided control | 1 | 6% |
| Animation | 1 | 6% |
| Enlarged items | 1 | 6% |
| Greater use of pictures | 1 | 6% |
| Lack of engagement | 1 | 6% |
| More interactive videos | 1 | 6% |
| More physical objects | 1 | 6% |
| Paper-based testing | 1 | 6% |
| **Total number of students** | **17** | **N/A** |

## Continuous and Systematic Improvement

This chapter discusses the various procedures used to gather information to improve the California Alternate Assessment (CAA) for Science as well as strategies to implement possible future improvements.

### Test Design

ETS works in collaboration with the California Department of Education (CDE) in planning, proposing, evaluating, and improving the CAA for Science test design.

The CAA for Science has been administered using an embedded performance task (PT) design since it was first administered as a pilot. During the second-year pilot in the 2017–‍2018 administration and the field test in the 2018–2019 administration, the CAA for Science’s test design consisted of three embedded PTs. Each embedded PT within a grade assessed one of three science domains—Life Sciences, Physical Sciences, and Earth and Space Sciences.

Each embedded PT assessed two Science Core Content Connectors (Science Connectors) from a domain. The embedded PTs contained an orienting activity and five questions aligned to each of the two Science Connectors. Thus, an embedded PT contained two orienting activities and 10 questions. Some of the orienting activities and questions incorporated simple activities designed to demonstrate a key concept associated with the assessed Science Connector.

The 2018–2019 field test was administered as an operational field test with the goal of building a bank of operational items. To further pursue that goal, an additional, fourth embedded PT of field test items that do not count toward the student’s total raw score was added during the 2019–2020 administration.

Because of the impact of the novel coronavirus disease 2019 pandemic, only a small percentage of registered students completed any one of the four embedded PTs during the 2019–2020 administration. Given the low testing volume during the 2019–2020 administration, the test forms from the 2019–2020 administration were reused during the 2020–2021 administration.

### Item Development

In 2019, ETS led a meeting with CDE staff to discuss and evaluate tools and processes for determining appropriate levels of text complexity in stimuli and items. The structure of the stimuli and item text on the CAAs presents challenges to the use of some common text complexity evaluation tools. A holistic array of tools and rubrics were proposed for use to provide a more accurate measure of the appropriateness of the language of stimuli and items. These measures are now used as part of the item development process for the CAAs.

### Administration and Test Delivery

One improvement being implemented starting with the 2021–2022 administration is a routing question to be provided before the survey at the end of the test. Instead of test examiners being presented with two surveys and choosing the correct one to respond to on the basis of a student’s responsiveness, the routing question will lead the test examiner to the correct survey and only the correct survey.

Information pages for the orienting activities are also being added. Previously, only orienting activities with videos had information pages within the test delivery system (TDS). As of the 2021–2022 administration, each orienting activity will have a corresponding information page to ensure test examiners administer the orienting activity.

The *Mark as No Response* option, available on every item within the TDS, was added for the 2019–2020 administration to provide information regarding the student testing experience. The *Mark as No Response* option should be used when the item is presented to the student and the student does not provide a response despite the test examiner’s best efforts to elicit a response.

### Psychometric Analyses

ETS analyzes CAA for Science items, including the following types of analyses:

* Item difficulty
* Item discrimination
* Item score distributions
* Differential item functioning

The CDE requested that the item difficulty flagging criteria be based on the number of response choices. Therefore, for future test administrations, ETS will flag difficult multiple-choice items based on the number of response options for the item:

* Items with only two response options will be flagged when the item’s *p*-value is below 0.50.
* Items with three response options will be flagged when the item’s *p*-value is below 0.30.
* Items with four response options will be flagged when the item’s *p*-value is below 0.20.

The polytomous items will continue to be flagged when the proportion of correct responses is less than 0.30.

### Research-based Operational Work

A feature of the CAA for Science embedded PTs is that the test examiners have the option to individualize certain elements of the assessment. Potential individualizations are designed so that the premise of the item and the scientific principles tested would remain the same. Individualization options in embedded PTs often involve the use of objects to make certain science concepts easier to understand for some students, causing concerns about the potential impact of giving test examiners the flexibility to choose materials to conduct activities associated with the embedded PTs.

ETS evaluated the impact of the individualizations after the 2017–2018 second-year pilot and after the 2018–2019 field test administrations. In general, individualizations and material choice do not explain a significant proportion of the variance of the students’ Science Connector scores. Student engagement and student disability explained significant proportions of the Science Connector scores.

When interpreting the results of the material choice analyses, caution should be taken because of the small percentage of students who received an individualization (e.g., individualized script) or who received individualized materials. Because of the low rates of students receiving an individualization, there is low statistical power to detect possible effects of the choice to use individualized materials if an effect exists. Additionally, the test examiner chose to use individualizations or individualized materials to make the Science Connector orienting activity more accessible to the student based on the needs of the student. Therefore, the results of these analyses are nested within student disability and the needs of the individual student.

The ETS psychometricians will continue to monitor the number of students receiving an individualization and, for future administrations, will evaluate the impact of the individualizations on student’s scores.

### Accessibility

Like all CAASPP assessments, the CAAs are administered using the TDS created by Cambium Assessment, Inc. for the Smarter Balanced assessments. As such, implementation of new computer-based universal tools, designated supports, and accommodations are aligned with the TDS.

1. The total population of students with the most significant cognitive disabilities in the California kindergarten through grade twelve public school system is approximately 38,000 (1 percent of the total student enrollment; this is provided on the CDE DataQuest website for the 2015–2016 school year). [↑](#footnote-ref-2)
2. Data for 2020–2021 was retrieved from the *CalEdFacts* web page on the CDE website. [↑](#footnote-ref-3)
3. This definition was retrieved from the California Longitudinal Pupil Achievement Data System (CALPADS) web page on the CDE website. [↑](#footnote-ref-4)
4. This technical report is based on the version of the *Usability, Accessibility, and Accommodations Guidelines* that was available during the 2020–2021 CAASPP administration. [↑](#footnote-ref-5)
5. The *Crosswalk* has since been replaced with the Accessibility Strategies web page on the Tools for Teachers website. [↑](#footnote-ref-6)
6. S. 1177—114th Congress: Every Student Succeeds Act. 2015. Title 1, Part A, Subpart 1, Section 1111(b)(2)(D)(ii)(I) [↑](#footnote-ref-7)
7. The IDEA is the primary federal program that authorizes state and local aid for special education and related services for children with disabilities. [↑](#footnote-ref-8)