California Science Test Interim Assessments Blueprint

Prepared for the California Department of Education by ETS

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Introduction

The summative California Science Test (CAST), administered pursuant to California *Education Code* Section 60640(b)(2)(B), is part of the California Assessment of Student Performance and Progress (CAASPP) System. The CAST measures the full range of the California Next Generation Science Standards (CA NGSS) over a three-year period and is administered to students in grades five, eight, and once in high school (i.e., grade ten, eleven, or twelve).

The CAASPP System includes the development of new interim assessments for the CAST. The first round of interim assessments will be released for the 2023–24 school year, and a second round of interims will be released in 2024–25. Three interim assessments per grade band will be developed during each round. Table 1. Summary of Item Counts for All Interim Assessments provides a summary of the interim assessments available for each grade band. The interim assessments are intended to support teaching and learning by providing educators with relevant information about a student's learning progress. The CAST Interim Assessments (IAs) will be fixed forms (i.e., every student receives the same items) and administered online. They will be designed to be administered during a 50-minute class period; however, they will be untimed to allow students the opportunity to fully complete the interim assessment. Like the CAST summative assessments, items on the interim assessments will be aligned with the CA NGSS. The blueprint for the CAST IAs documents how the CAST IA test forms will be assembled, including rules for the assessment of the CA NGSS Performance Expectations (PEs) and the integration of the Disciplinary Core Ideas (DCIs), Science and Engineering Practices (SEPs), and Crosscutting Concepts (CCCs). The CA NGSS are referred to as "three dimensional" (3D) because of the interrelationships of the DCIs, SEPs, and CCCs. The CAST IAs are low-stakes assessments designed to reflect a commitment to the 3D approach both in the assembly of forms, as detailed in this blueprint, and in the writing of test items (with each test item aligned to at least two of the three dimensions).

To meet content and statistical requirements, each interim assessment will consist of a set of discrete items and one performance task (PT). Each of the CAST IAs in middle school and high school will align with and explore a single science domain: Earth and Space Sciences (ESS), Life Sciences (LS), or Physical Sciences (PS). Each elementary CAST IA will align with and explore the PEs of all three science domains (ESS, LS, and PS) in each specific grade level[1] (i.e., grade three, four, or five). The engineering subdomain (Engineering, Technology, and Applications of Science, otherwise known as ETS) is subsumed in the three science domains. California's Environmental Principles and Concepts will also be used as context for items, when appropriate for the assessed PE.

[1] While the CAST IAs align with PEs from specific grade levels, students from any grade level can interact with any CAST IA.

Summary of Item Counts for Interim Assessments

Table 1. Summary of Item Counts for All Interim Assessments provides a summary of the number of discrete items and PTs included in each CAST IA for all grade levels and grade bands. Grades three, four, and five will each have a single interim assessment that assesses all three science domains. Middle school and high school will each have three interim assessments that assess a single science domain. Segment B PTs will have between four and six items, including a constructed-response item.

Table 1. Summary of Item Counts for All Interim Assessments

Grade Level or Grade Band	Domain(s) Assessed	Number of Segment A Discrete Items	Number of Segment B PTs	Total Items	Points
Grade 3	Earth and Space Sciences, Life Sciences, Physical Sciences	9	1	13 to 15	14 to 18
Grade 4	Earth and Space Sciences, Life Sciences, Physical Sciences	9	1	13 to 15	14 to 18
Grade 5	Earth and Space Sciences, Life Sciences, Physical Sciences	9	1	13 to 15	14 to 18
Middle School	Earth and Space Sciences	9	1	13 to 15	14 to 18
Middle School	Life Sciences	9	1	13 to 15	14 to 18
Middle School	Physical Sciences	9	1	13 to 15	14 to 18
High School	Earth and Space Sciences	10	1	14 to 16	15 to 19
High School	Life Sciences	10	1	14 to 16	15 to 19
High School	Physical Sciences	10	1	14 to 16	15 to 19

Claims for the CAST Interim Assessments

For the CAST IAs in grades three, four, and five, there is an overall claim. In middle school and high school, there is a corresponding domain-specific claim. Table 2. Claims for the CAST Interim Assessments shows the claim statements for the CAST Interim Assessments.

Table 2. Claims for the CAST Interim Assessments

Domains	Description
3D Overall	Teachers will get instructionally relevant information about student progress at the individual and group levels regarding performances associated with the expectations of the California Next Generation Science Standards through the integration of Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts across the domains of Physical Sciences, Life Sciences, Earth and Space Sciences, and Engineering, Technology, and Applications of Science.
3D Earth and Space Sciences	Teachers will get instructionally relevant information about student progress at the individual and group levels regarding performances associated with the expectations in the disciplinary area of Earth and Space Sciences within the California Next Generation Science Standards through the integration of Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts.
3D Life Sciences	Teachers will get instructionally relevant information about student progress at the individual and group levels regarding performances associated with the expectations in the disciplinary area of Life Sciences within the California Next Generation Science Standards through the integration of Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts.
3D Physical Sciences	Teachers will get instructionally relevant information about student progress at the individual and group levels regarding performances associated with the expectations in the disciplinary area of Physical Sciences within the California Next Generation Science Standards through the integration of Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts.

Segments of the CAST Interim Assessments

The CAST IAs are untimed tests, and it is expected to take approximately one 50-minute class period to administer each interim assessment. Each interim assessment consists of a fixed form with two segments.

1. Segment A will contain discrete items and is designed to measure a broad sample of PEs.
2. Segment B will contain a PT and is designed to provide deep measurement of a targeted sample of PEs in item sets.

Because it is not possible to assess all PEs in the first year of interim development, PEs assessed in Segments A and B will be different in the second year of interim development so that approximately 90 percent of all PEs can be assessed over two interim development cycles. Table 3. Coverage of PEs Across the CAST Interim Assessments shows the percentage of distribution of PEs across the interim assessments for Segments A and B.

Table 3. Coverage of PEs Across the CAST Interim Assessments

Domains	Interim I	Interim II	Coverage of PEs
Earth and Space Sciences	Subset of CA NGSS ESS PEs	Subset of CA NGSS ESS PEs	Average of 90% across all grades
Life Sciences	Subset of CA NGSS LS PEs	Subset of CA NGSS LS PEs	Average of 90% across all grades
Physical Sciences	Subset of CA NGSS PS PEs	Subset of CA NGSS PS PEs	Average of 90% across all grades

The goals of the CAST IAs are to

1. Assess a broad range of PEs to reflect classroom instruction across the CA NGSS, and
2. Provide instructionally relevant information about student progress across the CA NGSS.

The blueprint for the CAST IAs is not intended to guide instruction.

Distribution of Items Across DCIs for Grades Three, Four, Five, Middle School, and High School

Table 4. Composition of the Grades Three, Four, and Five Interim Assessments shows the distribution of items by science domain and DCI strand for Segments A and B for the grades three, four, and five interim assessments. The grades three, four, and five interim assessments draw on PEs from the specific grade level[2], which build on the foundational concepts addressed in kindergarten through grade two.

Table 5. Composition of the Middle School and High School Earth and Space Sciences Interim Assessments, Table 6. Composition of the Middle School and High School Life Sciences Interim Assessments, and Table 7. Composition of the Middle School and High School Physical Sciences Interim Assessments show the distribution of items by science domain and DCI strand for Segments A and B of the CAST IAs for middle school and high school. Each domain-specific interim assessment will have sufficient items and points to support the domain-specific claims in Table 2. Claims for the CAST Interim Assessments. Each interim assessment draws on PEs within a domain across several grade levels. The middle school interim assessments draw on all middle school PEs, and the high school interim assessments draw on all high school PEs.

Table 4. Composition of the Grades Three, Four, and Five Interim Assessments

Science Domain and DCI Strand**	Number of Items by DCI in Segment A—Grade 3	Number of Items by DCI in Segment A—Grade 4	Number of Items by DCI in Segment A—Grade 5	Number of PTs in Segment B—All Grade Levels
Physical Sciences 1 *Matter and Its Interactions*	0	0	2–3	0–1
Physical Sciences 2 *Motion and Stability: Forces and Interactions*	2–3	0	0–1	0–1
Physical Sciences 3 *Energy*	0	1–2	0–1	0–1
Physical Sciences 4 *Waves and Their Applications in Technologies for Information Transfer*	0	1–2	0	0–1
Engineering, Technology, and Applications of Science *Engineering Design*	0–1	0–1	0–1	0–1
Total Physical Sciences Items or Performance Tasks	2–4	2–4	2–4	0–1

[2] PTs in Segment B may include grade-level or grade-level-adjacent PEs. For example, items in a PT on the grade three CAST IA may be aligned with grade three or grade four PEs.

Table 4. Composition of the Grades Three, Four, and Five Interim Assessments *(continuation)*

Science Domain and DCI Strand**	Number of Items by DCI in Segment A— Grade 3	Number of Items by DCI in Segment A— Grade 4	Number of Items by DCI in Segment A— Grade 5	Number of PTs in Segment B— All Grade Levels
Life Sciences 1 *From Molecules to Organisms: Structures and Processes*	0–1	2–3	1–2	0–1
Life Sciences 2 *Ecosystems: Interactions, Energy, and Dynamics*	0–1	0	1–2	0–1
Life Sciences 3 *Heredity: Inheritance and Variation of Traits*	1–2	0	0	0–1
Life Sciences 4 *Biological Evolution: Unity and Diversity*	1–2	0	0	0–1
Engineering, Technology, and Applications of Science *Engineering Design*	0–1	0–1	0–1	0–1
Total Life Sciences Items or Performance Tasks	2–4	2–4	2–4	0–1
Earth and Space Sciences 1 *Earth's Place in the Universe*	0	0–1	1–2	0–1
Earth and Space Sciences 2 *Earth's Systems*	1–2	1–2	1–2	0–1
Earth and Space Sciences 3 *Earth and Human Activity*	0–1	1–2	0–1	0–1
Engineering, Technology, and Applications of Science *Engineering Design*	0–1	0–1	0–1	0–1
Total Earth and Space Sciences Items or Performance Tasks	2–4	2–4	2–4	0–1
Total Number of Discrete Items and Performance Tasks on Grade-Level Interim Assessments	9	9	9	1

**The CAST Item Specifications provide greater detail on the assessment targets by PE.

Table 5. Composition of the Middle School and High School Earth and Space Sciences Interim Assessments shows the distribution of items in the ESS domain and DCI strand for Segments A and B of the CAST IAs for middle school and high school.

Table 5. Composition of the Middle School and High School Earth and Space Sciences Interim Assessments

Science Domain and DCI Strand**	Number of Items by DCI in Segment A—Middle School	Number of Items by DCI in Segment A—High School	Number of PTs in Segment B—All Grade Levels
Earth and Space Sciences 1 *Earth's Place in the Universe*	1–3	1–5	0–1
Earth and Space Sciences 2 *Earth's Systems*	1–5	1–6	0–1
Earth and Space Sciences 3 *Earth and Human Activity*	1–4	1–5	0–1
Engineering, Technology, and Applications of Science *Engineering Design*	0–1	0–1	0–1
Total Earth and Space Sciences Items or Performance Tasks	9	10	1

**The CAST Item Specifications provide greater detail on the assessment targets by PE.

Table 6. Composition of the Middle School and High School Life Sciences Interim Assessments shows the distribution of items in the LS domain and DCI strand for Segments A and B of the CAST IAs for middle school and high school.

Table 6. Composition of the Middle School and High School Life Sciences Interim Assessments

Science Domain and DCI Strand**	Number of Items by DCI in Segment A—Middle School	Number of Items by DCI in Segment A—High School	Number of PTs in Segment B—All Grade Levels
Life Sciences 1 *From Molecules to Organisms: Structures and Processes*	1–6	1–6	0–1
Life Sciences 2 *Ecosystems: Interactions, Energy, and Dynamics*	1–4	1–7	0–1
Life Sciences 3 *Heredity: Inheritance and Variation of Traits*	1–2	1–2	0–1
Life Sciences 4 *Biological Evolution: Unity and Diversity*	1–5	1–5	0–1

Table 6. Composition of the Middle School and High School Life Sciences Interim Assessments *(continuation)*

Science Domain and DCI Strand**	Number of Items by DCI in Segment A—Middle School	Number of Items by DCI in Segment A—High School	Number of PTs in Segment B—All Grade Levels
Engineering, Technology, and Applications of Science *Engineering Design*	0–1	0–1	0–1
Total Life Sciences Items or Performance Tasks	9	10	1

**The CAST Item Specifications provide greater detail on the assessment targets by PE.

Table 7. Composition of the Middle School and High School Physical Sciences Interim Assessments shows the distribution of items in the PS domain and DCI strand for Segments A and B of the CAST IAs for middle school and high school.

Table 7. Composition of the Middle School and High School Physical Sciences Interim Assessments

Science Domain and DCI Strand**	Number of Items by DCI in Segment A—Middle School	Number of Items by DCI in Segment A—High School	Number of PTs in Segment B—All Grade Levels
Physical Sciences 1 *Matter and Its Interactions*	1–5	2–7	0–1
Physical Sciences 2 *Motion and Stability: Forces and Interactions*	1–4	1–5	0–1
Physical Sciences 3 *Energy*	1–4	1–4	0–1
Physical Sciences 4 *Waves and Their Applications in Technologies for Information Transfer*	1–2	1–4	0–1
Engineering, Technology, and Applications of Science *Engineering Design*	0–1	0–1	0–1
Total Physical Sciences Items or Performance Tasks	9	10	1

**The CAST Item Specifications provide greater detail on the assessment targets by PE.

Appendix A: Full Titles for SEPs, DCIs, and CCCs

Science and Engineering Practices (SEPs)

SEP 1—Asking Questions (Science)
SEP 1E—Defining Problems (Engineering)
SEP 2—Developing and Using Models
SEP 3—Planning and Carrying Out Investigations
SEP 4—Analyzing and Interpreting Data
SEP 5—Using Mathematics and Computational Thinking
SEP 6—Constructing Explanations (Science)
SEP 6E—Designing Solutions (Engineering)
SEP 7—Engaging in Argument from Evidence
SEP 8—Obtaining, Evaluating, and Communicating Information

Disciplinary Core Ideas (DCIs)

PS1—Matter and Its Interactions
PS2—Motion and Stability: Forces and Interactions
PS3—Energy
PS4—Waves and Their Applications in Technologies for Information Transfer
LS1—From Molecules to Organisms: Structures and Processes
LS2—Ecosystems: Interactions, Energy, and Dynamics
LS3—Heredity: Inheritance and Variation of Traits
LS4—Biological Evolution: Unity and Diversity
ESS1—Earth's Place in the Universe
ESS2—Earth's Systems
ESS3—Earth and Human Activity
ETS1—Engineering, Technology, and Applications of Science

Crosscutting Concepts (CCCs)

1—Patterns
2—Cause and effect
3—Scale, proportion, and quantity
4—Systems and system models
5—Energy and matter
6—Structure and function
7—Stability and change