PreACT® Secure
Technical Memo

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ACT®

Introduction

The *PreACT® Secure Technical Memo* provides a high-level introduction to technical information about PreACT Secure. The principal purpose of the memo is to document some basic technical characteristics of PreACT Secure for its intended uses and interpretations. The *PreACT Secure Technical Memo* documents test blueprints, scores, and high-level content descriptions that help support appropriate interpretations of PreACT Secure scores. The *PreACT Secure Technical Memo* applies to PreACT Secure administered during the 2022–2023 school year. The memo will be replaced with a full technical manual in fall 2023*.

ACT endorses and is committed to complying with *The Standards for Educational and Psychological Testing* (AERA, APA, & NCME, 2014). ACT also endorses the *Code of Fair Testing Practices in Education* (Joint Committee on Testing Practices, 2004), which is a statement of the obligations to test takers of those who develop, administer, or use educational tests and test data in the following four areas: developing and selecting appropriate tests, administering and scoring tests, reporting and interpreting test results, and informing test takers. ACT endorses and is committed to complying with the *Code of Professional Responsibilities in Educational Measurement* (NCME Ad Hoc Committee on the Development of a Code of Ethics, 1995), which is a statement of professional responsibilities for those involved with various aspects of assessments, including development, marketing, interpretation, and use.

We encourage individuals who want more detailed information on a topic discussed in this manual, or on a related topic, to contact ACT.

Please direct comments or inquiries to the address below:

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Overview of PreACT Secure

This overview briefly describes the purpose of PreACT Secure, who uses the test and how, the test content, and the types of scores students receive, as well as benefits of PreACT Secure.

Purpose. The primary purpose of PreACT Secure is to measure a student's level of achievement in core academic areas taught in high school and is intended to be taken in grades 9 and 10. Users apply test data, test scores, and interpretations for many different purposes:

- College and career planning – Students and educators use results to monitor progress toward college and career readiness.
- Preparation and prediction – Performance on PreACT Secure is used to predict performance on the ACT and ACT WorkKeys Tests.
- Educational measurement – Test results help to identify academic gaps and areas for improvement.

Subjects. PreACT Secure contains subject tests in the following content areas:

- English
- Reading
- Mathematics
- Science

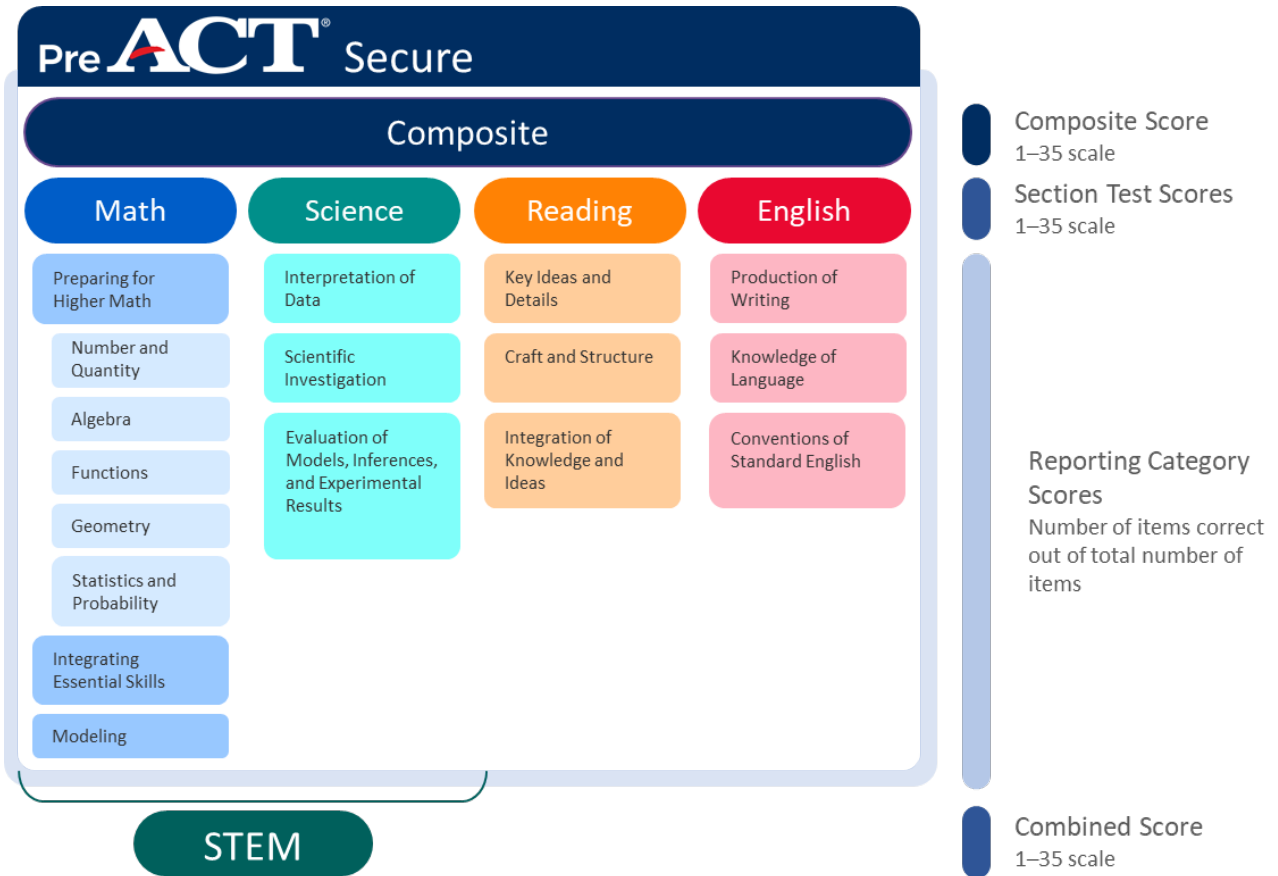The subject tests consist of multiple-choice items and are administered together as a battery.

Scores. PreACT Secure provides a variety of scores, as shown in the table on the next page and described below:

Composite and subject scores – Students receive a Composite score; overall subject scores for English, mathematics, reading, and science; and scores in multiple reporting categories for each of the subject tests. Each subject test score is reported on a scale that ranges from 1 to 35. The PreACT Secure score scale is linked to the ACT scores using common-item IRT pre-equating procedures. Therefore, corresponding test scores can be compared directly between PreACT Secure, and ACT (e.g., PreACT English to ACT English).
Science, technology, engineering, and math (STEM) score – Combines mathematics and science scores.
PreACT Secure reporting category scores – Provide granular information about student performance in designated categories on each subject test

Scores Reported

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Composite

Math	Science	Reading	English
Preparing for Higher Math	Interpretation of Data	Key Ideas and Details	Production of Writing
Number and Quantity	Scientific Investigation	Craft and Structure	Knowledge of Language
Algebra	Evaluation of Models, Inferences, and Experimental Results	Integration of Knowledge and Ideas	Conventions of Standard English
Functions			
Geometry			
Statistics and Probability			
Integrating Essential Skills			
Modeling			

STEM

Composite Score
1–35 scale

Section Test Scores
1–35 scale

Reporting Category Scores
Number of items correct out of total number of items

Combined Score
1–35 scale

English

Content Description

Item tally and time – The PreACT Secure English test has 48 items (36 scored items and 12 field-test items) and a 35-minute time limit.

Concept – The test puts the student in the position of a writer who makes decisions to revise and edit a text.

Knowledge and skills tested – The test measures knowledge areas and related skills reflected in these reporting categories:

- o **Production of Writing:** Students apply their understanding of the rhetorical purpose and focus of a piece of writing to develop a topic effectively. They use various strategies to achieve logical organization, topical unity, and cohesion.
- o **Knowledge of Language:** Students demonstrate effective language use by ensuring precision and concision in word choice and maintaining consistency in style and tone.
- o **Conventions of Standard English:** Students apply their understanding of the conventions of standard English grammar, usage, and mechanics to revise and edit text.

The reporting category table below shows the reporting categories and the granular knowledge and skill targets in these categories that make up the ACT content framework.

Format and item types – The PreACT Secure English test consists of four passages (three scored passages and one field-test passage), each accompanied by a sequence of multiple-choice test items.

- o Different text types are used to provide a variety of rhetorical situations.
- o Students must use the rich context of the text to make editorial choices, demonstrating their understanding of writing strategies and conventions.
- o Texts are chosen not only for their appropriateness in assessing writing and language skills but also to reflect students' interests and experiences.

Knowledge and skills not tested – Spelling and the rote recall of grammar rules are not tested.

Test blueprints.
Four scores are reported for the PreACT Secure test—a total test score based on all 36 scored items and the three reporting category scores. The reporting categories constitute a specific number of items and percentage of the test, as shown in the table below.

Reporting Category	Number of Items	Percentage of Test
Production of Writing	10–12	28–33%
Knowledge of Language	5–7	14–19%
Conventions of Standard English	18–20	50–56%

Reporting Category Descriptions

Reporting Category	Skill Area	Description/Examples
Production of Writing	*Topic Development—Purpose and Focus:* Involves the ability to make content and stylistic choices that provide support for a text's rhetorical purpose.	Determine if a text's purpose is supported by organizational structure and content. Revise text to enhance focus and cohesion.
	Organization, Unity, and Cohesion: Involves the ability to support a text's purpose by progressing from point to point logically and smoothly.	Order sentences and paragraphs and use transitions to enhance overall purpose, unity, and logical cohesion. Frame texts effectively with transitions, introductions, and conclusions.
Knowledge of Language	*Expressing Ideas Clearly:* Involves the ability to be precise and concise by using vocabulary skillfully and by avoiding wordiness and redundancy.	Use general academic and domain-specific language precisely and eliminate redundancy and wordiness when the meaning of the sentence or paragraph must be considered.
	Style: Involves the ability to maintain stylistic consistency appropriate for the communication task and to use language purposefully.	Maintain a consistent style and tone and use words, phrases, and sentences purposefully, considering their effect on the whole text.
Conventions of Standard English	*Sentence Structure and Formation:* Involves the ability to ensure the grammatical soundness of a variety of sentences.	Recognize and correct subtle structural errors in sophisticated sentence structure and complex contexts, including when the meaning of multiple sentences or paragraphs must be considered.
	Usage Conventions: Involves the knowledge of and ability to apply rules of standard English usage.	Recognize and correct usage errors in structurally sophisticated sentences, including when relevant elements are separated by intervening text.
	Punctuation Conventions: Involves the knowledge and	Recognize and correct punctuation errors in

Reporting Category	Skill Area	Description/Examples
	ability to apply the rules of standard English punctuation.	sophisticated sentence structures and complex contexts, including using punctuation to reduce ambiguity of sentences and paragraphs.

Mathematics

Content Description

Item tally and time – The PreACT Secure mathematics test has 38 items (33 scored items and 5 field-test items) and a 45-minute time limit.

Concept – The test measures the whole of a student's mathematical development of topics typically taught up to the beginning of Grade 12 in US schools, with emphasis placed on topics typically taught from Grade 8 through the first 2 years of high school. It focuses on the prerequisite knowledge and skills important for success in college mathematics courses and career training programs.

Knowledge and skills tested – The test measures knowledge areas and related skills reflected in these reporting categories:

- **Preparing for Higher Mathematics:** Students apply the more recent mathematics they are learning. This reporting category is divided into the following five subcategories:
  - **Number and Quantity:** Students demonstrate knowledge of real and complex number systems. They understand and reason with numerical quantities in many forms, including integer and rational exponents and vectors and matrices.
  - **Algebra:** Students manipulate algebraic expressions. They solve, graph, and create equations and inequalities of different types, including but not limited to linear, polynomial, radical, and exponential. They find solutions to systems of equations and extend their knowledge to applications.
  - **Functions:** Students apply their knowledge of function definition, notation, representation, and application. Function types include but are not limited to linear, radical, piecewise, polynomial, and logarithmic. Students manipulate and translate functions, as well as find and apply important features of graphs.
  - **Geometry:** Students define and apply knowledge of shapes and solids, such as congruence and similarity relationships or surface area and volume measurements. They understand composition of objects and solve for missing values in triangles, circles, and other figures, including using trigonometric ratios and equations of circles.
  - **Statistics and Probability:** Students describe center and spread of distributions, apply and analyze data collection methods, understand and model relationships in bivariate data, and calculate probabilities.
- **Integrating Essential Skills:** Students put together understandings and skills to solve problems of moderate to high complexity. Topics include rate and percentage; proportional reasoning; area, surface area, and volume; quantities and units; expressing numbers in diverse ways; using expressions to represent

quantities and equations to capture relationships; rational exponents; the basics of functions; and function notation.

- o **Modeling:** Students use mathematics to represent, through a model, an analysis of an actual, empirical situation. The Modeling reporting category represents all items that involve producing, interpreting, understanding, evaluating, and improving models. Each modeling item is also counted in the other appropriate reporting categories above. Thus, the Modeling reporting category is an overall measure of how well a student uses modeling skills across mathematical topics.

The reporting category table below shows the reporting categories and the granular knowledge and skill targets in these categories that make up the content framework.

Format and item type – All test items are multiple choice. Most test items are self-contained. Some may belong to a set of several items (for example, each about the same graph or chart). The items measure the following reporting categories:

- o Preparing for Higher Mathematics
- o Integrating Essential Skills
- o Modeling

Knowledge and skills not tested – Knowledge of basic formulas and computational skills are assumed as background for the problems, but recall of complex formulas and extensive computation are not required. A calculator is encouraged but not required.

Test blueprints. Nine scores are reported—a total test score based on the 33 scored items and eight reporting category scores, which include the subcategories for Preparing for Higher Mathematics. The reporting categories constitute a specific number of scored items and percentage of the test, as shown in the table below.

Reporting Category	Number of Items	Percentage of Test
Preparing for Higher Mathematics	21	64%
Number and Quantity	3–5	9–15%
Algebra	4–6	12–18%
Functions	4–6	12–18%
Geometry	3–5	9–15%
Statistics and Probability	3–5	9–15%
Integrating Essential Skills	12	36%
Modeling*	≥8	≥24%

* Items for Modeling are included in the item counts in Preparing for Higher Mathematics and Integrating Essential Skills.

In addition, the overall mathematics test score, and the overall science score, are used to determine the STEM score.

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Reporting Category Descriptions

Reporting Category	Skill Area	Description/Examples
Preparing for Higher Mathematics: Number and Quantity	Rational and Irrational Numbers	Use and apply the properties of rational and irrational numbers.
	Properties of Exponents	Use and apply the properties of exponents. Understand the relationship between rational exponents and radicals.
	Vectors and Matrices	Model situations, solve problems, and perform operations involving vectors and matrices.
	Complex Numbers	Perform operations and solve equations involving complex numbers.
	Quantities and Units	Reason quantitatively and use units to solve problems.
Preparing for Higher Mathematics: Algebra	Linear Expressions, Equations, and Inequalities	Model situations, solve problems, and perform operations involving linear expressions, equations, and inequalities.
	Quadratic Expressions, Equations, and Inequalities	Model situations, solve problems, and perform operations involving quadratic expressions, equations, and inequalities.
	Rational and Radical Expressions and Equations	Model situations, solve problems, and perform operations involving rational and radical expressions and equations.
	Polynomial Expressions and Equations	Model situations, solve problems, and perform operations involving polynomial expressions and equations.
	Systems of Equations and Inequalities	Solve, graph, and model situations with systems of equations and inequalities.

Reporting Category	Skill Area	Description/Examples
	Representation of Expressions and Equations	Rewrite expressions and equations in equivalent forms.
Preparing for Higher Mathematics: Functions	Properties of Functions	Evaluate, create, and describe the properties of functions. Convert between different representations of functions.
	Function Composition, Transformation, and Inverse Functions	Compose and transform functions, find inverse functions, and state the domain and range of a function composition.
	Sequences and Series	Model situations, solve problems, and perform operations involving sequences and series.
	Trigonometric Functions	Model situations, solve problems, and perform operations using trigonometric functions and identities.
	Exponential and Logarithmic Functions	Model situations, solve problems, and perform operations involving exponential and logarithmic functions.
Preparing for Higher Mathematics: Geometry	Transformations	Model situations, solve problems, and perform operations involving transformations of geometric figures in a plane.
	Proof, Reasoning, and Constructions	Use logical arguments to prove theorems about geometric figures, and construct various geometric figures.
	Similarity, Right Triangles, and Trigonometry	Use properties of similarity and congruence to solve problems. Define trigonometric ratios in terms of right triangles, and apply these ratios to general triangles.
	Coordinate Geometry	Model situations and solve problems with geometric figures in the coordinate plane.

Reporting Category	Skill Area	Description/Examples
	Conic Sections	Model situations and solve problems involving conic sections.
	Properties of Circles	Solve problems using properties and features of circles, including inscribed angles, central angles, radii, chords, secants, and tangents.
	Geometric Measurement and Modeling	Model situations and solve problems involving solids such as pyramids, cones, and spheres.
	Pythagorean Theorem	Use the Pythagorean Theorem to solve problems.
Preparing for Higher Mathematics: Statistics and Probability	Univariate Data Analysis	Solve problems involving the comparison and interpretation of the center, shape, and spread of univariate datasets, including normally distributed datasets.
	Bivariate Data Analysis	Summarize, represent, and interpret datasets with two categorical or two quantitative variables. Determine whether an association exists between two variables.
	Introduction to Formal Inferential Statistics	Use sample data and margin of error to estimate population parameters. Use simulation or other methods to reject or fail to reject claims about population parameters.
	Rules of Probability	Use rules of probability to compute probabilities and expected values.
	Counting, Permutations, and Combinations	Use counting principles, combinations, and permutations to compute probabilities of compound events and solve problems.
	Scatterplots	Analyze scatterplots and, where appropriate, draw informal lines of best fit and represent them symbolically.

Reporting Category	Skill Area	Description/Examples
Integrating Essential Skills	Properties of Integers and Rational Numbers	Use and apply the properties of integers and rational numbers.
	Computation and Problem-Solving with Integers and Rational Numbers	Evaluate expressions and solve problems involving integers and rational numbers.
	Ratio, Proportion, and Percent	Use ratios, proportions, and percents in problem-solving situations.
	Writing Algebraic Expressions	Model situations and perform operations with linear and polynomial expressions.
	Writing and Solving Simple Equations and Inequalities	Write one- and two-variable linear equations, and use these equations to answer questions.
	Perimeter, Circumference, and Area	Calculate the perimeter, circumference, and area of polygons and circles.
	Surface Area and Volume of Prisms	Calculate the surface area and volume of prisms.
	Measurement Units and Unit Conversion	Model situations, solve problems, and perform operations involving measurement units and scale models.
	Properties of Lines, Angles, and Shapes	Use the properties of lines, angles, two-dimensional shapes, and three-dimensional shapes to describe situations and solve problems.
	The Coordinate Plane	Solve problems involving the graphing of points and polygons in the coordinate plane.
	Informal Inferential Statistics	Estimate a population parameter with sample data. Compare features of two or more datasets.
	Data Summaries and Displays	Describe the distribution of a quantitative dataset by its shape and measures of center and

Reporting Category	Skill Area	Description/Examples
		spread. Present data in displays such as line plots, histograms, box plots, and bar charts.
	Basic Probability	Compute probabilities for simple events and for compound events where the sample space can be listed.
Modeling	Producing	Produce a model for a given real-world or mathematical context.
	Interpreting	Interpret the parameters of a model in terms of the situation.
	Understanding	Show understanding by determining the conditions under which a model works or does not work.
	Evaluating	Choose the best model for a situation or decide if a model is appropriate for a given situation.
	Improving	Improve a model by adjusting its parameters.

Reading

Content Description

Item tally and time – The PreACT Secure reading test has 33 items (25 scored items and 8 field-test items) and a 40-minute time limit.

Concept – The test measures a student's ability to read closely, reason about texts using evidence, and integrate information from multiple sources.

Knowledge and skills tested – The test measures knowledge areas and related skills reflected in these reporting categories:

- **Key Ideas and Details:** Students read texts closely to determine central ideas and themes; summarize information and ideas accurately; and read closely to understand relationships and draw logical inferences and conclusions, including understanding sequential, comparative, and cause-effect relationships.
- **Craft and Structure:** Students determine word and phrase meanings, analyze an author's word choice rhetorically, analyze text structure, understand authorial purpose and perspective, and analyze characters' points of view. Students interpret authorial decisions rhetorically and differentiate between various perspectives and sources of information.
- **Integration of Knowledge and Ideas:** Students understand authors' claims, differentiate between facts and opinions, and use evidence to make connections between different texts that are related by topic. Some items will require students to analyze how authors construct arguments, evaluating reasoning and evidence from various sources.

The reporting category table below shows the reporting categories and the granular knowledge and skill targets in these categories that make up the content framework.

Format and item types – The PreACT Secure reading test consists of four sections (three scored sections and one field-test section), each containing a passage or pair of passages accompanied by a sequence of multiple-choice test items.

- Passages in the reading test may include both literary narratives and informational texts from the humanities, natural sciences, and social sciences.

Knowledge and skills not tested – Rote recall of facts from outside the passage or rules of formal logic are not tested. The test also does not include items about vocabulary that can be answered without referring to the passage context.

Test blueprints. Four scores are reported for the PreACT Secure reading test—a total test score based on all 25 scored items and the three reporting category scores. The reporting categories constitute a specific number of items and percentage of the test, as shown in the table below.

Reporting Category	Number of Items	Percentage of Test
Key Ideas and Details	13–15	52–60%
Craft and Structure	7–9	28–36%
Integration of Knowledge and Ideas	3–4	12–16%

Reporting Category Descriptions

Reporting Category	Skill Area	Description/Examples
Key Ideas and Details	*Close Reading:* Involves the ability to attend carefully to what a text says and draw well-supported conclusions from a text.	Analyze challenging, complex, and highly complex texts to determine what the text says explicitly as well as draw conclusions based on textual support.
	Relationships: Involves the ability to identify and understand relationships between individuals, events, themes, and ideas in a text.	Identify and infer sequences, comparative relationships, and cause-effect relationships developed across a text.
	Central Ideas, Themes, Summaries: Involves the ability to synthesize information in a text in order to identify central ideas or themes, differentiate key ideas from ideas of lesser importance, and summarize text concisely.	Determine a central idea or theme of challenging, complex, and highly complex texts and summarize ideas and information developed across a text.
Craft and Structure	*Word Meanings and Word Choice:* Involves the ability to determine the meaning of words and phrases, including academic and domain-specific words, multiple-meaning words, and figurative language, based on the context of a text.	Determine the meaning, including figurative, connotative, and technical meanings, of words and phrases as they are used in more challenging, complex, and highly complex texts.
	Text Structure: Involves the ability to analyze text rhetorically in order to understand how an author's choices create effects on the reader.	Analyze rhetorical devices and the structure of more challenging, complex, and highly complex texts.

Reporting Category	Skill Area	Description/Examples
	Purpose and Point of View: Involves the ability to understand and analyze a text's rhetorical situation, including the author's intent, perspective, and use of rhetorical techniques.	Analyze stated and implied purposes in texts; analyze point of view and narrative techniques in narrative texts; analyze rhetorical techniques as well as authorial bias.
Integration of Knowledge and Ideas	*Arguments:* Involves the ability to understand and analyze arguments in a text, including claims, counterclaims, and supporting evidence.	Analyze the use of persuasive elements and development of an argument in more challenging, complex, and highly complex texts, assessing whether the evidence provided is relevant, sound, and sufficient.
	Synthesis of Multiple Texts: Involves the ability to make connections between, and integrate knowledge across, two or more texts.	Analyze how different literary, thematic, and structural elements inform both shared and distinct ideas when comparing more challenging, complex, and highly complex texts, as well as synthesize information across texts to build new knowledge and insights.

Science

Content Description

Item tally and time – The PreACT Secure science test has 36 items (30 scored items and 6 field-test items) and a 35-minute time limit.

Concept – The test measures science and engineering knowledge, practices, and skills that are highly correlated with college success. The correlations are based on both decades of empirical research and the responses of post-secondary educators on the ACT National Curriculum Survey.

Knowledge and skills tested – The test measures knowledge areas and related skills reflected in these reporting categories:

- o **Interpretation of Data:** Students locate, translate, infer, and extend from and evaluate data and information in scientific graphs, tables, and diagrams of varying complexity. This reporting category is divided into the following three subcategories:
    - ▪ Locating and Understanding
    - ▪ Inferring and Translating
    - ▪ Extending and Re-evaluating
- o **Scientific Investigation:** Students understand the tools, procedures, and designs of scientific experiments and compare, extend, and modify those experiments. This reporting category is divided into the following three subcategories:
    - ▪ Locating and Comparing
    - ▪ Designing and Implementing
    - ▪ Extending and Improving
- o **Evaluating Models, Inferences, and Experimental Results:** Students evaluate the validity of scientific claims based on evidence and formulate conclusions and predictions based on that information using a claim, evidence, or reasoning model of scientific argument. This reporting category is divided into the following three subcategories:
    - ▪ Inferences and Results – Evaluating and Extending
    - ▪ Models – Understanding
    - ▪ Models – Evaluating and Extending

The reporting category table below shows the reporting categories and the granular knowledge and skill targets in these categories that make up the ACT content framework.

Format and item type – Science and engineering knowledge, skills, and practices are applied to rich scientific passages that are written in one of three formats: Data Representation, Research Summaries, or Conflicting Viewpoints. Each passage is accompanied by a set of multiple-choice items. Interaction with each passage format requires students to engage in scientific sense-making around the following:

- o Experimental procedures and phenomena (Research Summaries)
- o Data presentations (Data Representation)

o   Scientific models and explanations (Conflicting Viewpoints)
o   Each passage is accompanied by a set of multiple-choice items.

Test blueprints. Four scores are reported—a total test score based on all 30 items and the three reporting category scores. The reporting categories constitute a specific number of items and percentage of the test, as shown below. A table describing the reporting categories in detail follows this.

Reporting Category	Number of Items	Percentage of Test
Interpretation of Data	6–12	20–40%
Scientific Investigation	5–12	17–40%
Evaluation of Models, Inferences, and Experimental Results	6–12	20–40%

In addition, the overall science test score is combined with the overall mathematics score to determine the STEM score.

Topics from all major disciplines (biology, chemistry, physics, and earth and space science) are used on the test to elicit evidence of how students apply science practices. Some items require specific content knowledge to successfully complete the task; however, these involve the use of a science practice as well. Consequently, no science scores are reported in relation to the major science disciplines.

Reporting Category Descriptions

Reporting Category	Skill Area	Description/Examples
Interpretation of Data	Locating and Understanding	Locate one or more pieces of data and understand features of graphics and tables, such as units, legends, and axes.
	Inferring and Translating	Use data from one or more graphs and/or tables to identify trends, make inferences and comparisons, or translate into other graphic formats.
	Extending and Re-evaluating	Make predictions based on trends in data.
Scientific Investigation	Locating and Comparing	Locate, compare, and contrast information about one or more scientific investigations or experiments.

Reporting Category	Skill Area	Description/Examples
	Designing and Implementing	Understand and evaluate aspects of experimental design such as methods, tools, variables, and controls.
	Extending and Implementing	Make predictions about future experiments or experimental conditions and determine additional methods to improve or evaluate investigations.
Evaluation of Models, Inferences, and Experimental Results	Inferences and Results: Evaluating and Extending	Evaluate and formulate hypotheses, predictions, and conclusions based on experimental results and other scientific data and knowledge.
	Models: Understanding and Comparing	Locate and compare information within a theoretical model or across competing models. (Note: These skills are only used with conflicting viewpoints passages.)
	Models: Evaluating and Extending	Evaluate and formulate predictions and hypotheses based on the examination of competing theoretical models. (Note: These skills are only used with conflicting viewpoints passages.)

About ACT

ACT is a mission-driven, nonprofit organization dedicated to helping people achieve education and workplace success. Grounded in 60 years of research, ACT is a trusted leader in college and career readiness solutions. Each year, ACT serves millions of students, job seekers, schools, government agencies and employers in the US and around the world with learning resources, assessments, research, and credentials designed to help them succeed from elementary school through career.
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