Iowa Statewide Assessment of Student Progress (ISASP)

Science Test Specifications, Grades 5, 8, and 10

ISASP IOWA STATEWIDE ASSESSMENT of STUDENT PROGRESS

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Science Test Specifications

Introduction

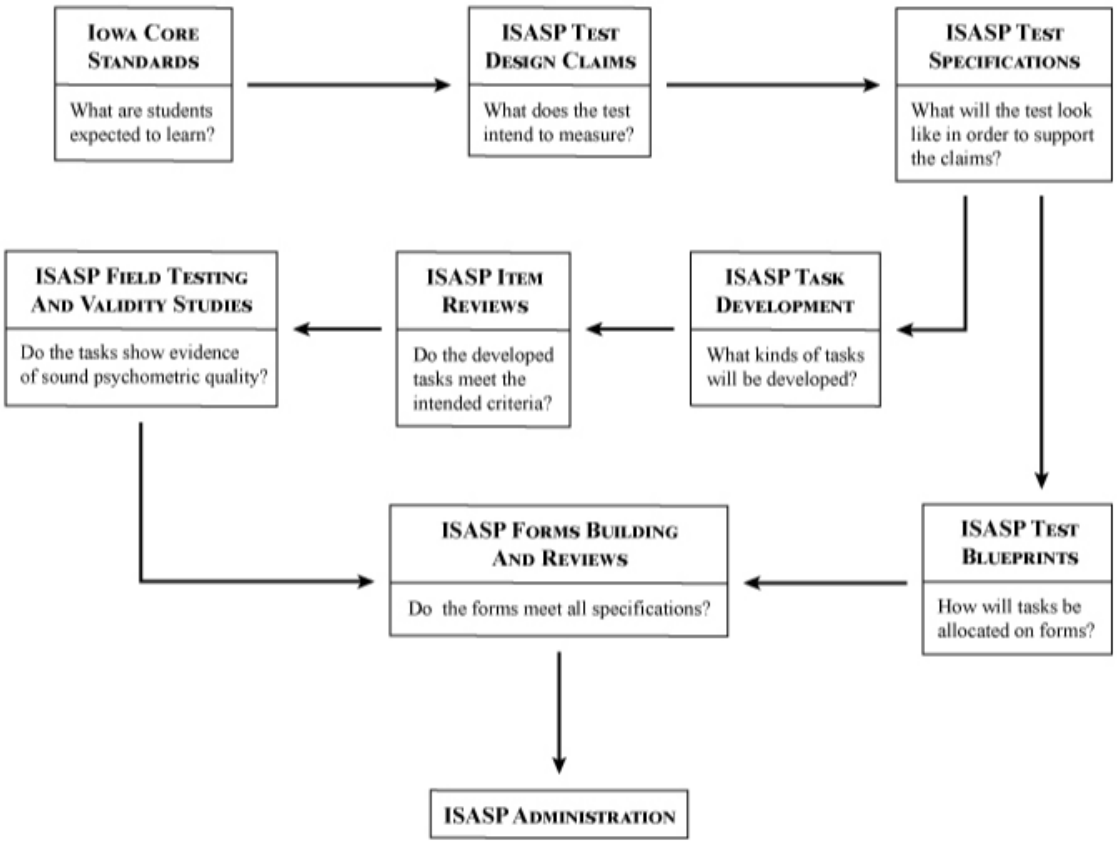
The Iowa Statewide Assessment of Student Progress (ISASP) includes individual assessments in English Language Arts (ELA), Mathematics, and Science intended for use within the last 12 weeks of the academic year. These summative assessments measure student achievement, growth and college and career readiness based on the Iowa Core Standards.

Science test specifications for grades 5, 8, and 10 are presented in this document. Specifically, it has three main sections: 1) test design claims, 2) test and design specifications, and 3) enhanced blueprints.

Evidence-Centered Design and the Iowa Statewide Assessment of Student Progress

Evidence-Centered Design (ECD) presents a rigorous framework for building assessments to ensure "that the way in which evidence is gathered and interpreted [during the test development process] is consistent with the underlying knowledge and purposes the assessment is intended to address." (Mislevy, Almond, & Lukas, 2003, p. 2). While ECD in the largest sense encompasses all aspects of the assessment program, it has particular significance for test development. ECD provides test developers with a means for decision making and documenting essential validity evidence around the claims the assessment is intending to measure, the selection and development of the specific tasks that will be given to elicit student responses, and the creation of the test specifications to be followed in forms assembly. Figure 1 provides a conceptual overview of the various stages of an evidence-based process.

Figure 1. An Evidence-Based Approach to Building the ISASP



Following ECD principles results in the development of ISASP assessments that can be mapped back directly to claims based on the Iowa Core Standards. As Herman and Linn (2015, p. 6) noted, "The transparency of the various ECD stages also provides a means for trying to assure that an assessment will represent the depth and breadth of standards and claims it is intended to measure. Each stage influences and constrains subsequent ones…". These stages work together to produce assessments that elicit the intended evidence to support the claims made by the ISASP.

Test Design Claims

The Science assessments of ISASP has been designed and developed to support the following claims with respect to student performance:

- Students demonstrate progress toward college and career readiness in Science
- Students demonstrate growth across grade bands (3-5, 6-8, and High School) in Science.

Students will demonstrate their understanding of the Iowa Core Standards in Science. Content related claims for grades 5, 8, and 10 are given in Table 1.

Table 1. Grade 5, 8, 10 – Content Related Claims

Grade 5, 8, 10	Claims
Life Science	Students can demonstrate understanding of molecules and organisms, ecosystems, heredity, and biological evolution.
Physical Science	Students can demonstrate understanding of matter and its interactions, motion and stability, energy, and waves.
Earth and Space Science	Students can demonstrate understanding of Earth's place in the universe, Earth's systems, and Earth and Human Activity.

Science standards cut across three dimensions as outlined by the Iowa Core Standards in Science– **Disciplinary Core Ideas**, **Science and Engineering Practices**, and **Crosscutting Concepts**. ISASP items are developed to align to at least two and up to three of these grade-level dimensions. Taken as a whole, the items comprising the ISASP Science test forms provide coverage of all three dimensions (see Achieve, 2018 for a discussion of the unique challenges for aligning summative Science assessments to the Next Generation Science Standards/Iowa Core Standards in Science).

Test and Design Specifications

Test and design specifications provide guidelines for developing sound and aligned assessments to support the claims of the assessment. The test specifications presented in this document reflect the depth and breadth of the performance expectations of the Iowa Core Science Standards. The test specifications include critical information about the domains of the Iowa Core to be assessed, the types of items to be used, the cognitive complexity and breadth of the items, and the statistical targets.

Domains Assessed

Table 2, presented below, provides the domains and domain coverage targets in the Iowa Core that are assessed and reported for the Science tests of the ISASP at Grades 5, 8, and 10. For each Iowa Core domain, the content-related claim referenced in the previous section is made based on student performance.

Table 2. Iowa Core Science Domains Assessed

Iowa Core Science Domains	Grade 5	Grade 8	Grade 10
Life Science	25-45%	25-45%	25-45%
Physical Science	25-45%	25-45%	25-45%
Earth and Space Sciences	25-45%	25-45%	25-45%

Item Types

Measuring the depth and breadth of the current Iowa Core Standards requires a balanced and layered approach that incorporates a range of tasks and stimulus materials. Selected-response items are excellent for efficiently evaluating student knowledge and understanding of a variety of concepts and content included within the Iowa Core. However, additional assessment formats are needed to measure those skills that are not easily assessed by these more traditional formats. The intent of

increasing the types of item formats in the assessments is to expand and improve the measurement of student understanding and proficiency overall.

The ISASP Science tests are designed to mirror the rigor of the current Iowa Core by employing a robust suite of traditional and nontraditional item types, including:

- **Short constructed-response items:** These items challenge students to draw upon higher-order thinking and cognitive processes and generate their own responses. Short constructed-response items in Science typically require the student to make and support with evidence a claim based on the results of a scientific experiment. Short constructed-response items are designed to be answered in 5-7 minutes testing time.
- **Technology-enhanced items (TEIs):** These online items require students to engage in tasks designed to use complex thought processes. These items take advantage of the latest computer-based technologies. They may include response interfaces such as hot spots, drag-and-drop, point-and-click, cloze and graphing; or require students to provide or select multiple responses to a single question. All TEIs are machine scored. Some specific examples of technology-enhanced items types are included in Table 3.
- **Selected-response items:** These items are efficient to administer and offer strong technical properties. These items can be written to address varying levels of cognitive complexity to measure students' skills and knowledge at three cognitive levels. All selected-response Science items have four options.

Table 3. Examples of TEI Types

Item Type	Description
Drop-down Item	This item type allows students to make a selection from a drop-down menu.
Fill-in Item	This item type allows students to type in a text-based response using a keyboard (virtual or physical).
Open-ended Item	This item type allows students to type in a text-based response using a keyboard (virtual or physical).
Order Item	This item type allows students to order options into a sequence.
Hot Spot Item	This item type allows students to select one or more regions on a graphic or image to identify their choice.
Manipulative Item	This item type allows students to work with interactives such as animation, simulation, probability spinner, or other component.

The number of items per item types for grades 5, 8 and 10 for ISASP Science Test is presented in Table 4.

Table 4. ISASP Science Test – Number and Types of Items

Grade	Selected-Response Items (1 point)	Technology-Enhanced Items (1 point)	Constructed-Response Items (2 points)	Total Items
5	25-27	3-5	2	32
8	25-27	3-5	2	32
10	25-27	3-5	2	32

Cognitive Complexity

The depth-of-knowledge (DOK) should be consistent between what is required by the Iowa Core Standards and the items on the ISASP. To ensure this consistency, all items have been reviewed for their cognitive demand to ensure that what students are expected to know and do is consistent between the two. The result is an assessment that includes task demonstrating a full range of item complexity, where each item in the new assessment has been assigned one of three Cognitive Level descriptors. Table 5 describes these levels. Table 6 gives the percentage of tasks on each test form aligned to specific DOK levels.

Table 5. ISASP Cognitive Descriptions

Cognitive Level	Description
Essential Competencies (DOK 1)	This level of difficulty involves recalling information such as facts, definitions, terms, or simple one-step procedures.
Conceptual Understanding (DOK 2)	This level of difficulty requires engaging in some cognitive processing beyond recalling or reproducing a response. A conceptual understanding item requires students to make some decisions as to how to approach the problem or activity and may require them to employ more than a single step.
Extended Reasoning (DOK 3)	This level of difficulty requires problem solving, planning, and/or using evidence. These items require students to develop a strategy to connect and relate ideas in order to solve the problem, and the problem may require that the student use multiple steps and draw upon a variety of skills.

Table 6. Percentage of Items per DOK Level

DOK Level	Grade 5	Grade 8	Grade 10
DOK 1	0-10%	0-10%	0-10%
DOK 2	50-70%	50-70%	50-70%
DOK 3	30-50%	30-50%	30-50%

Statistical Specifications

To ensure support for claims that make inferences about student achievement, growth and readiness, both classical and IRT-based statistics are used to assemble test forms. For classical statistics the selection of items will be limited to those that have p-values within an acceptable range (0.20 to 0.90) and discrimination indices greater than 0.20. For IRT estimates, the selection of items will be based on a-parameters that are above 0.4 and b-parameters between -3.0 and 3.0.

Test Blueprints

The assessments in Science are rigorous, assessing what students can do with what they have learned. Items included in the assessment are carefully selected from the full range of content of the Iowa Core, and require a range of cognitive skills. Furthermore, the specifications provide assessments that address the "three-dimensional" nature of the standards by asking students to demonstrate their understanding of Disciplinary Core Ideas, Science and Engineering Practices, and Crosscutting Concepts. Each item on the ISASP Science tests aligns to at least two of these three dimensions.

In spring 2022, the online Science tests for the Iowa Statewide Assessment of Student Progress (ISASP) moved to an adaptive test design. This design consists of sets of questions, or stages, that vary in difficulty. Students are presented with new stages based on their performance on previous stages. Adaptive testing allows for greater measurement precision of the student's proficiency, while remaining aligned to the Iowa Core standards.

Table 2 provides a summary of the percentage of items within total test by grade level by domain. More detailed test blueprints are given in the Science Enhanced Blueprints that follow.

Alignment Evidence

Development Process Evidence. As discussed in the section on evidence-centered design, alignment to the Iowa Core Standards has been a guiding principle of the development of the ISASP. Adopted by the state in 2016 for Science, these standards define and shape the development and research necessary to build assessments aligned to the Iowa Core in Science.

To produce items that are aligned, Iowa Testing Programs follows a well-defined development process that helps to ensure the appropriate balance and representation of content. This process includes the following steps:

- Creation of test claims for the assessment that tie directly to the Iowa Core Standards in Science
- Creation of test specifications that define the domains, standards and cognitive processes to be measured
- Development of test materials by Iowa educators and content experts that are aligned to the Iowa Core Standards
- Verification of these alignments by focus groups of Iowa educators who are actively teaching English Language Arts, Mathematics, and Science at the appropriate grade levels
- Continued evaluation of the items throughout field testing to confirm the items measure the standards as originally intended

Calling on the expertise of Iowa educators from the very beginning of the development process, including the initial conceptualization of the materials, is a defining feature of the ability to demonstrate alignment to the Iowa Core Standards.

Science Enhanced Blueprints – Grade Level Tables

Grade 5

Domain	Disciplinary Core Ideas (DCI)	Science and Engineering Practices (SEP)	Crosscutting Concepts* (CCC)	Number of Operational Items (Range)	Approximate Percent of Total Test (Range)
Life Science	LS1 From Molecules to Organisms: Structures and Processes LS2 Ecosystems: Interactions and Variation of Traits LS3 Heredity: Inheritance and Variation of Traits LS4 Biological Evolution: Unity and Diversity	1 Asking Questions and Defining Problems 2 Developing and Using Models 3 Planning and Carrying out Investigations 4 Analyzing and Interpreting Data 5 Using Mathematics and Computational Thinking 6 Constructing Explanations and Designing Solutions 7 Engaging in Argument from Evidence 8 Obtaining, Evaluating, and Communicating Information	1 Patterns 2 Cause and Effect 3 Scale, Proportion, and Quantity 4 Systems and System Models 5 Energy and Matter	(8 – 14)	(25% – 45%)
Physical Science	PS1 Matter and Its Interactions LS2 Motion and Stability: Forces and Interactions LS3 Energy LS4 Waves and Their Applications in Technologies for Information Transfer	1 Asking Questions and Defining Problems 2 Developing and Using Models 3 Planning and Carrying out Investigations 4 Analyzing and Interpreting Data 5 Using Mathematics and Computational Thinking 6 Constructing Explanations and Designing Solutions 7 Engaging in Argument from Evidence 8 Obtaining, Evaluating, and Communicating Information	1 Patterns 2 Cause and Effect 3 Scale, Proportion, and Quantity 4 Systems and System Models 5 Energy and Matter	(8 – 14)	(25% – 45%)
Earth and Space Science	ESS1 Earth's Place in the Universe ESS2 Earth's Systems ESS3 Earth and Human Activity	1 Asking Questions and Defining Problems 2 Developing and Using Models 3 Planning and Carrying out Investigations 4 Analyzing and Interpreting Data 5 Using Mathematics and Computational Thinking 6 Constructing Explanations and Designing Solutions 7 Engaging in Argument from Evidence 8 Obtaining, Evaluating, and Communicating Information	1 Patterns 2 Cause and Effect 3 Scale, Proportion, and Quantity 4 Systems and System Models 5 Energy and Matter	(8 – 14)	(25% – 45%)
Total Number of Items per Test				**32**	**100%**

ISASP Grade 5 Science	Item Ranges (Operational)			
	Clusters (3-5 items each)		Items	
	Minimum Number	Maximum Number	Minimum Number	Maximum Number
Life Science	**2**	**4**	**8**	**14**
3-LS1-1 Form Molecules to Organisms: Structures and Processes	0	1	0	7
3-LS2-1 Ecosystems: Interactions, Energy, and Dynamics	0	1	0	7
3-LS3-1 Heredity: Inheritance and Variation of Traits	0	1	0	7
3-LS3-2 Heredity: Inheritance and Variation of Traits	0	1	0	7
3-LS4-1 Biological Evolution: Unity and Diversity	0	1	0	7
3-LS4-2 Biological Evolution: Unity and Diversity	0	1	0	7
3-LS4-3 Biological Evolution: Unity and Diversity	0	1	0	7
3-LS4-4 Biological Evolution: Unity and Diversity*	0	1	0	7
4-LS1-1 From Molecules to Organisms: Structures and Processes	0	1	0	7
4-LS1-2 From Molecules to Organisms: Structures and Processes	0	1	0	7
5-LS1-1 From Molecules to Organisms: Structures and Processes	0	1	0	7
5-LS2-1 Ecosystems: Interactions, Energy, and Dynamics	0	1	0	7
Physical Science	**2**	**4**	**8**	**14**
3-PS2-1 Motion and Stability: Forces and Interactions	0	1	0	7
3-PS2-2 Motion and Stability: Forces and Interactions	0	1	0	7
3-PS2-3 Motion and Stability: Forces and Interactions	0	1	0	7
3-PS2-4 Motion and Stability: Forces and Interactions*	0	1	0	7
4-PS3-1 Energy	0	1	0	7
4-PS3-2 Energy	0	1	0	7
4-PS3-3 Energy	0	1	0	7
4-PS3-4 Energy*	0	1	0	7
4-PS4-1 Waves and Their Applications in Technologies for Information Transfer	0	1	0	7
4-PS4-2 Waves and Their Applications in Technologies for Information Transfer	0	1	0	7
4-PS4-3 Waves and Their Applications in Technologies for Information Transfer*	0	1	0	7
5-PS1-1 Matter and Its Interactions	0	1	0	7
5-PS1-2 Matter and Its Interactions	0	1	0	7

5-PS1-3 Matter and Its Interactions	0	1	0	7
5-PS1-4 Matter and Its Interactions	0	1	0	7
5-PS2-1 Motion and Stability: Forces and Interaction	0	1	0	7
5-PS3-1 Energy	0	1	0	7
Earth and Space Science	**2**	**4**	**8**	**14**
3-ESS2-1 Earth's Systems	0	1	0	7
3-ESS2-2 Earth's Systems	0	1	0	7
3-ESS3-1 Earth and Human Activity*	0	1	0	7
4-ESS1-1 Earth's Place in the Universe	0	1	0	7
4-ESS2-1 Earth's Systems	0	1	0	7
4-ESS2-2 Earth's Systems*	0	1	0	7
4-ESS3-1 Earth and Human Activity	0	1	0	7
4-ESS3-2 Earth and Human Activity	0	1	0	7
5-ESS1-1 Earth's Place in the Universe	0	1	0	7
5-ESS1-2 Earth's Place in the Universe	0	1	0	7
5-ESS2-1 Earth's Systems	0	1	0	7
5-ESS2-2 Earth's Systems	0	1	0	7
5-ESS3-1 Earth and Human Activity	0	1	0	7
Total Number of Items per Test	**32**			

**Engineering component included in PE*

Grade 8

Domain	Disciplinary Core Ideas (DCI)	Science and Engineering Practices (SEP)	Crosscutting Concepts (CCC)	Number of Operational Items (Range)	Approximate Percent of Total Test (Range)
Life Science	LS1 From Molecules to Organisms: Structures and Processes LS2 Ecosystems: Interactions and Variation of Traits LS3 Heredity: Inheritance and Variation of Traits LS4 Biological Evolution: Unity and Diversity	1 Asking Questions and Defining Problems 2 Developing and Using Models 3 Planning and Carrying out Investigations 4 Analyzing and Interpreting Data 5 Using Mathematics and Computational Thinking 6 Constructing Explanations and Designing Solutions 7 Engaging in Argument from Evidence 8 Obtaining, Evaluating, and Communicating Information	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	(8 – 14)	(25% – 45%)
Physical Science	PS1 Matter and Its Interactions PS2 Motion and Stability: Forces and Interactions PS3 Energy PS4 Waves and Their Applications in Technologies for Information Transfer	1 Asking Questions and Defining Problems 2 Developing and Using Models 3 Planning and Carrying out Investigations 4 Analyzing and Interpreting Data 5 Using Mathematics and Computational Thinking 6 Constructing Explanations and Designing Solutions 7 Engaging in Argument from Evidence 8 Obtaining, Evaluating, and Communicating Information	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	(8 – 14)	(25% – 45%)
Earth and Space Science	ESS1 Earth's Place in the Universe ESS2 Earth's Systems ESS3 Earth and Human Activity	1 Asking Questions and Defining Problems 2 Developing and Using Models 3 Planning and Carrying out Investigations 4 Analyzing and Interpreting Data 5 Using Mathematics and Computational Thinking 6 Constructing Explanations and Designing Solutions 7 Engaging in Argument from Evidence 8 Obtaining, Evaluating, and Communicating Information	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	(8 – 14)	(25% –45%)
Total Number of Items per Test				**32**	**100%**

ISASP Grade 8 Science	Item Ranges (Operational)			
	Clusters (3-5 items each)		Items	
	Minimum Number	Maximum Number	Minimum Number	Maximum Number
Life Science	**2**	**4**	**8**	**14**
MS(6)-LS1-1 From Molecules to Organisms: Structures and Processes	0	1	0	7
MS(6)-LS1-2 From Molecules to Organisms: Structures and Processes	0	1	0	7
MS(6)-LS1-3 From Molecules to Organisms: Structures and Processes	0	1	0	7
MS(6)-LS1-8 From Molecules to Organisms: Structures and Processes	0	1	0	7
MS(6)-LS3-2 Heredity: Inheritance and Variation of Traits	0	1	0	7
MS(7)-LS1-4 From Molecules to Organisms: Structures and Processes	0	1	0	7
MS(7)-LS1-5 From Molecules to Organisms: Structures and Processes	0	1	0	7
MS(7)-LS1-6 From Molecules to Organisms: Structures and Processes	0	1	0	7
MS(7)-LS1-7 From Molecules to Organisms: Structures and Processes	0	1	0	7
MS(7)-LS2-1 Ecosystems: Interactions, Energy, and Dynamics	0	1	0	7
MS(7)-LS2-2 Ecosystems: Interactions, Energy, and Dynamics	0	1	0	7
MS(7)-LS2-3 Ecosystems: Interactions, Energy, and Dynamics	0	1	0	7
MS(7)-LS2-4 Ecosystems: Interactions, Energy, and Dynamics	0	1	0	7
MS(7)-LS3-1 Heredity: Inheritance and Variation of Traits	0	1	0	7
MS(8)-LS2-5 Ecosystems: interactions, Energy, and Dynamics*	0	1	0	7
MS(8)-LS4-1 Biological Evolution: Unity and Diversity	0	1	0	7
MS(8)-LS4-2 Biological Evolution: Unity and Diversity	0	1	0	7
MS(8)-LS4-3 Biological Evolution: Unity and Diversity	0	1	0	7
MS(8)-LS4-4 Biological Evolution: Unity and Diversity	0	1	0	7
MS(8)-LS4-5 Biological Evolution: Unity and Diversity	0	1	0	7
MS(8)-LS4-6 Biological Evolution: Unity and Diversity	0	1	0	7
Physical Science	**2**	**4**	**8**	**14**
MS(6)-PS1-1 Matter and Its Interactions	0	1	0	7
MS(6)-PS1-2 Matter and Its Interactions	0	1	0	7
MS(6)-PS1-4 Matter and Its Interactions	0	1	0	7
MS(6)-PS1-5 Matter and Its Interactions	0	1	0	7

MS(6)-PS1-6 Matter and Its Interactions*	0	1	0	7
MS(7)-PS2-3 Motion and Stability: Forces and Interactions	0	1	0	7
MS(7)-PS2-4 Motion and Stability: Forces and Interactions	0	1	0	7
MS(7)-PS2-5 Motion and Stability: Forces and Interactions	0	1	0	7
MS(7)-PS3-2 Energy	0	1	0	7
MS(7)-PS3-4 Energy	0	1	0	7
MS(7)-PS3-5 Energy	0	1	0	7
MS(8)-PS1-3 Matter and Its Interactions	0	1	0	7
MS(8)-PS2-1 Motion and Stability: Forces and Interactions*	0	1	0	7
MS(8)-PS2-2 Motion and Stability: Forces and Interactions	0	1	0	7
MS(8)-PS3-1 Energy	0	1	0	7
MS(8)-PS3-3 Energy*	0	1	0	7
MS(8)-PS4-1 Waves and Their Applications in Technologies for Information Transfer	0	1	0	7
MS(8)-PS4-2 Waves and Their Applications in Technologies for Information Transfer	0	1	0	7
MS(8)-PS4-3 Waves and Their Applications in Technologies for Information Transfer	0	1	0	7
Earth and Space Science	**2**	**4**	**8**	**14**
MS(6)-ESS2-1 Earth's Systems	0	1	0	7
MS(6)-ESS2-2 Earth's Systems	0	1	0	7
MS(6)-ESS2-3 Earth's Systems	0	1	0	7
MS(6)-ESS3-1 Earth and Human Activity	0	1	0	7
MS(6)-ESS3-2 Earth and Human Activity	0	1	0	7
MS(7)-ESS1-1 Earth's Place in the Universe	0	1	0	7
MS(7)-ESS1-2 Earth's Place in the Universe	0	1	0	7
MS(7)-ESS1-3 Earth's Place in the Universe	0	1	0	7
MS(7)-ESS1-4 Earth's Place in the Universe	0	1	0	7
MS(8)-ESS2-4 Earth's Systems	0	1	0	7
MS(8)-ESS2-5 Earth's Systems	0	1	0	7
MS(8)-ESS2-6 Earth's Systems	0	1	0	7
MS(8)-ESS3-3 Earth and Human Activity*	0	1	0	7
MS(8)-ESS3-4 Earth and Human Activity	0	1	0	7
MS(8)-ESS3-5 Earth and Human Activity	0	1	0	7
Total Number of Items per Test	**32**			

**Engineering component included in PE*

Grade 10

Domain	Disciplinary Core Ideas (DCI)	Science and Engineering Practices (SEP)	Crosscutting Concepts (CCC)	Number of Operational Items (Range)	Approximate Percent of Total Test (Range)
Life Science	LS1 From Molecules to Organisms: Structures and Processes LS2 Ecosystems: Interactions and Variation of Traits LS3 Heredity: Inheritance and Variation of Traits LS4 Biological Evolution: Unity and Diversity	1 Asking Questions and Defining Problems 2 Developing and Using Models 3 Planning and Carrying out Investigations 4 Analyzing and Interpreting Data 5 Using Mathematics and Computational Thinking 6 Constructing Explanations and Designing Solutions 7 Engaging in Argument from Evidence 8 Obtaining, Evaluating, and Communicating Information	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	(8 – 14)	(25% – 45%)
Physical Science	PS1 Matter and Its Interactions PS2 Motion and Stability: Forces and Interactions PS3 Energy PS4 Waves and Their Applications in Technologies for Information Transfer	1 Asking Questions and Defining Problems 2 Developing and Using Models 3 Planning and Carrying out Investigations 4 Analyzing and Interpreting Data 5 Using Mathematics and Computational Thinking 6 Constructing Explanations and Designing Solutions 7 Engaging in Argument from Evidence 8 Obtaining, Evaluating, and Communicating Information	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	(8 – 14)	(25% – 45%)
Earth and Space Science	ESS1 Earth's Place in the Universe ESS2 Earth's Systems ESS3 Earth and Human Activity	1 Asking Questions and Defining Problems 2 Developing and Using Models 3 Planning and Carrying out Investigations 4 Analyzing and Interpreting Data 5 Using Mathematics and Computational Thinking 6 Constructing Explanations and Designing Solutions 7 Engaging in Argument from Evidence 8 Obtaining, Evaluating, and Communicating Information	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	(8 – 14)	(25% – 45%)
Total Number of Items per Test				**32**	**100%**

ISASP Grade 10 Science	Item Ranges (Operational)			
	Clusters (3-5 Items each)		Items	
	Minimum Number	Maximum Number	Minimum Number	Maximum Number
Life Science	**2**	**4**	**8**	**14**
HS-LS1-1 Form Molecules to Organisms: Structures and Processes	0	1	0	7
HS-LS1-2 Form Molecules to Organisms: Structures and Processes	0	1	0	7
HS-LS1-3 Form Molecules to Organisms: Structures and Processes	0	1	0	7
HS-LS1-4 Form Molecules to Organisms: Structures and Processes	0	1	0	7
HS-LS1-5 Form Molecules to Organisms: Structures and Processes	0	1	0	7
HS-LS1-6 Form Molecules to Organisms: Structures and Processes	0	1	0	7
HS-LS1-7 Form Molecules to Organisms: Structures and Processes	0	1	0	7
HS-LS2-1 Ecosystems: Interactions, Energy, and Dynamics	0	1	0	7
HS-LS2-2 Ecosystems: Interactions, Energy, and Dynamics	0	1	0	7
HS-LS2-3 Ecosystems: Interactions, Energy, and Dynamics	0	1	0	7
HS-LS2-4 Ecosystems: Interactions, Energy, and Dynamics	0	1	0	7
HS-LS2-5 Ecosystems: Interactions, Energy, and Dynamics	0	1	0	7
HS-LS2-6 Ecosystems: Interactions, Energy, and Dynamics	0	1	0	7
HS-LS2-7 Ecosystems: Interactions, Energy, and Dynamics*	0	1	0	7
HS-LS2-8 Ecosystems: Interactions, Energy, and Dynamics	0	1	0	7
HS-LS3-1 Heredity: Inheritance and Variation of Traits	0	1	0	7
HS-LS3-2Heredity: Inheritance and Variation of Traits	0	1	0	7
HS-LS3-3 Heredity: Inheritance and Variation of Traits	0	1	0	7
HS-LS4-1 Biological Evolution: Unity and Diversity	0	1	0	7
HS-LS4-2 Biological Evolution: Unity and Diversity	0	1	0	7
HS-LS4-3 Biological Evolution: Unity and Diversity	0	1	0	7
HS-LS4-4 Biological Evolution: Unity and Diversity	0	1	0	7
HS-LS4-5 Biological Evolution: Unity and Diversity	0	1	0	7
HS-LS4-6 Biological Evolution: Unity and Diversity*	0	1	0	7
Physical Science	**2**	**4**	**8**	**14**
HS-PS1-1 Matter and Its Interactions	0	1	0	7
HS-PS1-2 Matter and Its Interactions	0	1	0	7

HS-PS1-3 Matter and Its Interactions	0	1	0	7
HS-PS1-4 Matter and Its Interactions	0	1	0	7
HS-PS1-5 Matter and Its Interactions	0	1	0	7
HS-PS1-6 Matter and Its Interactions	0	1	0	7
HS-PS1-7 Matter and Its Interactions	0	1	0	7
HS-PS1-8 Matter and Its Interactions	0	1	0	7
HS-PS2-1 Motion and Stability: Forces and Interactions	0	1	0	7
HS-PS2-2 Motion and Stability: Forces and Interactions	0	1	0	7
HS-PS2-3 Motion and Stability: Forces and Interactions	0	1	0	7
HS-PS2-4 Motion and Stability: Forces and Interactions	0	1	0	7
HS-PS2-5 Motion and Stability: Forces and Interactions	0	1	0	7
HS-PS2-6 Motion and Stability: Forces and Interactions*	0	1	0	7
HS-PS3-1 Energy	0	1	0	7
HS-PS3-2 Energy	0	1	0	7
HS-PS3-3 Energy*	0	1	0	7
HS-PS3-4 Energy	0	1	0	7
HS-PS3-5 Energy	0	1	0	7
HS-PS4-1 Waves and Their Applications in Technologies for Information Transfer	0	1	0	7
HS-PS4-2 Waves and Their Applications in Technologies for Information Transfer	0	1	0	7
HS-PS4-3 Waves and Their Applications in Technologies for Information Transfer	0	1	0	7
HS-PS4-4 Waves and Their Applications in Technologies for Information Transfer	0	1	0	7
HS-PS4-5 Waves and Their Applications in Technologies for Information Transfer*	0	1	0	7
Earth and Space Science	**2**	**4**	**8**	**14**
HS-ESS1-1 Earth's Place in the Universe	0	1	0	7
HS-ESS1-2 Earth's Place in the Universe	0	1	0	7
HS-ESS1-3 Earth's Place in the Universe	0	1	0	7
HS-ESS1-4 Earth's Place in the Universe	0	1	0	7
HS-ESS1-5 Earth's Place in the Universe	0	1	0	7
HS-ESS1-6 Earth's Place in the Universe	0	1	0	7
HS-ESS2-1 Earth's Systems	0	1	0	7
HS-ESS2-2 Earth's Systems	0	1	0	7
HS-ESS2-3 Earth's Systems	0	1	0	7
HS-ESS2-4 Earth's Systems	0	1	0	7

HS-ESS2-5 Earth's Systems	0	1	0	7
HS-ESS2-6 Earth's Systems	0	1	0	7
HS-ESS2-7 Earth's Systems	0	1	0	7
HS-ESS3-1 Earth and Human Activity	0	1	0	7
HS-ESS3-2 Earth and Human Activity*	0	1	0	7
HS-ESS3-3 Earth and Human Activity	0	1	0	7
HS-ESS3-4 Earth and Human Activity	0	1	0	7
HS-ESS3-5 Earth and Human Activity	0	1	0	7
HS-ESS3-6 Earth and Human Activity	0	1	0	7
Total Number of Items per Test	**32**			

**Engineering component included in PE*

References

Achieve, Inc. (2018). *Criteria for procuring and evaluating high-quality and aligned summative science assessments, version 1.0.* Retrieved from https://www.achieve.org/files/Criteria03202018.pdf

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