STATE MATCH

Illinois

Middle/Junior and
Early High School
Learning Standards
English Language Arts,
Mathematics, and Science

Grade 8
Assessment Frameworks
Reading, Writing, and
Mathematics

Grade 11
Assessment Frameworks
Reading, Writing,
Mathematics, and Science

and

EXPLORE and
PLAN

June 2009

ACT®

About This Report

EXECUTIVE SUMMARY

(pp. 1–5)

This portion summarizes the findings of the alignment between ACT's EXPLORE® (8th and 9th grades) and PLAN® (10th grade) tests and the Illinois Learning Standards and Assessment Frameworks.

SECTIONS A-1 through A-3

(pp. 6–8, 31–33, 50–52)

These sections provide tables listing the precise number of Illinois Learning Standards and Assessment Framework objectives measured by ACT's EXPLORE and PLAN tests.

SECTIONS B-1 through B-3

(pp. 9–20, 34–40, 53–63)

All applicable Illinois Learning Standards and Assessment Framework objectives are listed here; each one highlighted is measured by ACT's EXPLORE or PLAN tests. Illinois Learning Standards listed here are from the following documents:

Middle/Junior and Early High School	*Illinois Learning Standards for English Language Arts*	1997
	Illinois Learning Standards for Mathematics	1997
	Illinois Learning Standards for Science	1997
ISAT Grade 8	*Illinois Reading Assessment Frameworks*	June 2007
	Illinois Writing Assessment Frameworks	July 2006
	Illinois Mathematics Assessment Frameworks	Sep. 2004
PSAE Grade 11	*Illinois Reading Assessment Frameworks*	Aug. 2005
	Illinois Writing Assessment Frameworks	Jan. 2007
	Illinois Mathematics Assessment Frameworks	Aug. 2005
	Illinois Science Assessment Frameworks	Aug. 2005

Underlined science content indicates that the content topics are included in, but not directly measured by, ACT's EXPLORE and PLAN Science tests.

SECTIONS C-1 through C-3

(pp. 21–30, 41–49, 65–74)

ACT's College Readiness Standards™ appear here. Highlighting indicates that a statement reflects one or more statements in the Illinois Learning Standards or the Assessment Frameworks. College Readiness Standards not highlighted are not addressed in the respective Illinois Learning Standards or Assessment Frameworks.

A supplement that identifies the specific ACT College Readiness Standard(s) corresponding to each Illinois Learning Standard or Assessment Framework objective in a side-by-side format is available at **www.act.org/education/statematch**.

Executive Summary

We at ACT believe our programs offer many advantages to Illinois students and educators, and this report offers strong evidence for this belief. This alignment analysis clearly answers three critical questions:

1. To what extent do ACT's EXPLORE (8th and 9th grades) and PLAN (10th grade) tests measure Illinois's Learning Standards and Assessment Frameworks?
2. Can ACT's EXPLORE and PLAN test results be used to meet Illinois's NCLB requirement?
3. Why should Illinois choose EXPLORE and PLAN?

1. Match Results.

Illinois Learning Standards and ACT's EXPLORE and PLAN tests: Comparisons conducted by our content specialists show that the EXPLORE and PLAN Reading, English, Mathematics, and Science tests measure many Illinois English Language Arts, Mathematics, and Science Learning Standards in Middle/Junior and Early High School:

ACT'S TESTS MEASURE MANY IMPORTANT ILLINOIS LEARNING STANDARDS AND ASSESSMENT FRAMEWORK OBJECTIVES IN ENGLISH LANGUAGE ARTS, MATHEMATICS, AND SCIENCE.

- English Language Arts: 3 out of 5 State Goals

  Most Illinois standards in Reading, Literature, and Writing are covered by the EXPLORE and PLAN English and Reading tests.

- Mathematics: 5 out of 5 State Goals

  All Illinois Mathematics Learning Standards are covered by the EXPLORE and PLAN Mathematics tests.

- Science: *Process* State Goals: 1 out of 2
  (*Content* State Goals: 1 out of 1)

  Most Illinois Science standards are covered by the EXPLORE and PLAN Science tests. (See note on page 2 regarding science content on ACT's tests.)

Most exceptions to a match between the EXPLORE and PLAN tests and Illinois Learning Standards arise from standards not being assessable in group settings, standards that are personal in nature, and standards requiring measurement over extended time.

Illinois Grade 8 Assessment Frameworks and ACT's EXPLORE tests: Comparisons conducted by our content specialists show that the EXPLORE Reading, English, Mathematics, and Science tests measure many Illinois Grade 8 Reading, Writing, and Mathematics Assessment Framework objectives:

- Reading: 2 out of 2 State Goals
  Writing: 1 out of 1 State Goal

  Many important Illinois Grade 8 Reading and Writing Assessment Framework objectives are covered by the EXPLORE English and Reading tests.

- Mathematics: 5 out of 5 State Goals

  Nearly all Illinois Mathematics Grade 8 Assessment Framework objectives are covered by the EXPLORE Mathematics Test.

Most exceptions to a match between EXPLORE and the Illinois Grade 8 Assessment Frameworks occur in the Reading and Writing Assessment Framework objectives related to vocabulary independent of context, reading strategies, and written compositions.

Illinois Grade 11 Assessment Frameworks and ACT's PLAN tests: Comparisons conducted by our content specialists show that the PLAN Reading, English, Mathematics, and Science tests measure most Illinois Grade 11 Reading, Writing, Mathematics, and Science Assessment Framework objectives:

- Reading: 1 out of 1 State Goal
  Writing: 1 out of 1 State Goal

  Most Illinois Grade 11 Reading and Writing Assessment Framework objectives are covered by the PLAN English and Reading tests.

- Mathematics: 5 out of 5 State Goals

  Nearly all Illinois Mathematics Grade 11 Assessment Framework objectives are covered by the PLAN Mathematics Test.

- Science: *Process* State Goals: 1 out of 2
  (*Content* State Goals: 1 out of 1)

  Many important Illinois Science Grade 11 Assessment Framework objectives are covered by the PLAN Science Test.

  (A note about science content: EXPLORE and PLAN Science tests present content from biology, chemistry, physics, and Earth/space sciences. Although content knowledge in these content areas is needed to answer some of the test questions, the test questions emphasize scientific reasoning and are based in experimental science contexts. Factual content knowledge, although needed to answer some of the test questions, is not systematically sampled from the full content knowledge domain. Therefore, each EXPLORE and PLAN Science Test covers some, but not all, of the discrete science content knowledge specifically described in the Illinois Science Learning Standards and Assessment Frameworks.

  To emphasize the point that content is included, but not necessarily covered in its entirety on every test form, science content match results appear in parentheses in Section A of this document (which describes the number of Illinois Learning Standards and Assessment Objectives measured by EXPLORE and PLAN), and are underlined rather than highlighted in Section B. Our goal here is to clearly communicate that science content will be included, but each specific content topic will not be covered consistently enough for inferences to be made about student proficiency in all areas.)

Most exceptions to a match between PLAN and the Illinois Grade 11 Assessment Frameworks occur in the Reading Assessment Framework objectives related to interpreting instructions and the Science Assessment Framework objectives related to technological design; safety and practices of science; and science, technology, and society.

2. NCLB requirement? Yes; several states use ACT's tests as integral components of their statewide academic assessment systems under NCLB for Grade 11 students and submit evidence of compliance with NCLB to the U.S. Department of Education (ED) for approval. Through the peer review process, the ED determines whether such evidence demonstrates that a given state's assessment system meets NCLB requirements. The more closely a state's standards align with its assessments, the more likely it is that the outcome of the NCLB peer review will be favorable. With so much at stake, states must be rigorous both in developing their academic standards and in choosing assessment instruments that will help achieve the common goal of preparing students for life after high school.

STATES CHOOSE EPAS BECAUSE:

- **STUDENT** MOTIVATION IS HIGH.
- **ACT'S** IS THE ONLY CURRICULUM-BASED ASSESSMENT SYSTEM THAT MEASURES STUDENT READINESS ALONG A CONTINUUM OF EMPIRICALLY DERIVED COLLEGE READINESS BENCHMARKS.
- **EPAS** DATA PROVIDE HELPFUL FEEDBACK FOR TEACHERS, STUDENTS, AND POLICYMAKERS TO MAKE EDUCATIONAL DECISIONS AND IDENTIFY WAYS TO IMPROVE.

3. Why implement EXPLORE, PLAN and the ACT? ACT's Educational Planning and Assessment System (EPAS™) tests—EXPLORE (8th and 9th grades); PLAN (10th grade); and the ACT (11th and 12th grades) provide a longitudinal, systematic approach to educational and career planning, assessment, instructional support, and evaluation. The system focuses on the integrated, higher-order thinking skills students develop in grades K–12 that are important for success both during and after high school.

Unlike many other large-scale assessments of academic ability, EXPLORE, PLAN, and the ACT are first and foremost achievement tests. They are measures whose tasks correspond to recognized high school learning experiences, but which at the same time do not precisely duplicate the high school curriculum. EXPLORE, PLAN, and the ACT measure not an abstract quality, such as intelligence or aptitude, but rather what students are able to do with what they have learned in school.

States and school districts choose the EPAS system because student motivation is high, and EPAS is the *only curriculum-based assessment system that measures student readiness along a continuum of empirically derived college readiness benchmarks*. ACT's College Readiness Standards are precise descriptors of the essential skills and knowledge that students need to become ready for college and career, beginning in grade 8 and continuing through grade 12. Various groups claim to describe what students truly need to know and be able to do for college and/or workplace readiness. Such groups typically ask individual experts in education to gather and discuss what they feel is important for students to understand. Not surprisingly, the answers vary. In contrast, ACT defines college readiness through a unique and rigorous empirical process:

- **The knowledge and skills necessary for students to be ready for college-level work are empirically identified via the ACT National Curriculum Survey®.**

  ACT surveys thousands of secondary and postsecondary instructors across the nation to determine which skills and knowledge are most important at each course level and for college and work readiness. The responses drive the test specifications for EXPLORE, PLAN, and the ACT.

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ACT BUILDS ITS DEFINITION OF COLLEGE READINESS ON A SOUND EMPIRICAL BASE:

1. **THE ACT NATIONAL CURRICULUM SURVEY**
2. **ACT'S COLLEGE READINESS BENCHMARK SCORES**
3. **ACT'S COLLEGE READINESS STANDARDS**

- **The empirically derived performance levels necessary for students to be ready to succeed in college-level work are defined in ACT's College Readiness Benchmark Scores.**

  ACT analyzed thousands of student records to identify the ACT scores associated with success in postsecondary coursework (i.e., a 50% chance of earning a B or better in credit-bearing first-year college courses): 18 for English, 22 for Math, 21 for Reading, and 24 for Science.

- **Skills and knowledge a student currently has and areas for improvement can be identified by the empirically derived ACT College Readiness Standards.**

  Using thousands of student records and responses, content and measurement experts at ACT have developed detailed statements that describe what students typically know and are able to do at different levels of test performance. These data-driven, empirically derived score descriptors articulate student achievement within various score ranges on the English, Reading, Writing, Mathematics, and Science tests on EXPLORE, PLAN, and the ACT. These statements provide specific details about students' college readiness and can be used to identify next steps for improvement.

ACT research has shown that, whether planning to enter college or workforce training programs after graduation, high school students need to be educated to a comparable level of readiness in reading and mathematics. Graduates need this level of readiness if they are to succeed in college-level courses without remediation and to enter workforce training programs ready to learn job-specific skills.

Early planning based on sound information is a key factor in helping students reach their academic and career goals. **EXPLORE** provides baseline information on the academic preparation of students that can be used to plan high school coursework. ACT's research has shown that eighth-grade academic achievement is the best predictor of college and career readiness by high school graduation. Further, improvement in eighth-grade academic achievement and being on target for college and career readiness in eighth grade are more beneficial than any high school-level achievement enhancement.

PLAN helps tenth-grade students build a foundation for future academic and career success and provides information needed to address school districts' high-priority issues. It is a comprehensive guidance resource that helps students measure their current academic development, explore career/training options, and make plans for the remaining years of high school and post-graduation years. PLAN provides a midpoint review of students' progress toward their education and career goals while there is still time to make necessary interventions.

The ACT test assesses high school students' general educational development and provides unparalleled information about a student's readiness for entry-level

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college coursework and ability to make successful transitions to college and work after high school.

Each test in ACT's EPAS system also includes noncognitive measures and surveys that allow students to build relationships between their academic development, their backgrounds, and their plans.

If the goal of high school education is to prepare students for college and career readiness, then we should be educating all high school students according to a common academic expectation, one that prepares them for both postsecondary education and the workforce. Only then—whether they are among the two-thirds who enter college directly after graduation or those who enter workforce training programs—will they be ready for life after high school.

ACT's EPAS system would not only provide important information regarding students' academic achievement relative to the Illinois Learning Standards, but EPAS offers what no other testing program can: an empirically based, time-honored measure of college and career readiness that can help Illinois students reach their educational and career goals and help provide Illinois High Schools with the information they need to prepare their students for college and career.

Section A-1: Number of Illinois Middle/Junior and Early High School Learning Standards Measured by EXPLORE and PLAN

Table A-1a. Number of Illinois English Language Arts Learning Standards Measured by EXPLORE and PLAN

Illinois Goals and Standards*		Number of Illinois Benchmarks Measured by ACT's tests	Aspects of Illinois Standards that are Not Measured
1. Reading	A. Vocabulary development	MS-JH: 1 out of 2 Early HS: 0 out of 2	Apply knowledge of word origins
	B. Reading strategies	MS-JH: 4 out of 4 Early HS: 3 out of 3	Relate to prior knowledge
	C. Reading comprehension	MS-JH: 4 out of 6 Early HS: 3 out of 6	Compare authors Interpret tables Evaluate information from multiple sources
2. Literature	A. Literary elements and techniques	MS-JH: 3 out of 4 Early HS: 4 out of 4	Identify characteristics of authors Compare themes across societies Evaluate effect of historical context on form
	B. Variety of literary works	MS-JH: 2 out of 3 Early HS: 1 out of 3	
3. Writing	A. Grammar, sentence structure, and punctuation	MS-JH: 1 out of 1 Early HS: 1 out of 1	
	B. Composition	MS-JH: 2 out of 2 Early HS: 2 out of 3	Produce work for publication
	C. Communicate ideas	MS-JH: 0 out of 2 Early HS: 0 out of 2	Use technology Write for real situation
4. Listening & Speaking	A. Listening	MS-JH: 0 out of 4 Early HS: 0 out of 4	
	B. Speaking	MS-JH: 0 out of 4 Early HS: 0 out of 4	
5. Research	A. Locate, organize, and use sources	MS-JH: 0 out of 2 Early HS: 0 out of 2	
	B. Analyze and evaluate sources	MS-JH: 0 out of 2 Early HS: 0 out of 2	
	C. Apply acquired information	MS-JH: 0 out of 3 Early HS: 0 out of 3	
	TOTALS 3 out of 5 Goals 8 out of 13 Standards	MS-JH: 17 out of 39 Early HS: 14 out of 39	

*Refer to Illinois English Language Arts Learning Standards on pages 9–12

Table A-1b. Number of Illinois Mathematics Learning Standards Measured by EXPLORE and PLAN

Illinois Goals and Standards*		Number of Illinois Benchmarks Measured by ACT's tests	Aspects of Illinois Standards that are Not Measured
6. Number Sense	A. Representations and ordering	MS-JH: 1 out of 1 Early HS: 1 out of 1	
	B. Operations and properties	MS-JH: 3 out of 3 Early HS: 1 out of 1	
	C. Computation and estimation	MS-JH: 2 out of 2 Early HS: 1 out of 1	
	D. Ratios, proportions, and percents	MS-JH: 1 out of 1 Early HS: 1 out of 1	
7. Estimation and Measurement	A. Measurement	MS-JH: 1 out of 2 Early HS: 2 out of 2	Use protractor
	B. Estimation	MS-JH: 1 out of 1 Early HS: 0 out of 1	Use scientific instruments including timers, calculators, computers
	C. Application	MS-JH: 2 out of 2 Early HS: 3 out of 3	
8. Algebra and Analytical Methods	A. Representations, patterns, and expressions	MS-JH: 2 out of 2 Early HS: 2 out of 2	
	B. Tables, graphs, and symbols	MS-JH: 1 out of 1 Early HS: 2 out of 2	
	C. Solving equations	MS-JH: 1 out of 1 Early HS: 2 out of 2	
	D. Writing and interpreting equations	MS-JH: 3 out of 3 Early HS: 1 out of 1	
9. Geometry	A. Properties	MS-JH: 3 out of 3 Early HS: 2 out of 2	
	B. Relationships	MS-JH: 1 out of 1 Early HS: 1 out of 1	
	C. Justifications of conjectures and conclusions	MS-JH: 2 out of 2 Early HS: 3 out of 3	
	D. Trigonometry	MS-JH: 1 out of 1 Early HS: 0 out of 1	Analyze and solve problems involving triangles using trigonometric ratios
10. Data Analysis and Probability	A. Data analysis	MS-JH: 3 out of 3 Early HS: 3 out of 3	
	B. Statistics	MS-JH: 0 out of 1 Early HS: 0 out of 1	Design and execute surveys Design a statistical experiment
	C. Probability	MS-JH: 2 out of 2 Early HS: 2 out of 3	Design and conduct simulations
	TOTALS 5 out of 5 Goals 17 out of 18 Standards	MS-JH: 30 out of 32 Early HS: 27 out of 31	

*Refer to Illinois Mathematics Learning Standards on pages 13–16

Table A-1c. Number of Illinois Science Learning Standards Measured by EXPLORE and PLAN

Illinois Goals and Standards*		Number of Illinois Benchmarks Measured by ACT's tests	Aspects of Illinois Standards that are Not Measured
11. Inquiry and Design	A. Scientific inquiry	MS-JH: 7 out of 7 Early HS: 6 out of 6	
	B. Technological design	MS-JH: 0 out of 6 Early HS: 0 out of 7	Identify design problem Sketch design Build and test prototype Evaluate test results Use technology
13. Science, Technology, and Society	A. Safety and practices of science	MS-JH: 0 out of 3 Early HS: 1 out of 4	Suggest ways to reduce risk in science activities Describe how science knowledge changes over time Explain how peer review helps assure accuracy
	B. Science, technology, and society	MS-JH: 0 out of 6 Early HS: 0 out of 5	Contrast science and technology Analyze an occupation Analyze resource management Evaluate scientific claims used in advertisements
	Process TOTALS 1 out of 2 Goals 1 out of 4 Standards	MS-JH: 7 out of 22 Early HS: 7 out of 22	
12. Concepts and Principles	A. Living things	MS-JH: (3) out of (3) Early HS: (3) out of (3)	
	B. Environment and interaction of living things	MS-JH: (2) out of (2) Early HS: (2) out of (2)	
	C. Matter and energy	MS-JH: (2) out of (2) Early HS: (2) out of (2)	
	D. Force and motion	MS-JH: (2) out of (2) Early HS: (2) out of (2)	
	E. Earth science	MS-JH: (3) out of (3) Early HS: (2) out of (2)	
	F. Astronomy	MS-JH: (3) out of (3) Early HS: (2) out of (2)	
	Content TOTALS 1 out of 1 Goal 6 out of 6 Standards	MS-JH: (15) out of (15) Early HS: (13) out of (13)	

*Refer to Illinois Science Learning Standards on pages 17–20

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Section B-1: Illinois Middle/Junior and Early High School Learning Standards Measured by EXPLORE and PLAN

English Language Arts

ILLINOIS English Language Arts
Middle/Junior High School Learning Standards

Reading

State Goal 1: Read with understanding and fluency.

A. Apply word analysis and vocabulary skills to comprehend selections.

1.A.3a. Apply knowledge of word origins and derivations to comprehend words used in specific content areas (e.g., scientific, political, literary, mathematical).

1.A.3b. Analyze the meaning of words and phrases in their context.

B. Apply reading strategies to improve understanding and fluency.

1.B.3a. Preview reading materials, make predictions and relate reading to information from other sources.

1.B.3b. Identify text structure and create a visual representation (e.g., graphic organizer, outline, drawing) to use while reading.

1.B.3c. Continuously check and clarify for understanding (e.g., in addition to previous skills, draw comparisons to other readings).

1.B.3d. Read age-appropriate material with fluency and accuracy.

C. Comprehend a broad range of reading materials.

1.C.3a. Use information to form, explain and support questions and predictions.

1.C.3b. Interpret and analyze entire narrative text using story elements, point of view and theme.

1.C.3c. Compare, contrast and evaluate ideas and information from various sources and genres.

1.C.3d. Summarize and make generalizations from content and relate them to the purpose of the material.

1.C.3e. Compare how authors and illustrators use text and art across materials to express their ideas (e.g., foreshadowing, flashbacks, color, strong verbs, language that inspires).

1.C.3f. Interpret tables that display textual information and data in visual formats.

Literature

State Goal 2: Read and understand literature representative of various societies, eras and ideas.

A. Understand how literary elements and techniques are used to convey meaning.

2.A.3a. Identify and analyze a variety of literary techniques (e.g., figurative language, allusion, dialogue, description, word choice, dialect) within classical and contemporary works representing a variety of genres.

2.A.3b. Describe how the development of theme, character, plot and setting contribute to the overall impact of a piece of literature.

2.A.3c. Identify characteristics and authors of various literary forms (e.g., short stories, novels, drama, fables, biographies, documentaries, poetry, science fiction).

2.A.3d. Identify ways that an author uses language structure, word choice and style to convey the author's viewpoint.

B. Read and interpret a variety of literary works.

2.B.3a. Respond to literary material from personal, creative and critical points of view.

2.B.3b. Compare and contrast common literary themes across various societies and eras.

2.B.3c. Analyze how characters in literature deal with conflict, solve problems and relate to real-life situations.

Writing

State Goal 3: Write to communicate for a variety of purposes.

A. Use correct grammar, spelling, punctuation, capitalization and structure.

3.A.3. Write compositions that contain complete sentences and effective paragraphs using English conventions.

B. Compose well-organized and coherent writing for specific purposes and audiences.

3.B.3a. Produce documents that convey a clear understanding and interpretation of ideas and information and display focus, organization, elaboration and coherence.

3.B.3b. Edit and revise for word choice, organization, consistent point of view and transitions among paragraphs using contemporary technology and formats suitable for submission and/or publication.

C. Communicate ideas in writing to accomplish a variety of purposes.

3.C.3a. Compose narrative, informative, and persuasive writings (e.g., in addition to previous writings, literature reviews, instructions, news articles, correspondence) for a specified audience.

3.C.3b. Using available technology, produce compositions and multimedia works for specified audiences.

Listening and Speaking

State Goal 4: Listen and speak effectively in a variety of situations.

A. Listen effectively in formal and informal situations.

4.A.3a. Demonstrate ways (e.g., ask probing questions, provide feedback to a speaker, summarize and paraphrase complex spoken messages) that listening attentively can improve comprehension.

4.A.3b. Compare a speaker's verbal and nonverbal messages.

4.A.3c. Restate and carry out multistep oral instructions.

4.A.3d. Demonstrate the ability to identify and manage barriers to listening (e.g., noise, speaker credibility, environmental distractions).

B. Speak effectively using language appropriate to the situation and audience.

4.B.3a. Deliver planned oral presentations, using language and vocabulary appropriate to the purpose, message and audience; provide details and supporting information that clarify main ideas; and use visual aids and contemporary technology as support.

4.B.3b. Design and produce reports and multi-media compositions that represent group projects.

4.B.3c. Develop strategies to manage or overcome communication anxiety and apprehension (e.g., sentence outlining, note cards).

4.B.3d. Use verbal and nonverbal communication strategies to maintain communications and to resolve conflict.

Research

State Goal 5: Use the language arts to acquire, assess and communicate information.

A. Locate, organize, and use information from various sources to answer questions, solve problems and communicate ideas.

5.A.3a. Identify appropriate resources to solve problems or answer questions through research.

5.A.3b. Design a project related to contemporary issues (e.g., real-world math, career development, community service) using multiple sources.

B. Analyze and evaluate information acquired from various sources.

5.B.3a. Choose and analyze information sources for individual, academic and functional purposes.

5.B.3b. Identify, evaluate and cite primary sources.

C. Apply acquired information, concepts and ideas to communicate in a variety of formats.

5.C.3a. Plan, compose, edit and revise documents that synthesize new meaning gleaned from multiple sources.

5.C.3b. Prepare and orally present original work (e.g., poems, monologues, reports, plays, stories) supported by research.

5.C.3c. Take notes, conduct interviews, organize and report information in oral, visual and electronic formats.

ILLINOIS English Language Arts
Early High School Learning Standards

Reading

State Goal 1: Read with understanding and fluency.

A. Apply word analysis and vocabulary skills to comprehend selections.

1.A.4a. Expand knowledge of word origins and derivations and use idioms, analogies, metaphors and similes to extend vocabulary development.

1.A.4b. Compare the meaning of words and phrases and use analogies to explain the relationships among them.

B. Apply reading strategies to improve understanding and fluency.

1.B.4a. Preview reading materials, clarify meaning, analyze overall themes and coherence, and relate reading with information from other sources.

1.B.4b. Analyze, interpret and compare a variety of texts for purpose, structure, content, detail and effect.

1.B.4c. Read age-appropriate material with fluency and accuracy.

C. Comprehend a broad range of reading materials.

1.C.4a. Use questions and predictions to guide reading.

1.C.4b. Explain and justify an interpretation of a text.

1.C.4c. Interpret, evaluate and apply information from a variety of sources to other situations (e.g., academic, vocational, technical, personal).

1.C.4d. Summarize and make generalizations from content and relate them to the purpose of the material.

1.C.4e. Analyze how authors and illustrators use text and art to express and emphasize their ideas (e.g., imagery, multiple points of view).

1.C.4f. Interpret tables, graphs and maps in conjunction with related text.

Literature

State Goal 2: Read and understand literature representative of various societies, eras and ideas.

A. Understand how literary elements and techniques are used to convey meaning.

2.A.4a. Analyze and evaluate the effective use of literary techniques (e.g., figurative language, allusion, dialogue, description, symbolism, word choice, dialect) in classic and contemporary literature representing a variety of forms and media.

2.A.4b. Explain relationships between and among literary elements including character, plot, setting, theme, conflict and resolution and their influence on the effectiveness of the literary piece.

2.A.4c. Describe relationships between the author's style, literary form (e.g., short stories, novels, drama, fables, biographies, documentaries, poetry, essays) and intended effect on the reader.

2.A.4d. Describe the influence of the author's language structure and word choice to convey the author's viewpoint.

B. Read and interpret a variety of literary works.

2.B.4a. Critique ideas and impressions generated by oral, visual, written and electronic materials.

2.B.4b. Analyze form, content, purpose and major themes of American literature and literature of other countries in their historical perspectives.

2.B.4c. Discuss and evaluate motive, resulting behavior and consequences demonstrated in literature.

Writing

State Goal 3: Write to communicate for a variety of purposes.

A. Use correct grammar, spelling, punctuation, capitalization and structure.

3.A.4. Use standard English to edit documents for clarity, subject/verb agreement, adverb and adjective agreement and verb tense; proofread for spelling, capitalization and punctuation; and ensure that documents are formatted in final form for submission and/or publication.

B. Compose well-organized and coherent writing for specific purposes and audiences.

3.B.4a. Produce documents that exhibit a range of writing techniques appropriate to purpose and audience, with clarity of focus, logic of organization, appropriate elaboration and support and overall coherence.

3.B.4b. Produce, edit, revise and format work for submission and/or publication (e.g., manuscript form, appropriate citation of sources) using contemporary technology.

3.B.4c. Evaluate written work for its effectiveness and make recommendations for its improvement.

C. Communicate ideas in writing to accomplish a variety of purposes.

3.C.4a. Write for real or potentially real situations in academic, professional and civic contexts (e.g., college applications, job applications, business letters, petitions).

3.C.4b. Using available technology, produce compositions and multimedia works for specified audiences.

Listening and Speaking

State Goal 4: Listen and speak effectively in a variety of situations.

A. Listen effectively in formal and informal situations.

4.A.4a. Apply listening skills as individuals and members of a group in a variety of settings (e.g., lectures, discussions, conversations, team projects, presentations, interviews).

4.A.4b. Apply listening skills in practical settings (e.g., classroom note taking, interpersonal conflict situations, giving and receiving directions, evaluating persuasive messages).

4.A.4c. Follow complex oral instructions.

4.A.4d. Demonstrate understanding of the relationship of verbal and nonverbal messages within a context (e.g., contradictory, supportive, repetitive, substitutive).

B. Speak effectively using language appropriate to the situation and audience.

4.B.4a. Deliver planned informative and persuasive oral presentations using visual aids and contemporary technology as individuals and members of a group; demonstrate organization, clarity, vocabulary, credible and accurate supporting evidence.

4.B.4b. Use group discussion skills to assume leadership and participant roles within an assigned project or to reach a group goal.

4.B.4c. Use strategies to manage or overcome communication anxiety and apprehension (e.g., developed outlines, notecards, practice).

4.B.4d. Use verbal and nonverbal strategies to maintain communication and to resolve individual and group conflict.

Research

State Goal 5: Use the language arts to acquire, assess and communicate information.

A. Locate, organize, and use information from various sources to answer questions, solve problems and communicate ideas.

5.A.4a. Demonstrate a knowledge of strategies needed to prepare a credible research report (e.g., notes, planning sheets).

5.A.4b. Design and present a project (e.g., research report, scientific study, career/higher education opportunities) using various formats from multiple sources.

B. Analyze and evaluate information acquired from various sources.

5.B.4a. Choose and evaluate primary and secondary sources (print and nonprint) for a variety of purposes.

5.B.4b. Use multiple sources and multiple formats; cite according to standard style manuals.

C. Apply acquired information, concepts and ideas to communicate in a variety of formats.

5.C.4a. Plan, compose, edit and revise information (e.g., brochures, formal reports, proposals, research summaries, analyses, editorials, articles, overheads, multimedia displays) for presentation to an audience.

5.C.4b. Produce oral presentations and written documents using supportive research and incorporating contemporary technology.

5.C.4c. Prepare for and participate in formal debates.

ILLINOIS Mathematics
Middle/Junior High School Learning Standards

Number Sense

State Goal 6: Demonstrate and apply a knowledge and sense of numbers, including numeration and operations (addition, subtraction, multiplication, division), patterns, ratios and proportions.

A. Demonstrate knowledge and use of numbers and their representations in a broad range of theoretical and practical settings.

6.A.3. Represent fractions, decimals, percentages, exponents and scientific notation in equivalent forms.

B. Investigate, represent and solve problems using number facts, operations (addition, subtraction, multiplication, division) and their properties, algorithms and relationships.

6.B.3a. Solve practical computation problems involving whole numbers, integers and rational numbers.

6.B.3b. Apply primes, factors, divisors, multiples, common factors and common multiples in solving problems.

6.B.3c. Identify and apply properties of real numbers including pi, squares, and square roots.

C. Compute and estimate using mental mathematics, paper-and-pencil methods, calculators and computers.

6.C.3a. Select computational procedures and solve problems with whole numbers, fractions, decimals, percents and proportions.

6.C.3b. Show evidence that computational results using whole numbers, fractions, decimals, percents and proportions are correct and/or that estimates are reasonable.

D. Solve problems using comparison of quantities, ratios, proportions and percents.

6.D.3. Apply ratios and proportions to solve practical problems.

Estimation and Measurement

State Goal 7: Estimate, make and use measurements of objects, quantities and relationships and determine acceptable levels of accuracy.

A. Measure and compare quantities using appropriate units, instruments and methods.

7.A.3a. Measure length, capacity, weight/mass and angles using sophisticated instruments (e.g., compass, protractor, trundle wheel).

7.A.3b. Apply the concepts and attributes of length, capacity, weight/mass, perimeter, area, volume, time, temperature and angle measures in practical situations.

B. Estimate measurements and determine acceptable levels of accuracy.

7.B.3. Select and apply instruments including rulers and protractors and units of measure to the degree of accuracy required.

C. Select and use appropriate technology, instruments and formulas to solve problems, interpret results and communicate findings.

7.C.3a. Construct a simple scale drawing for a given situation.

7.C.3b. Use concrete and graphic models and appropriate formulas to find perimeters, areas, surface areas and volumes of two- and three-dimensional regions.

Algebra and Analytical Methods

State Goal 8: Use algebraic and analytical methods to identify and describe patterns and relationships in data, solve problems and predict results.

A. Describe numerical relationships using variables and patterns.

8.A.3a. Apply the basic properties of commutative, associative, distributive, transitive, inverse, identity, zero, equality and order of operations to solve problems.

8.A.3b. Solve problems using linear expressions, equations and inequalities.

B. Interpret and describe numerical relationships using tables, graphs and symbols.

8.B.3. Use graphing technology and algebraic methods to analyze and predict linear relationships and make generalizations from linear patterns.

C. Solve problems using systems of numbers and their properties.

8.C.3. Apply the properties of numbers and operations including inverses algebraic settings derived from economics, business and the sciences.

D. Use algebraic concepts and procedures to represent and solve problems.

8.D.3a. Solve problems using numeric, graphic or symbolic representations of variables, expressions, equations and inequalities.

8.D.3b. Propose and solve problems using proportions, formulas and linear functions.

8.D.3c. Apply properties of powers, perfect squares and square roots.

Geometry

State Goal 9: Use geometric methods to analyze, categorize and draw conclusions about points, lines, planes and space.

A. Demonstrate and apply geometric concepts involving points, lines, planes and space.

9.A.3a. Draw or construct two- and three-dimensional geometric figures including prisms, pyramids, cylinders and cones.

9.A.3b. Draw transformation images of figures, with and without the use of technology.

9.A.3c. Use concepts of symmetry, congruency, similarity, scale, perspective, and angles to describe and analyze two- and three-dimensional shapes found in practical applications (e.g., geodesic domes, A-frame houses, basketball courts, inclined planes, art forms, blueprints).

B. Identify, describe, classify and compare relationships using points, lines, planes and solids.

9.B.3. Identify, describe, classify and compare two- and three- dimensional geometric figures and models according to their properties.

C. Construct convincing arguments and proofs to solve problems

9.C.3a. Construct, develop and communicate logical arguments (informal proofs) about geometric figures and patterns.

9.C.3b. Develop and solve problems using geometric relationships and models, with and without the use of technology.

D. Use trigonometric ratios and circular functions to solve problems.

9.D.3. Compute distances, lengths and measures of angles using proportions, the Pythagorean theorem and its converse.

Data Analysis and Probability

State Goal 10: Collect, organize and analyze data using statistical methods; predict results; and interpret uncertainty using concepts of probability.

A. Organize, describe and make predictions from existing data.

10.A.3a. Construct, read and interpret tables, graphs (including circle graphs) and charts to organize and represent data.

10.A.3b. Compare the mean, median, mode and range, with and without the use of technology.

10.A.3c. Test the reasonableness of an argument based on data and communicate their findings.

B. Formulate questions, design data collection methods, gather and analyze data and communicate findings.

10.B.3. Formulate questions (e.g., relationships between car age and mileage, average incomes and years of schooling), devise and conduct experiments or simulations, gather data, draw conclusions and communicate results to an audience using traditional methods and contemporary technologies.

C. Determine, describe and apply the probabilities of events.

10.C.3a. Determine the probability and odds of events using fundamental counting principles.

10.C.3b. Analyze problem situations (e.g., board games, grading scales) and make predictions about results.

Number Sense

State Goal 6: Demonstrate and apply a knowledge and sense of numbers, including numeration and operations (addition, subtraction, multiplication, division), patterns, ratios and proportions.

A. Demonstrate knowledge and use of numbers and their representations in a broad range of theoretical and practical settings.

6.A.4. Identify and apply the associative, commutative, distributive and identity properties of real numbers, including special numbers such as pi and square roots.

B. Investigate, represent and solve problems using number facts, operations (addition, subtraction, multiplication, division) and their properties, algorithms and relationships.

6.B.4. Select and use appropriate arithmetic operations in practical situations including calculating wages after taxes, developing a budget and balancing a checkbook.

C. Compute and estimate using mental mathematics, paper-and-pencil methods, calculators and computers.

6.C.4. Determine whether exact values or approximations are appropriate (e.g., bid a job, determine gas mileage for a trip).

D. Solve problems using comparison of quantities, ratios, proportions and percents.

6.D.4. Solve problems involving recipes or mixtures, financial calculations and geometric similarity using ratios, proportions and percents.

Estimation and Measurement

State Goal 7: Estimate, make and use measurements of objects, quantities and relationships and determine acceptable levels of accuracy.

A. Measure and compare quantities using appropriate units, instruments and methods.

7.A.4a. Apply units and scales to describe and compare numerical data and physical objects.

7.A.4b. Apply formulas in a wide variety of theoretical and practical real-world measurement applications involving perimeter, area, volume, angle, time, temperature, mass, speed, distance, density and monetary values.

B. Estimate measurements and determine acceptable levels of accuracy.

7.B.4. Estimate and measure the magnitude and directions of physical quantities (e.g., velocity, force, slope) using rulers, protractors and other scientific instruments including timers, calculators and computers.

C. Select and use appropriate technology, instruments and formulas to solve problems, interpret results and communicate findings.

7.C.4a. Make indirect measurements, including heights and distances, using proportions (e.g., finding the height of a tower by its shadow).

7.C.4b. Interpret scale drawings and models using maps and blueprints.

7.C.4c. Convert within and between measurement systems and monetary systems using technology where appropriate.

Algebra and Analytical Methods

State Goal 8: Use algebraic and analytical methods to identify and describe patterns and relationships in data, solve problems and predict results.

A. Describe numerical relationships using variables and patterns.

8.A.4a. Use algebraic methods to convert repeating decimals to fractions.

8.A.4b. Represent mathematical patterns and describe their properties using variables and mathematical symbols.

B. Interpret and describe numerical relationships using tables, graphs and symbols.

8.B.4a. Represent algebraic concepts with physical materials, words, diagrams, tables, graphs, equations and inequalities and use appropriate technology.

8.B.4b. Use the basic functions of absolute value, square root, linear, quadratic and step to describe numerical relationships.

C. Solve problems using systems of numbers and their properties.

8.C.4a. Analyze and report the effects of changing coefficients, exponents and other parameters on functions and their graphs.

8.C.4b. Apply algebraic properties and procedures with matrices, vectors, functions and sequences using data found in business, industry and consumer situations.

D. Use algebraic concepts and procedures to represent and solve problems.

8.D.4. Formulate and solve linear and quadratic equations and linear inequalities algebraically and investigate nonlinear inequalities using graphs, tables, calculators and computers.

Geometry

State Goal 9: Use geometric methods to analyze, categorize and draw conclusions about points, lines, planes and space.

A. Demonstrate and apply geometric concepts involving points, lines, planes and space.

9.A.4a. Construct a model of a three-dimensional figure from a two-dimensional pattern.

9.A.4b. Make perspective drawings, tessellations and scale drawings, with and without the use of technology.

B. Identify, describe, classify and compare relationships using points, lines, planes and solids.

9.B.4. Recognize and apply relationships within and among geometric figures.

C. Construct convincing arguments and proofs to solve problems

9.C.4a. Construct and test logical arguments for geometric situations using technology where appropriate.

9.C.4b. Construct and communicate convincing arguments for geometric situations.

9.C.4c. Develop and communicate mathematical proofs (e.g., two-column, paragraph, indirect) and counter examples for geometric statements.

D. Use trigonometric ratios and circular functions to solve problems.

9.D.4. Analyze and solve problems involving triangles (e.g., distances which cannot be measured directly) using trigonometric ratios.

Data Analysis and Probability

State Goal 10: Collect, organize and analyze data using statistical methods; predict results; and interpret uncertainty using concepts of probability.

A. Organize, describe and make predictions from existing data.

10.A.4a. Represent and organize data by creating lists, charts, tables, frequency distributions, graphs, scatterplots and box-plots.

10.A.4b. Analyze data using mean, median, mode, range, variance and standard deviation of a data set, with and without the use of technology.

10.A.4c. Predict from data using interpolation, extrapolation and trend lines, with and without the use of technology.

B. Formulate questions, design data collection methods, gather and analyze data and communicate findings.

10.B.4. Design and execute surveys or experiments, gather data to answer relevant questions, and communicate results and conclusions to an audience using traditional methods and contemporary technology.

C. Determine, describe and apply the probabilities of events.

10.C.4a. Solve problems of chance using the principles of probability including conditional settings.

10.C.4b. Design and conduct simulations (e.g., waiting times at restaurant, probabilities of births, likelihood of game prizes), with and without the use of technology.

10.C.4c. Propose and interpret discrete probability distributions, with and without the use of technology.

ILLINOIS Science
Middle/Junior High School Learning Standards

Inquiry and Design

State Goal 11: Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.

A. Know and apply the concepts, principles and processes of scientific inquiry.

11.A.3a. Formulate hypotheses that can be tested by collecting data.

11.A.3b. Conduct scientific experiments that control all but one variable.

11.A.3c. Collect and record data accurately using consistent measuring and recording techniques and media.

11.A.3d. Explain the existence of unexpected results in a data set.

11.A.3e. Use data manipulation tools and quantitative (e.g., mean, mode, simple equations) and representational methods (e.g., simulations, image processing) to analyze measurements.

11.A.3f. Interpret and represent results of analysis to produce findings.

11.A.3g. Report and display the process and results of a scientific investigation.

B. Know and apply the concepts, principles and processes of technological design.

11.B.3a. Identify an actual design problem and establish criteria for determining the success of a solution.

11.B.3b. Sketch, propose and compare design solutions to the problem considering available materials, tools, cost effectiveness and safety.

11.B.3c. Select the most appropriate design and build a prototype or simulation.

11.B.3d. Test the prototype using available materials, instruments and technology and record the data.

11.B.3e. Evaluate the test results based on established criteria, note sources of error and recommend improvements.

11.B.3f. Using available technology, report the relative success of the design based on the test results and criteria.

Concepts and Principles

State Goal 12: Understand the fundamental concepts, principles and interconnections of the life, physical and earth/space sciences.

A. Know and apply concepts that explain how living things function, adapt and change.

12.A.3a. Explain how cells function as “building blocks” of organisms and describe the requirements for cells to live.

12.A.3b. Compare characteristics of organisms produced from a single parent with those of organisms produced by two parents.

12.A.3c. Compare and contrast how different forms and structures reflect different functions (e.g., similarities and differences among animals that fly, walk or swim; structures of plant cells and animal cells).

B. Know and apply concepts, that describe how living things interact with each other and with their environment.

12.B.3a. Identify and classify biotic and abiotic factors in an environment that affect population density, habitat and placement of organisms in an energy pyramid.

12.B.3b. Compare and assess features of organisms for their adaptive, competitive and survival potential (e.g., appendages, reproductive rates, camouflage, defensive structures).

C. Know and apply concepts that describe properties of matter and energy and the interactions between them.

12.C.3a. Explain interactions of energy with matter including changes of state and conservation of mass and energy.

12.C.3b. Model and describe the chemical and physical characteristics of matter (e.g., atoms, molecules, elements, compounds, mixtures).

D. Know and apply concepts that describe force and motion and the principles that explain them.

12.D.3a. Explain and demonstrate how forces affect motion (e.g., action/reaction, equilibrium conditions, free-falling objects).

12.D.3b. Explain the factors that affect the gravitational forces on objects (e.g., changes in mass, distance).

E. Know and apply concepts that describe the features and processes of the Earth and its resources.

12.E.3a. Analyze and explain large-scale dynamic forces, events and processes that affect the Earth’s land, water and atmospheric systems (e.g., jetstream, hurricanes, plate tectonics).

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12.E.3b. Describe interactions between solid earth, oceans, atmosphere and organisms that have resulted in ongoing changes of Earth (e.g., erosion, El Nino).

12.E.3c. Evaluate the biodegradability of renewable and nonrenewable natural resources.

F. Know and apply concepts that explain the composition and structure of the universe and Earth's place in it.

12.F.3a. Simulate, analyze and explain the effects of gravitational force in the solar system (e.g., orbital shape and speed, tides, spherical shape of the planets and moons).

12.F.3b. Describe the organization and physical characteristics of the solar system (e.g., sun, planets, satellites, asteroids, comets).

12.F.3c. Compare and contrast the sun as a star with other objects in the Milky Way Galaxy (e.g., nebulae, dust clouds, stars, black holes).

Science, Technology and Society

State Goal 13: Understand the relationships among science, technology and society in historical and contemporary contexts.

A. Know and apply the accepted practices of science.

13.A.3a. Identify and reduce potential hazards in science activities (e.g., ventilation, handling chemicals).

13.A.3b. Analyze historical and contemporary cases in which the work of science has been affected by both valid and biased scientific practices.

13.A.3c. Explain what is similar and different about observational and experimental investigations.

B. Know and apply concepts that describe the interaction between science, technology and society.

13.B.3a. Identify and explain ways that scientific knowledge and economics drive technological development.

13.B.3b. Identify important contributions to science and technology that have been made by individuals and groups from various cultures.

13.B.3c. Describe how occupations use scientific and technological knowledge and skills.

13.B.3d. Analyze the interaction of resource acquisition, technological development and ecosystem impact (e.g., diamond, coal or gold mining; deforestation).

13.B.3e. Identify advantages and disadvantages of natural resource conservation and management programs.

13.B.3f. Apply classroom-developed criteria to determine the effects of policies on local science and technology issues (e.g., energy consumption, landfills, water quality).

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Inquiry and Design

State Goal 11: Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.

A. Know and apply the concepts, principles and processes of scientific inquiry.

11.A.4a. Formulate hypotheses referencing prior research and knowledge.

11.A.4b. Conduct controlled experiments or simulations to test hypotheses.

11.A.4c. Collect, organize and analyze data accurately and precisely.

11.A.4d. Apply statistical methods to the data to reach and support conclusions.

11.A.4e. Formulate alternative hypotheses to explain unexpected results.

11.A.4f. Using available technology, report, display and defend to an audience conclusions drawn from investigations.

B. Know and apply the concepts, principles and processes of technological design.

11.B.4a. Identify a technological design problem inherent in a commonly used product.

11.B.4b. Propose and compare different solution designs to the design problem based upon given constraints including available tools, materials and time.

11.B.4c. Develop working visualizations of the proposed solution designs (e.g., blueprints, schematics, flowcharts, cad-cam, animations).

11.B.4d. Determine the criteria upon which the designs will be judged, identify advantages and disadvantages of the designs and select the most promising design.

11.B.4e. Develop and test a prototype or simulation of the solution design using available materials, instruments and technology.

11.B.4f. Evaluate the test results based on established criteria, note sources of error and recommend improvements.

11.B.4g. Using available technology, report to an audience the relative success of the design based on the test results and criteria.

Concepts and Principles

State Goal 12: Understand the fundamental concepts, principles and interconnections of the life, physical and earth/space sciences.

A. Know and apply concepts that explain how living things function, adapt and change.

12.A.4a. Explain how genetic combinations produce visible effects and variations among physical features and cellular functions of organisms.

12.A.4b. Describe the structures and organization of cells and tissues that underlie basic life functions including nutrition, respiration, cellular transport, biosynthesis and reproduction.

12.A.4c. Describe processes by which organisms change over time using evidence from comparative anatomy and physiology, embryology, the fossil record, genetics and biochemistry.

B. Know and apply concepts that describe how living things interact with each other and with their environment.

12.B.4a. Compare physical, ecological and behavioral factors that influence interactions and interdependence of organisms.

12.B.4b. Simulate and analyze factors that influence the size and stability of populations within ecosystems (e.g., birth rate, death rate, predation, migration patterns).

C. Know and apply concepts that describe properties of matter and energy and the interactions between them.

12.C.4a. Use kinetic theory, wave theory, quantum theory and the laws of thermo-dynamics to explain energy transformations.

12.C.4b. Analyze and explain the atomic and nuclear structure of matter.

D. Know and apply concepts that describe force and motion and the principles that explain them.

12.D.4a. Explain and predict motions in inertial and accelerated frames of reference.

12.D.4b. Describe the effects of electromagnetic and nuclear forces including atomic and molecular bonding, capacitance and nuclear reactions.

E. Know and apply concepts that describe the features and processes of the Earth and its resources.

12.E.4a. Explain how external and internal energy sources drive Earth processes (e.g., solar energy drives weather patterns; internal heat drives plate tectonics).

12.E.4b. Describe how rock sequences and fossil remains are used to interpret the age and changes in the Earth.

F. Know and apply concepts that explain the composition and structure of the universe and Earth's place in it.

12.F.4a. Explain theories, past and present, for changes observed in the universe.

12.F.4b. Describe and compare the chemical and physical characteristics of galaxies and objects within galaxies (e.g., pulsars, nebulae, black holes, dark matter, stars).

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Science, Technology and Society

State Goal 13: Understand the relationships among science, technology and society in historical and contemporary contexts.

A. Know and apply the accepted practices of science.

13.A.4a. Estimate and suggest ways to reduce the degree of risk involved in science activities.

13.A.4b. Assess the validity of scientific data by analyzing the results, sample set, sample size, similar previous experimentation, possible misrepresentation of data presented and potential sources of error.

13.A.4c. Describe how scientific knowledge, explanations and technological designs may change with new information over time (e.g., the understanding of DNA, the design of computers).

13.A.4d. Explain how peer review helps to assure the accurate use of data and improves the scientific process.

B. Know and apply concepts that describe the interaction between science, technology and society

13.B.4a. Compare and contrast scientific inquiry and technological design as pure and applied sciences.

13.B.4b. Analyze a particular occupation to identify decisions that may be influenced by a knowledge of science.

13.B.4c. Analyze ways that resource management and technology can be used to accommodate population trends.

13.B.4d. Analyze local examples of resource use, technology use or conservation programs; document findings; and make recommendations for improvements.

13.B.4e. Evaluate claims derived from purported scientific studies used in advertising and marketing strategies.

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Section C-1: ACT's College Readiness Standards Included in Illinois Middle/Junior and Early High School Learning Standards

In recent years ACT has brought a distinctive voice to the debate on what it means to be truly ready for college. Using a wealth of longitudinal data—data that no one else possesses—ACT has pioneered empirical approaches to assessing students' college readiness. Using thousands of student records and responses, content and measurement experts at ACT have developed detailed statements that describe what students typically know and are able to do at different levels of test performance. These data-driven, empirically derived score descriptors, known as ACT's College Readiness Standards, describe student achievement within various score ranges on the English, Reading, Writing, Mathematics, and Science tests on EXPLORE, PLAN, and the ACT.

How ACT College Readiness Standards Work with ACT College Readiness Benchmarks

The ACT College Readiness Benchmarks are the minimum ACT test scores required for students to have a high probability of success in first-year, credit-bearing college courses—English Composition, Algebra, social sciences courses, or Biology. EXPLORE and PLAN Benchmarks provided minimum score targets for eighth- and tenth-grade students to gauge their progress in becoming college ready by the time they graduate from high school.

ACT's College Readiness Benchmarks				
Test	**College Course**	**ACT Test Score**	**PLAN Test Score**	**EXPLORE Test Score**
English	English Composition	18	15	13
Mathematics	College Algebra	22	19	17
Reading	College Social Studies/Humanities	21	17	15
Science	College Biology	24	21	20

Students who meet a Benchmark on the ACT have approximately a 50 percent chance of earning a B or better and approximately a 75 percent chance or better of earning a C or better in the corresponding entry-level college course or courses. Students who meet a Benchmark on EXPLORE or PLAN have a high chance of meeting the College Readiness Benchmarks for the ACT and of being ready for the corresponding college course(s) by the time they graduate from high school.

The knowledge and skills in the score ranges that include these Benchmark scores are shown in the tables on the following pages. Students who master these standards are more likely than those who do not to persist to the second year at the same institution; achieve a grade of B or higher in first-year college courses; achieve a first-year college GPA of 2.5 or higher; progress toward a college degree; and complete a college degree.

Research shows that the academic quality and intensity of the high school curriculum is a key determinant of success in postsecondary education. *States should ensure that high school coursework be of sufficient rigor to prepare their graduates for postsecondary education and workforce training.*

This section (Section C-1) provides information about the Illinois Middle/Junior and Early High School Learning Standards as they relate to ACT's College Readiness Standards. The ACT College Readiness Standards included in the Illinois Middle/Junior and Early High School Learning Standards are highlighted. College Readiness Standards not highlighted are those that include specific content, complexity, and/or proficiency level descriptors that ACT content experts determined were not included in the Illinois Middle/Junior and Early High School Learning Standards.

Score Ranges	Table C-1a. ACT's College Readiness Standards — English		
Bench-marks	**Topic Development in Terms of Purpose and Focus**	**Organization, Unity, and Coherence**	**Word Choice in Terms of Style, Tone, Clarity, and Economy**
13–15 ***EXPL: 13*** ***PLAN: 15***		Use conjunctive adverbs or phrases to show time relationships in simple narrative essays (e.g., *then*, *this time*)	Revise sentences to correct awkward and confusing arrangements of sentence elements Revise vague nouns and pronouns that create obvious logic problems
16–19 ***ACT: 18***	Identify the basic purpose or role of a specified phrase or sentence Delete a clause or sentence because it is obviously irrelevant to the essay	Select the most logical place to add a sentence in a paragraph	Delete obviously synonymous and wordy material in a sentence Revise expressions that deviate from the style of an essay
20–23	Identify the central idea or main topic of a straightforward piece of writing Determine relevancy when presented with a variety of sentence-level details	Use conjunctive adverbs or phrases to express straightforward logical relationships (e.g., *first*, *afterward*, *in response*) Decide the most logical place to add a sentence in an essay Add a sentence that introduces a simple paragraph	Delete redundant material when information is repeated in different parts of speech (e.g., "alarmingly startled") Use the word or phrase most consistent with the style and tone of a fairly straightforward essay Determine the clearest and most logical conjunction to link clauses
24–27	Identify the focus of a simple essay, applying that knowledge to add a sentence that sharpens that focus or to determine if an essay has met a specified goal Delete material primarily because it disturbs the flow and development of the paragraph Add a sentence to accomplish a fairly straightforward purpose such as illustrating a given statement	Determine the need for conjunctive adverbs or phrases to create subtle logical connections between sentences (e.g., *therefore*, *however*, *in addition*) Rearrange the sentences in a fairly uncomplicated paragraph for the sake of logic Add a sentence to introduce or conclude the essay or to provide a transition between paragraphs when the essay is fairly straightforward	Revise a phrase that is redundant in terms of the meaning and logic of the entire sentence Identify and correct ambiguous pronoun references Use the word or phrase most appropriate in terms of the content of the sentence and tone of the essay
28–32*	Apply an awareness of the focus and purpose of a fairly involved essay to determine the rhetorical effect and suitability of an existing phrase or sentence, or to determine the need to delete plausible but irrelevant material Add a sentence to accomplish a subtle rhetorical purpose such as to emphasize, to add supporting detail, or to express meaning through connotation	Make sophisticated distinctions concerning the logical use of conjunctive adverbs or phrases, particularly when signaling a shift between paragraphs Rearrange sentences to improve the logic and coherence of a complex paragraph Add a sentence to introduce or conclude a fairly complex paragraph	Correct redundant material that involves sophisticated vocabulary and sounds acceptable as conversational English (e.g., "an aesthetic viewpoint" versus "the outlook of an aesthetic viewpoint") Correct vague and wordy or clumsy and confusing writing containing sophisticated language
33–36†	Determine whether a complex essay has accomplished a specific purpose Add a phrase or sentence to accomplish a complex purpose, often expressed in terms of the main focus of the essay	Consider the need for introductory sentences or transitions, basing decisions on a thorough understanding of both the logic and rhetorical effect of the paragraph and essay	Delete redundant material that involves subtle concepts or that is redundant in terms of the paragraph as a whole

*** Statements apply to PLAN & ACT only**

† Statements apply to the ACT only

Score Ranges / Bench-marks	Table C-1a. ACT's College Readiness Standards — English (continued)		
	Sentence Structure and Formation	**Conventions of Usage**	**Conventions of Punctuation**
13–15 ***EXPL: 13*** ***PLAN: 15***	Use conjunctions or punctuation to join simple clauses Revise shifts in verb tense between simple clauses in a sentence or between simple adjoining sentences	Solve such basic grammatical problems as how to form the past and past participle of irregular but commonly used verbs and how to form comparative and superlative adjectives	Delete commas that create basic sense problems (e.g., between verb and direct object)
16–19 ***ACT: 18***	Determine the need for punctuation and conjunctions to avoid awkward-sounding sentence fragments and fused sentences Decide the appropriate verb tense and voice by considering the meaning of the entire sentence	Solve such grammatical problems as whether to use an adverb or adjective form, how to ensure straightforward subject-verb and pronoun-antecedent agreement, and which preposition to use in simple contexts Recognize and use the appropriate word in frequently confused pairs such as *there* and *their*, *past* and *passed*, and *led* and *lead*	Provide appropriate punctuation in straightforward situations (e.g., items in a series) Delete commas that disturb the sentence flow (e.g., between modifier and modified element)
20–23	Recognize and correct marked disturbances of sentence flow and structure (e.g., participial phrase fragments, missing or incorrect relative pronouns, dangling or misplaced modifiers)	Use idiomatically appropriate prepositions, especially in combination with verbs (e.g., *long for*, *appeal to*) Ensure that a verb agrees with its subject when there is some text between the two	Use commas to set off simple parenthetical phrases Delete unnecessary commas when an incorrect reading of the sentence suggests a pause that should be punctuated (e.g., between verb and direct object clause)
24–27	Revise to avoid faulty placement of phrases and faulty coordination and subordination of clauses in sentences with subtle structural problems Maintain consistent verb tense and pronoun person on the basis of the preceding clause or sentence	Ensure that a pronoun agrees with its antecedent when the two occur in separate clauses or sentences Identify the correct past and past participle forms of irregular and infrequently used verbs and form present-perfect verbs by using *have* rather than *of*	Use punctuation to set off complex parenthetical phrases Recognize and delete unnecessary commas based on a careful reading of a complicated sentence (e.g., between the elements of a compound subject or compound verb joined by *and*) Use apostrophes to indicate simple possessive nouns Recognize inappropriate uses of colons and semicolons
28–32*	Use sentence-combining techniques, effectively avoiding problematic comma splices, run-on sentences, and sentence fragments, especially in sentences containing compound subjects or verbs Maintain a consistent and logical use of verb tense and pronoun person on the basis of information in the paragraph or essay as a whole	Correctly use reflexive pronouns, the possessive pronouns *its* and *your*, and the relative pronouns *who* and *whom* Ensure that a verb agrees with its subject in unusual situations (e.g., when the subject-verb order is inverted or when the subject is an indefinite pronoun)	Use commas to set off a nonessential/nonrestrictive appositive or clause Deal with multiple punctuation problems (e.g., compound sentences containing unnecessary commas and phrases that may or may not be parenthetical) Use an apostrophe to show possession, especially with irregular plural nouns Use a semicolon to indicate a relationship between closely related independent clauses
33–36†	Work comfortably with long sentences and complex clausal relationships within sentences, avoiding weak conjunctions between independent clauses and maintaining parallel structure between clauses	Provide idiomatically and contextually appropriate prepositions following verbs in situations involving sophisticated language or ideas Ensure that a verb agrees with its subject when a phrase or clause between the two suggests a different number for the verb	Use a colon to introduce an example or an elaboration

*** Statements apply to PLAN & ACT only**

† Statements apply to the ACT only

Score Ranges	Table C-1b. ACT's College Readiness Standards — Reading	
Bench-marks	**Main Ideas and Author's Approach**	**Supporting Details**
13–15 *EXPL: 15*	Recognize a clear intent of an author or narrator in uncomplicated literary narratives	Locate basic facts (e.g., names, dates, events) clearly stated in a passage
16–19 *PLAN: 17*	Identify a clear main idea or purpose of straightforward paragraphs in uncomplicated literary narratives	Locate simple details at the sentence and paragraph level in uncomplicated passages Recognize a clear function of a part of an uncomplicated passage
20–23 *ACT: 21*	Infer the main idea or purpose of straightforward paragraphs in uncomplicated literary narratives Understand the overall approach taken by an author or narrator (e.g., point of view, kinds of evidence used) in uncomplicated passages	Locate important details in uncomplicated passages Make simple inferences about how details are used in passages
24–27	Identify a clear main idea or purpose of any paragraph or paragraphs in uncomplicated passages Infer the main idea or purpose of straightforward paragraphs in more challenging passages Summarize basic events and ideas in more challenging passages Understand the overall approach taken by an author or narrator (e.g., point of view, kinds of evidence used) in more challenging passages	Locate important details in more challenging passages Locate and interpret minor or subtly stated details in uncomplicated passages Discern which details, though they may appear in different sections throughout a passage, support important points in more challenging passages
28–32*	Infer the main idea or purpose of more challenging passages or their paragraphs Summarize events and ideas in virtually any passage Understand the overall approach taken by an author or narrator (e.g., point of view, kinds of evidence used) in virtually any passage	Locate and interpret minor or subtly stated details in more challenging passages Use details from different sections of some complex informational passages to support a specific point or argument
33–36†	Identify clear main ideas or purposes of complex passages or their paragraphs	Locate and interpret details in complex passages Understand the function of a part of a passage when the function is subtle or complex

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Descriptions of the ACT Reading Passages

Uncomplicated Literary Narratives refers to excerpts from essays, short stories, and novels that tend to use simple language and structure, have a clear purpose and a familiar style, present straightforward interactions between characters, and employ only a limited number of literary devices such as metaphor, simile, or hyperbole.

More Challenging Literary Narratives refers to excerpts from essays, short stories, and novels that tend to make moderate use of figurative language, have a more intricate structure and messages conveyed with some subtlety, and may feature somewhat complex interactions between characters.

Complex Literary Narratives refers to excerpts from essays, short stories, and novels that tend to make generous use of ambiguous language and literary devices, feature complex and subtle interactions between characters, often contain challenging context-dependent vocabulary, and typically contain messages and/or meanings that are not explicit but are embedded in the passage.

Score Ranges	Table C-1b. ACT's College Readiness Standards — Reading (continued)		
Bench-marks	**Sequential, Comparative, and Cause-Effect Relationships**	**Meanings of Words**	**Generalizations and Conclusions**
13–15 ***EXPL: 15***	Determine when (e.g., first, last, before, after) or if an event occurred in uncomplicated passages Recognize clear cause-effect relationships described within a single sentence in a passage	Understand the implication of a familiar word or phrase and of simple descriptive language	Draw simple generalizations and conclusions about the main characters in uncomplicated literary narratives
16–19 ***PLAN: 17***	Identify relationships between main characters in uncomplicated literary narratives Recognize clear cause-effect relationships within a single paragraph in uncomplicated literary narratives	Use context to understand basic figurative language	Draw simple generalizations and conclusions about people, ideas, and so on in uncomplicated passages
20–23 ***ACT: 21***	Order simple sequences of events in uncomplicated literary narratives Identify clear relationships between people, ideas, and so on in uncomplicated passages Identify clear cause-effect relationships in uncomplicated passages	Use context to determine the appropriate meaning of some figurative and nonfigurative words, phrases, and statements in uncomplicated passages	Draw generalizations and conclusions about people, ideas, and so on in uncomplicated passages Draw simple generalizations and conclusions using details that support the main points of more challenging passages
24–27	Order sequences of events in uncomplicated passages Understand relationships between people, ideas, and so on in uncomplicated passages Identify clear relationships between characters, ideas, and so on in more challenging literary narratives Understand implied or subtly stated cause-effect relationships in uncomplicated passages Identify clear cause-effect relationships in more challenging passages	Use context to determine the appropriate meaning of virtually any word, phrase, or statement in uncomplicated passages Use context to determine the appropriate meaning of some figurative and nonfigurative words, phrases, and statements in more challenging passages	Draw subtle generalizations and conclusions about characters, ideas, and so on in uncomplicated literary narratives Draw generalizations and conclusions about people, ideas, and so on in more challenging passages
28–32*	Order sequences of events in more challenging passages Understand the dynamics between people, ideas, and so on in more challenging passages Understand implied or subtly stated cause-effect relationships in more challenging passages	Determine the appropriate meaning of words, phrases, or statements from figurative or somewhat technical contexts	Use information from one or more sections of a more challenging passage to draw generalizations and conclusions about people, ideas, and so on
33–36†	Order sequences of events in complex passages Understand the subtleties in relationships between people, ideas, and so on in virtually any passage Understand implied, subtle, or complex cause-effect relationships in virtually any passage	Determine, even when the language is richly figurative and the vocabulary is difficult, the appropriate meaning of context-dependent words, phrases, or statements in virtually any passage	Draw complex or subtle generalizations and conclusions about people, ideas, and so on, often by synthesizing information from different portions of the passage Understand and generalize about portions of a complex literary narrative

*** Statements apply to PLAN & ACT only**

† Statements apply to the ACT only

Uncomplicated Informational Passages refers to materials that tend to contain a limited amount of data, address basic concepts using familiar language and conventional organizational patterns, have a clear purpose, and are written to be accessible.

More Challenging Informational Passages refers to materials that tend to present concepts that are not always stated explicitly and that are accompanied or illustrated by more—and more detailed—supporting data, include some difficult context-dependent words, and are written in a somewhat more demanding and less accessible style.

Complex Informational Passages refers to materials that tend to include a sizable amount of data, present difficult concepts that are embedded (not explicit) in the text, use demanding words and phrases whose meaning must be determined from context, and are likely to include intricate explanations of processes or events.

Score Ranges	Table C-1c. ACT's College Readiness Standards — Mathematics			
Bench-marks	**Basic Operations & Applications**	**Probability, Statistics, & Data Analysis**	**Numbers: Concepts & Properties**	**Expressions, Equations, & Inequalities**
13–15	Perform one-operation computation with whole numbers and decimals Solve problems in one or two steps using whole numbers Perform common conversions (e.g., inches to feet or hours to minutes)	Calculate the average of a list of positive whole numbers Perform a single computation using information from a table or chart	Recognize equivalent fractions and fractions in lowest terms	Exhibit knowledge of basic expressions (e.g., identify an expression for a total as $b + g$) Solve equations in the form $x + a = b$, where a and b are whole numbers or decimals
16–19 ***EXPL: 17*** ***PLAN: 19***	Solve routine one-step arithmetic problems (using whole numbers, fractions, and decimals) such as single-step percent Solve some routine two-step arithmetic problems	Calculate the average of a list of numbers Calculate the average, given the number of data values and the sum of the data values Read tables and graphs Perform computations on data from tables and graphs Use the relationship between the probability of an event and the probability of its complement	Recognize one-digit factors of a number Identify a digit's place value	Substitute whole numbers for unknown quantities to evaluate expressions Solve one-step equations having integer or decimal answers Combine like terms (e.g., $2x + 5x$)
20–23 ***ACT: 22***	Solve routine two-step or three-step arithmetic problems involving concepts such as rate and proportion, tax added, percentage off, and computing with a given average	Calculate the missing data value, given the average and all data values but one Translate from one representation of data to another (e.g., a bar graph to a circle graph) Determine the probability of a simple event Exhibit knowledge of simple counting techniques*	Exhibit knowledge of elementary number concepts including rounding, the ordering of decimals, pattern identification, absolute value, primes, and greatest common factor	Evaluate algebraic expressions by substituting integers for unknown quantities Add and subtract simple algebraic expressions Solve routine first-degree equations Perform straightforward word-to-symbol translations Multiply two binomials*
24–27	Solve multistep arithmetic problems that involve planning or converting units of measure (e.g., feet per second to miles per hour)	Calculate the average, given the frequency counts of all the data values Manipulate data from tables and graphs Compute straightforward probabilities for common situations Use Venn diagrams in counting*	Find and use the least common multiple Order fractions Work with numerical factors Work with scientific notation Work with squares and square roots of numbers Work problems involving positive integer exponents* Work with cubes and cube roots of numbers* Determine when an expression is undefined* Exhibit some knowledge of the complex numbers†	Solve real-world problems using first-degree equations Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions) Identify solutions to simple quadratic equations Add, subtract, and multiply polynomials* Factor simple quadratics (e.g., the difference of squares and perfect square trinomials)* Solve first-degree inequalities that do not require reversing the inequality sign*
28–32*	Solve word problems containing several rates, proportions, or percentages	Calculate or use a weighted average Interpret and use information from figures, tables, and graphs Apply counting techniques Compute a probability when the event and/or sample space are not given or obvious	Apply number properties involving prime factorization Apply number properties involving even/odd numbers and factors/multiples Apply number properties involving positive/negative numbers Apply rules of exponents Multiply two complex numbers†	Manipulate expressions and equations Write expressions, equations, and inequalities for common algebra settings Solve linear inequalities that require reversing the inequality sign Solve absolute value equations Solve quadratic equations Find solutions to systems of linear equations
33–36†	Solve complex arithmetic problems involving percent of increase or decrease and problems requiring integration of several concepts from pre-algebra and/or pre-geometry (e.g., comparing percentages or averages, using several ratios, and finding ratios in geometry settings)	Distinguish between mean, median, and mode for a list of numbers Analyze and draw conclusions based on information from figures, tables, and graphs Exhibit knowledge of conditional and joint probability	Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers Exhibit knowledge of logarithms and geometric sequences Apply properties of complex numbers	Write expressions that require planning and/or manipulating to accurately model a situation Write equations and inequalities that require planning, manipulating, and/or solving Solve simple absolute value inequalities

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† Statements apply to the ACT only

= Included in Illinois Mathematics Learning Standards

Score Ranges / Bench-marks	Table C-1c. ACT's College Readiness Standards — Mathematics (continued)			
	Graphical Representations	**Properties of Plane Figures**	**Measurement**	**Functions†**
13–15	Identify the location of a point with a positive coordinate on the number line		Estimate or calculate the length of a line segment based on other lengths given on a geometric figure	
16–19 ***EXPL: 17*** ***PLAN: 19***	Locate points on the number line and in the first quadrant	Exhibit some knowledge of the angles associated with parallel lines	Compute the perimeter of polygons when all side lengths are given Compute the area of rectangles when whole number dimensions are given	
20–23 ***ACT: 22***	Locate points in the coordinate plane Comprehend the concept of length on the number line* Exhibit knowledge of slope*	Find the measure of an angle using properties of parallel lines Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°)	Compute the area and perimeter of triangles and rectangles in simple problems Use geometric formulas when all necessary information is given	Evaluate quadratic functions, expressed in function notation, at integer values
24–27	Identify the graph of a linear inequality on the number line* Determine the slope of a line from points or equations* Match linear graphs with their equations* Find the midpoint of a line segment*	Use several angle properties to find an unknown angle measure Recognize Pythagorean triples* Use properties of isosceles triangles*	Compute the area of triangles and rectangles when one or more additional simple steps are required Compute the area and circumference of circles after identifying necessary information Compute the perimeter of simple composite geometric figures with unknown side lengths*	Evaluate polynomial functions, expressed in function notation, at integer values Express the sine, cosine, and tangent of an angle in a right triangle as a ratio of given side lengths
28–32*	Interpret and use information from graphs in the coordinate plane Match number line graphs with solution sets of linear inequalities Use the distance formula Use properties of parallel and perpendicular lines to determine an equation of a line or coordinates of a point Recognize special characteristics of parabolas and circles (e.g., the vertex of a parabola and the center or radius of a circle)†	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles Use the Pythagorean theorem	Use relationships involving area, perimeter, and volume of geometric figures to compute another measure	Evaluate composite functions at integer values Apply basic trigonometric ratios to solve right-triangle problems
33–36†	Match number line graphs with solution sets of simple quadratic inequalities Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$ Solve problems integrating multiple algebraic and/or geometric concepts Analyze and draw conclusions based on information from graphs in the coordinate plane	Draw conclusions based on a set of conditions Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas Use relationships among angles, arcs, and distances in a circle	Use scale factors to determine the magnitude of a size change Compute the area of composite geometric figures when planning or visualization is required	Write an expression for the composite of two simple functions Use trigonometric concepts and basic identities to solve problems Exhibit knowledge of unit circle trigonometry Match graphs of basic trigonometric functions with their equations

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† Statements apply to the ACT only

= Included in Illinois Mathematics Learning Standards

Score Ranges	Table C-1d. ACT's College Readiness Standards — Science		
Bench-marks	**Interpretation of Data**	**Scientific Investigation**	**Evaluation of Models, Inferences, and Experimental Results**
13–15	Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels)		
16–19	Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation	Understand the methods and tools used in a simple experiment	
20–23 *EXPL: 20* *PLAN: 21*	Select data from a complex data presentation (e.g., a table or graph with more than three variables; a phase diagram) Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram	Understand the methods and tools used in a moderately complex experiment Understand a simple experimental design Identify a control in an experiment Identify similarities and differences between experiments	Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model Identify key issues or assumptions in a model
24–27 *ACT: 24*	Compare or combine data from two or more simple data presentations (e.g., categorize data from a table using a scale from another table) Compare or combine data from a complex data presentation Interpolate between data points in a table or graph Determine how the value of one variable changes as the value of another variable changes in a complex data presentation Identify and/or use a simple (e.g., linear) mathematical relationship between data Analyze given information when presented with new, simple information	Understand the methods and tools used in a complex experiment Understand a complex experimental design Predict the results of an additional trial or measurement in an experiment Determine the experimental conditions that would produce specified results	Select a simple hypothesis, prediction, or conclusion that is supported by two or more data presentations or models Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Identify strengths and weaknesses in one or more models Identify similarities and differences between models Determine which model(s) is(are) supported or weakened by new information Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
28–32*	Compare or combine data from a simple data presentation with data from a complex data presentation Identify and/or use a complex (e.g., nonlinear) mathematical relationship between data Extrapolate from data points in a table or graph	Determine the hypothesis for an experiment Identify an alternate method for testing a hypothesis	Select a complex hypothesis, prediction, or conclusion that is supported by a data presentation or model Determine whether new information supports or weakens a model, and why Use new information to make a prediction based on a model
33–36†	Compare or combine data from two or more complex data presentations Analyze given information when presented with new, complex information	Understand precision and accuracy issues Predict how modifying the design or methods of an experiment will affect results Identify an additional trial or experiment that could be performed to enhance or evaluate experimental results	Select a complex hypothesis, prediction, or conclusion that is supported by two or more data presentations or models Determine whether given information supports or contradicts a complex hypothesis or conclusion, and why

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Science College Readiness Standards are measured in the context of science topics students encounter in science courses. These topics may include:

Life Science/Biology	Physical Science/Chemistry, Physics	Earth & Space Science
• Animal behavior • Animal development and growth • Body systems • Cell structure and processes • Ecology • Evolution • Genetics • Homeostasis • Life cycles • Molecular basis of heredity • Origin of life • Photosynthesis • Plant development, growth, structure • Populations • Taxonomy	• Atomic structure • Chemical bonding, equations, nomenclature, reactions • Electrical circuits • Elements, compounds, mixtures • Force and motions • Gravitation • Heat and work • Kinetic and potential energy • Magnetism • Momentum • The Periodic Table • Properties of solutions • Sound and light • States, classes, and properties of matter • Waves	• Earthquakes and volcanoes • Earth's atmosphere • Earth's resources • Fossils and geological time • Geochemical cycles • Groundwater • Lakes, rivers, oceans • Mass movements • Plate tectonics • Rocks, minerals • Solar system • Stars, galaxies, and the universe • Water cycle • Weather and climate • Weathering and erosion

Section A-2: Number of Illinois Grade 8 Assessment Framework Objectives Measured by EXPLORE

Table A-2a. Number of Illinois Grade 8 Reading Assessment Framework Objectives Measured by EXPLORE

Illinois Goals and Standards*		Number of Illinois Objectives Measured by EXPLORE	Aspects of Illinois Grade 8 Assessment Objectives that are Not Measured
1. Reading	A. Vocabulary development	3 out of 5	Use knowledge of prefixes, suffixes, and word roots
	B. Reading strategies	3 out of 8	Make and verify predictions Create outlines, notes, or other visual representations Use information in charts, graphs, diagrams, maps, and tables Compare various selections
	C. Reading comprehension	9 out of 12	Use information from a variety of sources Determine whether a set of instructions or procedures [is] clear Determine why some points are illustrated
2. Literature	A. Literary elements and techniques	9 out of 10	Compare stories to personal experience
	B. Variety of literary works	0 out of 1	Identify various subcategories of genres
	TOTALS 2 out of 2 Goals 4 out of 5 Standards	24 out of 36	

*Refer to Illinois Grade 8 Reading Assessment Framework objectives on pages 34–35

Table A-2b. Number of Illinois Grade 8 Writing Assessment Framework Objectives Measured by EXPLORE			
Illinois Goals and Standards*		**Number of Illinois Objectives Measured by EXPLORE**	**Aspects of Illinois Grade 8 Assessment Objectives that are Not Measured**
3. Writing	A. Grammar, sentence structure, spelling, punctuation, and capitalization	9 out of 13	Spell words correctly Capitalize words correctly
	B. Composition + C. Communicate ideas	21 out of 32	Develop key points evenly Vary sentence structure Fully develop the composition for grade level Write in-depth, balanced support Describe events/reactions through multiple strategies
	TOTALS 1 out of 1 Goal 3 out of 3 Standards	30 out of 45	

*Refer to Illinois Grade 8 Writing Assessment Framework objectives on pages 36–37

Table A-2c. Number of Illinois Grade 8 Mathematics Assessment Framework Objectives Measured by EXPLORE			
Illinois Goals and Standards*		**Number of Illinois Objectives Measured by EXPLORE**	**Aspects of Illinois Grade 8 Assessment Objectives that are Not Measured**
6. Number Sense	A. Representations and ordering	8 out of 8	
	B. Operations and Properties + C. Computation and estimation	5 out of 6	Estimate the square or cube root of a number
	D. Ratios, proportions, and percents	4 out of 4	
7. Measurement	A., B., and C. Units, tools, estimation, and applications	6 out of 6	
8. Algebra	A. Representations, patterns, and expressions	5 out of 5	
	B. Tables, graphs, and symbols	5 out of 5	
	C. and D. Writing, interpreting, and solving equations	3 out of 3	
9. Geometry	A. Properties	8 out of 9	Analyze the results of a combination of transformations
	B. Relationships	3 out of 3	
10. Data Analysis, Statistics, and Probability	A. and B. Data analysis and Statistics	4 out of 5	Compare and contrast the effectiveness of different representations of the same data
	C. Probability	3 out of 3	
	TOTALS 5 out of 5 Goals 16 out of 16 Standards	54 out of 57	

*Refer to Illinois Grade 8 Mathematics Assessment Framework objectives on pages 38–40

Reading

ILLINOIS Reading
Grade 8 Assessment Framework Objectives

STATE GOAL 1: Read with understanding and fluency.

A. VOCABULARY DEVELOPMENT

Words in Isolation

1.8.01. Determine the meaning of an unknown word or content-area vocabulary using knowledge of prefixes, suffixes, and word roots.

1.8.02. Use etymologies to determine the meanings of words.

Words in Context

1.8.03. Determine the meaning of an unknown word using word, sentence, and cross-sentence clues.

1.8.04. Determine the connotation of a word using word, sentence, and cross-sentence clues.

1.8.05. Determine the meaning of a word in context when the word has multiple meanings.

B. READING STRATEGIES

1.8.06. Make and verify predictions based on prior knowledge and understanding of genres.

1.8.07. Clarify an understanding of text by creating outlines, notes, or other visual representations.

1.8.08. Use information in charts, graphs, diagrams, maps, and tables to help understand a reading passage.

1.8.09. Compare the content and organization (e.g., themes, topics, text structure, story elements) of various selections.

1.8.10. Relate information in the passage to other readings.

1.8.11. Identify cause and effect organizational patterns in fiction and nonfiction.

1.8.12. Identify compare and contrast organizational patterns in fiction and nonfiction.

1.8.13. Identify proposition and support organizational patterns in fiction and nonfiction.

C. READING COMPREHENSION

Literal or Simple Inference

1.8.14. Determine the answer to a literal or simple inference question regarding the meaning of a passage.

Summarizing and Main Idea

1.8.15. Compare an original text to a summary to determine whether the summary accurately captures the key ideas.

1.8.16. Summarize a story or nonfiction passage, or identify the best summary.

Sequencing and Ordering

1.8.17. Identify the outcome or conclusion of a story or nonfiction account, based on previous occurrences or events.

1.8.18. Identify the causes of events in a story or nonfiction account.

Drawing Conclusions Based on Evidence

1.8.19. Draw inferences, conclusions, or generalizations about text and support them with textual evidence and prior knowledge.

1.8.20. Differentiate between conclusions that are based on fact and those that are based on opinion.

1.8.21. Explain information presented in a nonfiction passage using evidence from the passage.

1.8.22. Use information from a variety of sources to explain a situation or decision or to solve a problem.

Interpreting Instructions

1.8.23. Determine whether a set of technical, multiple-step instructions or procedures are clear (e.g., if not clear, edit to clarify).

Author's Purpose and Design

1.8.24. Determine the author's purpose as represented by the choice of genre, and literary devices employed.

1.8.25. Determine why some points are illustrated.

STATE GOAL 2: Read and understand literature representative of various societies, eras and ideas.

A. LITERARY ELEMENTS AND TECHNIQUES

Story and Literary Structure

2.8.01. Identify elements of fiction: theme, rising action, falling action, conflict, point of view, resolution, and flashback.

2.8.02. Explain how theme, rising action, falling action, conflict, point of view, and resolution contribute to the meaning and a reader's interpretation of a literary selection.

2.8.03. Identify the author's message or theme.

2.8.04. Compare stories to personal experience, prior knowledge, or other stories

2.8.05. Recognize points of view in narratives (e.g., first person).

Characterization

2.8.06. Determine what characters are like by their words, thoughts, and actions, as well as how other characters react to them.

2.8.07. Determine character motivation.

2.8.08. Identify conflict or contradiction within a character or a character's behavior.

2.8.09. Explain the relationship between main and supporting characters.

Literary Terms and Devices

2.8.10. Identify literary devices (e.g., figurative language, hyperbole, understatement, symbols, dialogue).

2.8.11. Explain how the literary devices (e.g., imagery, metaphor, figurative language dialogue) contribute to the meaning of a literary selection.

2.8.12. Identify varieties of irony, including dramatic irony.

B. VARIETY OF LITERARY WORKS

2.8.13. Identify various subcategories of genres: poetry, drama (comedy and tragedy), science fiction, historical fiction, myth or legend, biography/autobiography, short story, poem, fairy tale, folktale, fable, nonfiction, and essay.

ILLINOIS Writing
Grade 8 Assessment Framework Objectives

STATE GOAL 3: Write to communicate for a variety of purposes.

A. GRAMMAR, SENTENCE STRUCTURE, SPELLING, PUNCTUATION, AND CAPITALIZATION

Grammar and Sentence Structure

3.8.01. Write complete sentences (e.g., avoid fragments and run-on sentences).

3.8.02. Use the correct form of regular and irregular verbs.

3.8.03. Write a variety of sentences (e.g., simple, compound and complex).

3.8.04. Use correct subject-verb agreement.

3.8.05. Write sentences with correct pronoun-antecedent agreement.

3.8.06. Demonstrate grade-appropriate use of the various parts of speech.

3.8.07. Use consistent verb tense.

Spelling

3.8.08. Spell grade-appropriate words correctly.

Punctuation and Capitalization

3.8.09. Capitalize words correctly (based on grade-appropriate rules).

3.8.10. Use correct end punctuation.

3.8.11. Use commas joining two independent clauses.

3.8.12. Use grade-appropriate apostrophes correctly.

3.8.13. Use quotation marks in direct quotations.

B & C. COMPOSITION

PERSUASIVE COMPOSITION

Write a persuasive composition by taking a position on a topic and developing one side of the argument.

Persuasive (Focus)

The clarity with which a composition presents and maintains a clear main idea or point view

3.8.14. Write a sophisticated opening through the use of anecdotes, quotations, definitions, personal appeals or other effective strategies.

3.8.15. Clearly maintain logic and position throughout.

3.8.16. Write an effective closing which unifies the essay.

Persuasive (Support)

The degree to which the main point or position is supported and explained by specific details and reasons

3.8.17. Use well chosen words that suit the message and occasion.

3.8.18. Use multiple strategies to develop support (e.g., explanation, evidence, examples).

3.8.19. Build and connect ideas to create depth.

3.8.20. Develop key points evenly (to the same degree of specificity).

3.8.21. Maintain consistent voice throughout.

Persuasive (Organization)

The clarity of the logical flow of ideas and the explicitness of the text structure or plan (coherence and cohesion).

3.8.22. Include a clear structure (appropriate to purpose).

3.8.23. Use appropriate, purposeful paragraphing for major points.

3.8.24. Connect sentences and paragraphs through effective and varied transitions and other devices (e.g., repetition, pronouns, synonyms, parallel structure).

3.8.25. Vary sentence structure and word choice.

Persuasive (Integration)

Evaluation of the composition based on a focused, global judgment of how effectively the composition as a whole fulfills the assignment

3.8.26. Fully develop the composition for grade level.

3.8.27. Include clear, purposeful focus and voice.

3.8.28. Write in-depth, balanced support.

3.8.29. Develop lines of reasoning coherently and cohesively throughout the composition.

NARRATIVE COMPOSITION

Write a personal narrative composition recounting and reflecting upon a significant experience, describing the action that occurs and the reactions of the participants involved.

Narrative (Focus)

The clarity with which a narrative composition presents and maintains a unifying event or theme

3.8.30. Clearly set the purpose of the composition through a successful introduction strategy.

3.8.31. Include reactions that are effectively connected to the unifying event.

3.8.32. Write an effective closing which unifies the writing.

Narrative (Elaboration)

The degree to which the event is elaborated by specific details, descriptions, and reactions

3.8.33. Develop all major episodes/reactions with specific details and examples (developed to the same degree of specificity).

3.8.34. Describe events/reactions through multiple strategies (e.g., points of view/perspective, others' reactions, dialogue, etc.).

3.8.35. Write an effective closing which unifies the writing.

3.8.36. Use specific words to describe the event/reactions.

3.8.37. Maintain consistent voice throughout.

Narrative (Organization)

The clarity of the logical flow of an experience and/or movement of an event through time (coherence and cohesion)

3.8.38. Write a sequence of episodes that move through time with a beginning, a middle, and an end without gaps.

3.8.39. Use appropriate, purposeful paragraphing (follow narrative structure).

3.8.40. Use effective and varied devices to demonstrate coherence and cohesion (e.g., transitions, parallel structure, pronouns, etc.).

3.8.41. Present and interrelate episodes and reactions logically.

3.8.42. Vary sentence structure to produce cohesion.

Narrative (Integration)

The evaluation of the composition based on a focused, global judgment of how effectively the composition as a whole fulfills the assignment

3.8.43. Fully develop the composition for grade level.

3.8.44. Maintain a clear and purposeful focus, an in-depth, balanced elaboration, and a consistent voice.

3.8.45. Develop a sequence of episodes coherently and cohesively throughout.

ILLINOIS Mathematics
Grade 8 Assessment Framework Objectives

STATE GOAL 6: Number Sense. Demonstrate and apply a knowledge and sense of numbers, including numeration and operations (addition, subtraction, multiplication, division), patterns, ratios and proportions.

A. Representations and Ordering

Read, Write, and Represent Numbers

6.8.01. Read, write, and recognize equivalent representations of integer powers of 10.

6.8.02. Read, write, recognize, model, and interpret integers, including translating numerical expressions.

6.8.03. Recognize, translate between, and apply multiple representations of rational numbers (decimals, fractions, mixed numbers, percents, and roots).

6.8.04. Use scientific notation to represent numbers and solve problems.

6.8.05. Represent repeated factors using exponents.

Order and Compare Numbers

6.8.06. Order and compare rational numbers.

Number Line

6.8.07. Identify and locate rational and irrational numbers (e.g., π, $\sqrt{2}$, $\sqrt{5}$) on a number line.

Classifications of Numbers

6.8.08. Solve problems involving descriptions of numbers, including characteristics and relationships (e.g., exponents, roots, prime/composite, prime factorization, greatest common factor, least common multiple).

B & C. Computation, Operations, Estimation, and Properties

Number Operations

6.8.09. Solve problems and number sentences involving addition, subtraction, multiplication, and division using rational numbers, exponents, and roots.

6.8.10. Identify and apply order of operations to simplify numeric expressions involving integers (including exponents and roots), fractions, and decimals.

Properties

6.8.11. Identify and apply the following properties of operations with rational numbers:

- the commutative and associative properties for addition and multiplication;
- the distributive property;
- the additive and multiplicative identity properties;
- the additive and multiplicative inverse properties; and
- the multiplicative property of zero.

6.8.12. Describe the effect of multiplying and dividing by numbers, including the effect of multiplying or dividing a rational number by:

- a number less than zero;
- zero;
- a number between zero and one; and
- a number greater than one.

Estimation

6.8.13. Select, use, and justify appropriate operations, methods, and tools to compute or estimate with rational numbers. Verify solutions and determine the reasonableness of results.

6.8.14. Estimate the square or cube root of a number less than 1,000 between two whole numbers (e.g., $\sqrt[3]{200}$ is between 5 and 6).

D. Ratios, Proportions, and Percents

Identify and Express Ratios

6.8.15. Use ratios to describe problem situations.

Proportional Reasoning

6.8.16. Use proportional reasoning to model and solve problems.

Percents

6.8.17. Read, write, recognize, model, and interpret percents, including those less than 1% and greater than 100%.

6.8.18. Solve number sentences and problems involving fractions, decimals, and percents (e.g., percent increase and decrease, interest rates, tax, discounts, tips).

STATE GOAL 7: Measurement. Estimate, make and use measurements of objects, quantities and relationships and determine acceptable levels of accuracy.

A, B, & C. Units, Tools, Estimation, and Applications

Measurement Tools

7.8.01. Select and use appropriate standard units and tools to solve measurement problems, including measurements of polygons and circles.

Area, Perimeter, and Circumference

7.8.02. Solve problems involving perimeter/circumference and area of polygons, circles, and composite figures using diagrams, models, and grids or by measuring or using given formulas (may include sketching a figure from its description).

Estimation

7.8.03. Compare and estimate length (including perimeter/circumference), area, volume, weight/mass, and angles (0° to 360°) using referents.

Volume and Surface Area

7.8.04. Solve problems involving the volume or surface area of a right rectangular prism, right circular cylinder, or composite shape using an appropriate formula or strategy.

Measurement Conversions

7.8.05. Solve problems involving unit conversions *within the same measurement system* for length, weight/mass, capacity, square units, and measures expressed as rates (e.g., converting feet/second to yards/minute).

Indirect Measurements and Scale Drawings

7.8.06. Solve problems involving scale drawings, maps, and indirect measurement (e.g., determining the height of a building by comparing its known shadow length to the known height and shadow length of another object).

STATE GOAL 8: Algebra. Use algebraic and analytical methods to identify and describe patterns and relationships in data, solve problems and predict results.

A. Representations, Patterns, and Expressions

Patterns

8.8.01. Analyze, extend, and create sequences or linear functions, and determine algebraic expressions to describe the *n*th term of a sequence.

Write and Simplify Expressions

8.8.02. Write an expression using variables to represent unknown quantities.

8.8.03. Simplify algebraic expressions.

8.8.04. Recognize and generate equivalent forms of algebraic expressions.

Evaluate Algebraic Expressions

8.8.05. Evaluate or simplify algebraic expressions with one or more rational variable values (e.g., $3a^2 - b$ for $a = 3$ and $b = 7$).

B. Connections Using Tables, Graphs, and Symbols

Describing Change

8.8.06. Recognize, describe, and extend patterns using rate of change.

Coordinate System

8.8.07. Represent linear equations and quantitative relationships on a rectangular coordinate system, and interpret the meaning of a specific part of a graph.

Representations

8.8.08. Translate between different representations (table, written, graphical, or pictorial) of whole number relationships and linear expressions.

8.8.09. Interpret the meaning of slope and intercepts in linear situations.

Inequalities

8.8.10. Identify, graph, and interpret up to two inequalities with a single variable (including the intersection or union of these inequalities) on a number line.

C & D. Writing, Interpreting, and Solving Equations

Write Equations and Inequalities

8.8.11. Represent and analyze problems with linear equations and inequalities.

Solve Equations and Inequalities

8.8.12. Solve linear equations and inequalities in one variable over the rational numbers (e.g., $5x + 7 = -13$, $4x - 3 = -7x + 8$, $-2x + 3 > -5$).

8.8.13. Solve word problems involving unknown quantities.

STATE GOAL 9: Geometry. Use geometric methods to analyze, categorize and draw conclusions about points, lines, planes and space.

A. Properties of Single Figures and Coordinate Geometry

Properties of Single Figures

9.8.01. Solve problems involving two- and three-dimensional shapes.

9.8.02. Solve problems that require knowledge of triangle and quadrilateral properties (e.g., triangle inequality).

9.8.03. Find the length of any side of a right triangle using the Pythagorean theorem (whole number solutions).

Circles

9.8.04. Identify, describe, and determine the radius, diameter, and circumference of a circle and their relationship to each other and to pi.

Coordinate Geometry

9.8.05. Graph points, and identify coordinates of points on the Cartesian coordinate plane (all four quadrants).

9.8.06. Represent and identify geometric figures using coordinate geometry, including those resulting from transformations.

Transformations

9.8.07. Analyze the results of a combination of transformations, and determine a different transformation that could produce the same result.

Lines, Segments, Rays, and Angles

9.8.08. Identify or analyze relationships of angles formed by intersecting lines (including parallel lines cut by a transversal) and angles formed by radii of a circle.

9.8.09. Solve problems involving vertical, complementary, and supplementary angles.

B. Relationships Between and Among Multiple Figures

Relationships Between Two- and Three-Dimensional Objects

9.8.10. Identify front, side, and top views of a three-dimensional solid built with cubes.

Congruency and Similarity

9.8.11. Solve problems involving congruent and similar figures.

Distance

9.8.12. Relate absolute value to distance on the number line.

STATE GOAL 10: Data Analysis, Statistics, and Probability. Collect, organize and analyze data using statistical methods; predict results; and interpret uncertainty using concepts of probability.

A & B. Data Analysis and Statistics

Read and Interpret Displays

10.8.01. Read, interpret (including possible misleading characteristics), and make predictions from data represented in a bar graph, line (dot) plot, Venn diagram (with two or three circles), chart/table, line graph, scatter plot, circle graph, stem-and-leaf plot, or histogram.

10.8.02. Compare and contrast the effectiveness of different representations of the same data.

Complete and Create Displays

10.8.03. Create a bar graph, chart/table, line graph, or circle graph and solve a problem using the data in the graph for a given set of data.

Line of Best Fit

10.8.04. Identify or draw a reasonable approximation of the line of best fit from a set of data or a scatter plot, and use the line to make predictions.

Statistics

10.8.05. Analyze and apply measures of central tendency (mode, range, median, and mean) in problem-solving situations.

C. Probability

Probability

10.8.06. Solve problems involving the probability of an event composed of repeated trials, compound events (including independent events), or future events with or without replacement.

Outcomes and Counting Principles

10.8.07. Represent all possible outcomes (sample space) for simple or compound events (e.g., tables, grids, tree diagrams).

10.8.08. Solve simple problems involving the number of ways objects can be arranged (permutations and combinations).

Section C-2: ACT's College Readiness Standards Included in Illinois Grade 8 Assessment Frameworks

In recent years ACT has brought a distinctive voice to the debate on what it means to be truly ready for college. Using a wealth of longitudinal data—data that no one else possesses—ACT has pioneered empirical approaches to assessing students' college readiness. Using thousands of student records and responses, content and measurement experts at ACT have developed detailed statements that describe what students typically know and are able to do at different levels of test performance. These data-driven, empirically derived score descriptors, known as ACT's College Readiness Standards, describe student achievement within various score ranges on the English, Reading, Writing, Mathematics, and Science tests on EXPLORE, PLAN, and the ACT.

How ACT College Readiness Standards Work with ACT College Readiness Benchmarks

The ACT College Readiness Benchmarks are the minimum ACT test scores required for students to have a high probability of success in first-year, credit-bearing college courses—English Composition, Algebra, social sciences courses, or Biology. EXPLORE and PLAN Benchmarks provided minimum score targets for eighth- and tenth-grade students to gauge their progress in becoming college ready by the time they graduate from high school.

ACT's College Readiness Benchmarks				
Test	**College Course**	**ACT Test Score**	**PLAN Test Score**	**EXPLORE Test Score**
English	English Composition	18	15	13
Mathematics	College Algebra	22	19	17
Reading	College Social Studies/Humanities	21	17	15
Science	College Biology	24	21	20

Students who meet a Benchmark on the ACT have approximately a 50 percent chance of earning a B or better and approximately a 75 percent chance or better of earning a C or better in the corresponding entry-level college course or courses. Students who meet a Benchmark on EXPLORE or PLAN have a high chance of meeting the College Readiness Benchmarks for the ACT and of being ready for the corresponding college course(s) by the time they graduate from high school.

The knowledge and skills in the score ranges that include these Benchmark scores are shown in the tables on the following pages. Students who master these standards are more likely than those who do not to persist to the second year at the same institution; achieve a grade of B or higher in first-year college courses; achieve a first-year college GPA of 2.5 or higher; progress toward a college degree; and complete a college degree.

Research shows that the academic quality and intensity of the high school curriculum is a key determinant of success in postsecondary education. *States should ensure that high school coursework be of sufficient rigor to prepare their graduates for postsecondary education and workforce training.*

This section (Section C-2) provides information about the Illinois Grade 8 Assessment Frameworks as they relate to ACT's College Readiness Standards. The ACT College Readiness Standards included in the Illinois Grade 8 Assessment Frameworks are highlighted. College Readiness Standards not highlighted are those that include specific content, complexity, and/or proficiency level descriptors that ACT content experts determined were not included in the Illinois Grade 8 Assessment Frameworks.

Score Ranges	Table C-2a. ACT's College Readiness Standards — English		
Bench-marks	**Topic Development in Terms of Purpose and Focus**	**Organization, Unity, and Coherence**	**Word Choice in Terms of Style, Tone, Clarity, and Economy**
13–15 ***EXPL: 13*** ***PLAN: 15***		Use conjunctive adverbs or phrases to show time relationships in simple narrative essays (e.g., *then*, *this time*)	Revise sentences to correct awkward and confusing arrangements of sentence elements Revise vague nouns and pronouns that create obvious logic problems
16–19 ***ACT: 18***	Identify the basic purpose or role of a specified phrase or sentence Delete a clause or sentence because it is obviously irrelevant to the essay	Select the most logical place to add a sentence in a paragraph	Delete obviously synonymous and wordy material in a sentence Revise expressions that deviate from the style of an essay
20–23	Identify the central idea or main topic of a straightforward piece of writing Determine relevancy when presented with a variety of sentence-level details	Use conjunctive adverbs or phrases to express straightforward logical relationships (e.g., *first*, *afterward*, *in response*) Decide the most logical place to add a sentence in an essay Add a sentence that introduces a simple paragraph	Delete redundant material when information is repeated in different parts of speech (e.g., "alarmingly startled") Use the word or phrase most consistent with the style and tone of a fairly straightforward essay Determine the clearest and most logical conjunction to link clauses
24–27	Identify the focus of a simple essay, applying that knowledge to add a sentence that sharpens that focus or to determine if an essay has met a specified goal Delete material primarily because it disturbs the flow and development of the paragraph Add a sentence to accomplish a fairly straightforward purpose such as illustrating a given statement	Determine the need for conjunctive adverbs or phrases to create subtle logical connections between sentences (e.g., *therefore*, *however*, *in addition*) Rearrange the sentences in a fairly uncomplicated paragraph for the sake of logic Add a sentence to introduce or conclude the essay or to provide a transition between paragraphs when the essay is fairly straightforward	Revise a phrase that is redundant in terms of the meaning and logic of the entire sentence Identify and correct ambiguous pronoun references Use the word or phrase most appropriate in terms of the content of the sentence and tone of the essay
28–32*	Apply an awareness of the focus and purpose of a fairly involved essay to determine the rhetorical effect and suitability of an existing phrase or sentence, or to determine the need to delete plausible but irrelevant material Add a sentence to accomplish a subtle rhetorical purpose such as to emphasize, to add supporting detail, or to express meaning through connotation	Make sophisticated distinctions concerning the logical use of conjunctive adverbs or phrases, particularly when signaling a shift between paragraphs Rearrange sentences to improve the logic and coherence of a complex paragraph Add a sentence to introduce or conclude a fairly complex paragraph	Correct redundant material that involves sophisticated vocabulary and sounds acceptable as conversational English (e.g., "an aesthetic viewpoint" versus "the outlook of an aesthetic viewpoint") Correct vague and wordy or clumsy and confusing writing containing sophisticated language
33–36†	Determine whether a complex essay has accomplished a specific purpose Add a phrase or sentence to accomplish a complex purpose, often expressed in terms of the main focus of the essay	Consider the need for introductory sentences or transitions, basing decisions on a thorough understanding of both the logic and rhetorical effect of the paragraph and essay	Delete redundant material that involves subtle concepts or that is redundant in terms of the paragraph as a whole

*** Statements apply to PLAN & ACT only**

† Statements apply to the ACT only

Score Ranges / Bench-marks	Table C-2a. ACT's College Readiness Standards — English (continued)		
	Sentence Structure and Formation	**Conventions of Usage**	**Conventions of Punctuation**
13–15 ***EXPL: 13*** ***PLAN: 15***	Use conjunctions or punctuation to join simple clauses Revise shifts in verb tense between simple clauses in a sentence or between simple adjoining sentences	Solve such basic grammatical problems as how to form the past and past participle of irregular but commonly used verbs and how to form comparative and superlative adjectives	Delete commas that create basic sense problems (e.g., between verb and direct object)
16–19 ***ACT: 18***	Determine the need for punctuation and conjunctions to avoid awkward-sounding sentence fragments and fused sentences Decide the appropriate verb tense and voice by considering the meaning of the entire sentence	Solve such grammatical problems as whether to use an adverb or adjective form, how to ensure straightforward subject-verb and pronoun-antecedent agreement, and which preposition to use in simple contexts Recognize and use the appropriate word in frequently confused pairs such as *there* and *their*, *past* and *passed*, and *led* and *lead*	Provide appropriate punctuation in straightforward situations (e.g., items in a series) Delete commas that disturb the sentence flow (e.g., between modifier and modified element)
20–23	Recognize and correct marked disturbances of sentence flow and structure (e.g., participial phrase fragments, missing or incorrect relative pronouns, dangling or misplaced modifiers)	Use idiomatically appropriate prepositions, especially in combination with verbs (e.g., *long for*, *appeal to*) Ensure that a verb agrees with its subject when there is some text between the two	Use commas to set off simple parenthetical phrases Delete unnecessary commas when an incorrect reading of the sentence suggests a pause that should be punctuated (e.g., between verb and direct object clause)
24–27	Revise to avoid faulty placement of phrases and faulty coordination and subordination of clauses in sentences with subtle structural problems Maintain consistent verb tense and pronoun person on the basis of the preceding clause or sentence	Ensure that a pronoun agrees with its antecedent when the two occur in separate clauses or sentences Identify the correct past and past participle forms of irregular and infrequently used verbs and form present-perfect verbs by using *have* rather than *of*	Use punctuation to set off complex parenthetical phrases Recognize and delete unnecessary commas based on a careful reading of a complicated sentence (e.g., between the elements of a compound subject or compound verb joined by *and*) Use apostrophes to indicate simple possessive nouns Recognize inappropriate uses of colons and semicolons
28–32*	Use sentence-combining techniques, effectively avoiding problematic comma splices, run-on sentences, and sentence fragments, especially in sentences containing compound subjects or verbs Maintain a consistent and logical use of verb tense and pronoun person on the basis of information in the paragraph or essay as a whole	Correctly use reflexive pronouns, the possessive pronouns *its* and *your*, and the relative pronouns *who* and *whom* Ensure that a verb agrees with its subject in unusual situations (e.g., when the subject-verb order is inverted or when the subject is an indefinite pronoun)	Use commas to set off a nonessential/nonrestrictive appositive or clause Deal with multiple punctuation problems (e.g., compound sentences containing unnecessary commas and phrases that may or may not be parenthetical) Use an apostrophe to show possession, especially with irregular plural nouns Use a semicolon to indicate a relationship between closely related independent clauses
33–36†	Work comfortably with long sentences and complex clausal relationships within sentences, avoiding weak conjunctions between independent clauses and maintaining parallel structure between clauses	Provide idiomatically and contextually appropriate prepositions following verbs in situations involving sophisticated language or ideas Ensure that a verb agrees with its subject when a phrase or clause between the two suggests a different number for the verb	Use a colon to introduce an example or an elaboration

*** Statements apply to PLAN & ACT only**

† Statements apply to the ACT only

Score Ranges / Bench-marks	Table C-2b. ACT's College Readiness Standards — Reading	
	Main Ideas and Author's Approach	**Supporting Details**
13–15 *EXPL: 15*	Recognize a clear intent of an author or narrator in uncomplicated literary narratives	Locate basic facts (e.g., names, dates, events) clearly stated in a passage
16–19 *PLAN: 17*	Identify a clear main idea or purpose of straightforward paragraphs in uncomplicated literary narratives	Locate simple details at the sentence and paragraph level in uncomplicated passages Recognize a clear function of a part of an uncomplicated passage
20–23 *ACT: 21*	Infer the main idea or purpose of straightforward paragraphs in uncomplicated literary narratives Understand the overall approach taken by an author or narrator (e.g., point of view, kinds of evidence used) in uncomplicated passages	Locate important details in uncomplicated passages Make simple inferences about how details are used in passages
24–27	Identify a clear main idea or purpose of any paragraph or paragraphs in uncomplicated passages Infer the main idea or purpose of straightforward paragraphs in more challenging passages Summarize basic events and ideas in more challenging passages Understand the overall approach taken by an author or narrator (e.g., point of view, kinds of evidence used) in more challenging passages	Locate important details in more challenging passages Locate and interpret minor or subtly stated details in uncomplicated passages Discern which details, though they may appear in different sections throughout a passage, support important points in more challenging passages
28–32*	Infer the main idea or purpose of more challenging passages or their paragraphs Summarize events and ideas in virtually any passage Understand the overall approach taken by an author or narrator (e.g., point of view, kinds of evidence used) in virtually any passage	Locate and interpret minor or subtly stated details in more challenging passages Use details from different sections of some complex informational passages to support a specific point or argument
33–36†	Identify clear main ideas or purposes of complex passages or their paragraphs	Locate and interpret details in complex passages Understand the function of a part of a passage when the function is subtle or complex

*** Statements apply to PLAN & ACT only** **† Statements apply to the ACT only**

Descriptions of the ACT Reading Passages

Uncomplicated Literary Narratives refers to excerpts from essays, short stories, and novels that tend to use simple language and structure, have a clear purpose and a familiar style, present straightforward interactions between characters, and employ only a limited number of literary devices such as metaphor, simile, or hyperbole.

More Challenging Literary Narratives refers to excerpts from essays, short stories, and novels that tend to make moderate use of figurative language, have a more intricate structure and messages conveyed with some subtlety, and may feature somewhat complex interactions between characters.

Complex Literary Narratives refers to excerpts from essays, short stories, and novels that tend to make generous use of ambiguous language and literary devices, feature complex and subtle interactions between characters, often contain challenging context-dependent vocabulary, and typically contain messages and/or meanings that are not explicit but are embedded in the passage.

Score Ranges	Table C-2b. ACT's College Readiness Standards — Reading (continued)		
Bench-marks	**Sequential, Comparative, and Cause-Effect Relationships**	**Meanings of Words**	**Generalizations and Conclusions**
13–15 *EXPL: 15*	Determine when (e.g., first, last, before, after) or if an event occurred in uncomplicated passages Recognize clear cause-effect relationships described within a single sentence in a passage	Understand the implication of a familiar word or phrase and of simple descriptive language	Draw simple generalizations and conclusions about the main characters in uncomplicated literary narratives
16–19 *PLAN: 17*	Identify relationships between main characters in uncomplicated literary narratives Recognize clear cause-effect relationships within a single paragraph in uncomplicated literary narratives	Use context to understand basic figurative language	Draw simple generalizations and conclusions about people, ideas, and so on in uncomplicated passages
20–23 *ACT: 21*	Order simple sequences of events in uncomplicated literary narratives Identify clear relationships between people, ideas, and so on in uncomplicated passages Identify clear cause-effect relationships in uncomplicated passages	Use context to determine the appropriate meaning of some figurative and nonfigurative words, phrases, and statements in uncomplicated passages	Draw generalizations and conclusions about people, ideas, and so on in uncomplicated passages Draw simple generalizations and conclusions using details that support the main points of more challenging passages
24–27	Order sequences of events in uncomplicated passages Understand relationships between people, ideas, and so on in uncomplicated passages Identify clear relationships between characters, ideas, and so on in more challenging literary narratives Understand implied or subtly stated cause-effect relationships in uncomplicated passages Identify clear cause-effect relationships in more challenging passages	Use context to determine the appropriate meaning of virtually any word, phrase, or statement in uncomplicated passages Use context to determine the appropriate meaning of some figurative and nonfigurative words, phrases, and statements in more challenging passages	Draw subtle generalizations and conclusions about characters, ideas, and so on in uncomplicated literary narratives Draw generalizations and conclusions about people, ideas, and so on in more challenging passages
28–32*	Order sequences of events in more challenging passages Understand the dynamics between people, ideas, and so on in more challenging passages Understand implied or subtly stated cause-effect relationships in more challenging passages	Determine the appropriate meaning of words, phrases, or statements from figurative or somewhat technical contexts	Use information from one or more sections of a more challenging passage to draw generalizations and conclusions about people, ideas, and so on
33–36†	Order sequences of events in complex passages Understand the subtleties in relationships between people, ideas, and so on in virtually any passage Understand implied, subtle, or complex cause-effect relationships in virtually any passage	Determine, even when the language is richly figurative and the vocabulary is difficult, the appropriate meaning of context-dependent words, phrases, or statements in virtually any passage	Draw complex or subtle generalizations and conclusions about people, ideas, and so on, often by synthesizing information from different portions of the passage Understand and generalize about portions of a complex literary narrative

*** Statements apply to PLAN & ACT only**

† Statements apply to the ACT only

Uncomplicated Informational Passages refers to materials that tend to contain a limited amount of data, address basic concepts using familiar language and conventional organizational patterns, have a clear purpose, and are written to be accessible.

More Challenging Informational Passages refers to materials that tend to present concepts that are not always stated explicitly and that are accompanied or illustrated by more—and more detailed—supporting data, include some difficult context-dependent words, and are written in a somewhat more demanding and less accessible style.

Complex Informational Passages refers to materials that tend to include a sizable amount of data, present difficult concepts that are embedded (not explicit) in the text, use demanding words and phrases whose meaning must be determined from context, and are likely to include intricate explanations of processes or events.

Score Ranges	Table C-2c. ACT's College Readiness Standards — Mathematics			
Bench-marks	**Basic Operations & Applications**	**Probability, Statistics, & Data Analysis**	**Numbers: Concepts & Properties**	**Expressions, Equations, & Inequalities**
13–15	Perform one-operation computation with whole numbers and decimals Solve problems in one or two steps using whole numbers Perform common conversions (e.g., inches to feet or hours to minutes)	Calculate the average of a list of positive whole numbers Perform a single computation using information from a table or chart	Recognize equivalent fractions and fractions in lowest terms	Exhibit knowledge of basic expressions (e.g., identify an expression for a total as $b + g$) Solve equations in the form $x + a = b$, where a and b are whole numbers or decimals
16–19 *EXPL: 17* *PLAN: 19*	Solve routine one-step arithmetic problems (using whole numbers, fractions, and decimals) such as single-step percent Solve some routine two-step arithmetic problems	Calculate the average of a list of numbers Calculate the average, given the number of data values and the sum of the data values Read tables and graphs Perform computations on data from tables and graphs Use the relationship between the probability of an event and the probability of its complement	Recognize one-digit factors of a number Identify a digit's place value	Substitute whole numbers for unknown quantities to evaluate expressions Solve one-step equations having integer or decimal answers Combine like terms (e.g., $2x + 5x$)
20–23 *ACT: 22*	Solve routine two-step or three-step arithmetic problems involving concepts such as rate and proportion, tax added, percentage off, and computing with a given average	Calculate the missing data value, given the average and all data values but one Translate from one representation of data to another (e.g., a bar graph to a circle graph) Determine the probability of a simple event Exhibit knowledge of simple counting techniques*	Exhibit knowledge of elementary number concepts including rounding, the ordering of decimals, pattern identification, absolute value, primes, and greatest common factor	Evaluate algebraic expressions by substituting integers for unknown quantities Add and subtract simple algebraic expressions Solve routine first-degree equations Perform straightforward word-to-symbol translations Multiply two binomials*
24–27	Solve multistep arithmetic problems that involve planning or converting units of measure (e.g., feet per second to miles per hour)	Calculate the average, given the frequency counts of all the data values Manipulate data from tables and graphs Compute straightforward probabilities for common situations Use Venn diagrams in counting*	Find and use the least common multiple Order fractions Work with numerical factors Work with scientific notation Work with squares and square roots of numbers Work problems involving positive integer exponents* Work with cubes and cube roots of numbers* Determine when an expression is undefined* Exhibit some knowledge of the complex numbers†	Solve real-world problems using first-degree equations Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions) Identify solutions to simple quadratic equations Add, subtract, and multiply polynomials* Factor simple quadratics (e.g., the difference of squares and perfect square trinomials)* Solve first-degree inequalities that do not require reversing the inequality sign*
28–32*	Solve word problems containing several rates, proportions, or percentages	Calculate or use a weighted average Interpret and use information from figures, tables, and graphs Apply counting techniques Compute a probability when the event and/or sample space are not given or obvious	Apply number properties involving prime factorization Apply number properties involving even/odd numbers and factors/multiples Apply number properties involving positive/negative numbers Apply rules of exponents Multiply two complex numbers†	Manipulate expressions and equations Write expressions, equations, and inequalities for common algebra settings Solve linear inequalities that require reversing the inequality sign Solve absolute value equations Solve quadratic equations Find solutions to systems of linear equations
33–36†	Solve complex arithmetic problems involving percent of increase or decrease and problems requiring integration of several concepts from pre-algebra and/or pre-geometry (e.g., comparing percentages or averages, using several ratios, and finding ratios in geometry settings)	Distinguish between mean, median, and mode for a list of numbers Analyze and draw conclusions based on information from figures, tables, and graphs Exhibit knowledge of conditional and joint probability	Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers Exhibit knowledge of logarithms and geometric sequences Apply properties of complex numbers	Write expressions that require planning and/or manipulating to accurately model a situation Write equations and inequalities that require planning, manipulating, and/or solving Solve simple absolute value inequalities

*** Statements apply to PLAN & ACT only**

† Statements apply to the ACT only

= Included in Illinois Grade 8 Mathematics Assessment Objectives

Score Ranges *Bench-marks*	Table C-2c. ACT's College Readiness Standards — Mathematics (continued) **Graphical Representations**	**Properties of Plane Figures**	**Measurement**	**Functions†**
13–15	Identify the location of a point with a positive coordinate on the number line		Estimate or calculate the length of a line segment based on other lengths given on a geometric figure	
16–19 ***EXPL: 17*** ***PLAN: 19***	Locate points on the number line and in the first quadrant	Exhibit some knowledge of the angles associated with parallel lines	Compute the perimeter of polygons when all side lengths are given Compute the area of rectangles when whole number dimensions are given	
20–23 ***ACT: 22***	Locate points in the coordinate plane Comprehend the concept of length on the number line* Exhibit knowledge of slope*	Find the measure of an angle using properties of parallel lines Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°)	Compute the area and perimeter of triangles and rectangles in simple problems Use geometric formulas when all necessary information is given	Evaluate quadratic functions, expressed in function notation, at integer values
24–27	Identify the graph of a linear inequality on the number line* Determine the slope of a line from points or equations* Match linear graphs with their equations* Find the midpoint of a line segment*	Use several angle properties to find an unknown angle measure Recognize Pythagorean triples* Use properties of isosceles triangles*	Compute the area of triangles and rectangles when one or more additional simple steps are required Compute the area and circumference of circles after identifying necessary information Compute the perimeter of simple composite geometric figures with unknown side lengths*	Evaluate polynomial functions, expressed in function notation, at integer values Express the sine, cosine, and tangent of an angle in a right triangle as a ratio of given side lengths
28–32*	Interpret and use information from graphs in the coordinate plane Match number line graphs with solution sets of linear inequalities Use the distance formula Use properties of parallel and perpendicular lines to determine an equation of a line or coordinates of a point Recognize special characteristics of parabolas and circles (e.g., the vertex of a parabola and the center or radius of a circle)†	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles Use the Pythagorean theorem	Use relationships involving area, perimeter, and volume of geometric figures to compute another measure	Evaluate composite functions at integer values Apply basic trigonometric ratios to solve right-triangle problems
33–36†	Match number line graphs with solution sets of simple quadratic inequalities Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$ Solve problems integrating multiple algebraic and/or geometric concepts Analyze and draw conclusions based on information from graphs in the coordinate plane	Draw conclusions based on a set of conditions Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas Use relationships among angles, arcs, and distances in a circle	Use scale factors to determine the magnitude of a size change Compute the area of composite geometric figures when planning or visualization is required	Write an expression for the composite of two simple functions Use trigonometric concepts and basic identities to solve problems Exhibit knowledge of unit circle trigonometry Match graphs of basic trigonometric functions with their equations

*** Statements apply to PLAN & ACT only** **† Statements apply to the ACT only**

Section A-3: Number of Illinois Grade 11 Assessment Framework Objectives Measured by PLAN

Table A-3a. Number of Illinois Grade 11 Reading Assessment Framework Objectives Measured by PLAN

Illinois Goals and Standards*		Number of Illinois Objectives Measured by PLAN	Aspects of Illinois Grade 11 Assessment Objectives that are Not Measured
1. Reading	A. Vocabulary development	4 out of 6	Determine the meaning of jargon and/or technical terms used independent of context Determine what an acronym stands for in context
	B. Reading strategies	0 out of 1	Infer target audiences for passages
	C. Reading comprehension	16 out of 23	Sequence steps in instructions Understand the rationale behind a policy or procedure Apply information to a described situation Interpret instructions
	TOTALS 1 out of 1 Goal 2 out of 3 Standards	20 out of 30	

*Refer to Illinois Grade 11 Reading Assessment Framework objectives on page 53

Table A-3b. Number of Illinois Grade 11 Writing Assessment Framework Objectives Measured by PLAN

Illinois Goals and Standards*		Number of Illinois Objectives Measured by PLAN	Aspects of Illinois Grade 11 Assessment Objectives that are Not Measured
3. Writing	A. Grammar, sentence structure, and punctuation	26 out of 26	
	B. Composition + C. Communicate ideas	9 out of 10	Persuasive Writing: Take a position on the question stated in the prompt
	TOTALS 1 out of 1 Goal 2 out of 3 Standards	35 out of 36	

*Refer to Illinois Grade 11 Writing Assessment Framework objectives on pages 54–55

Table A-3c. Number of Illinois Grade 11 Mathematics Assessment Framework Objectives Measured by PLAN			
Illinois Goals and Standards*		**Number of Illinois Objectives Measured by PLAN**	**Aspects of Illinois Grade 11 Assessment Objectives that are Not Measured**
6. Number Sense	A. Representations and ordering	3 out of 3	
	B. and C. Computation, operations, estimation, and properties	12 out of 13	Perform numerical computations with non-real complex numbers
	D. Ratios, proportions, and percents	3 out of 3	
7. Measurement	A., B., and C. Units, tools, estimation, and applications	7 out of 7	
8. Algebra	A. Representations, patterns, and expressions	6 out of 6	
	B. Tables, graphs, and symbols	7 out of 7	
	C. and D. Writing, interpreting, and solving equations	9 out of 9	
9. Geometry	A. Properties	11 out of 11	
	B. Relationships	4 out of 4	
	C. Justifications of conjectures and conclusions	3 out of 3	
	D. Trigonometry	2 out of 5	Identify graphs of a given trigonometric function Define, identify, and evaluate trigonometric ratios Use trigonometric identities
10. Data Analysis, Statistics, and Probability	A. and B. Data analysis and Statistics	6 out of 6	
	C. Probability	4 out of 4	
	TOTALS 5 out of 5 Goals 17 out of 18 Standards	77 out of 81	

*Refer to Illinois Grade 11 Mathematics Assessment Framework objectives on pages 56–58

Table A-3d. Number of Illinois Grade 11 Science Assessment Framework Objectives Measured by PLAN			
Illinois Goals and Standards*		**Number of Illinois Objectives Measured by PLAN**	**Aspects of Illinois Grade 11 Assessment Objectives that are Not Measured**
11. Inquiry and Design	A. Scientific inquiry	4 out of 4	
	B. Technological design	0 out of 4	Identify design problem Select criteria outlining a successful design solution Choose model which best solves a design problem Select possible sources of error in conducting a test
13. Science, Technology, and Society	A. Safety and practices of science	1 out of 5	Understand basic rules of safety in conducting scientific experiments Understand why experimental replication is essential to scientific claims Understand how scientific knowledge may change with new information Understand that scientists must be responsible about how they conduct their experiments
	B. Science, technology, and society	1 out of 4	Analyze scientific breakthroughs in terms of societal and technological effects Analyze resource "management" Analyze careers and occupations that are affected by science
	Process TOTALS 1 out of 2 Goals 1 out of 4 Standards	6 out of 17	
12. Concepts and Principles	A. Living things	(30) out of (30)	
	B. Environment and interaction of living things	(6) out of (6)	
	C. Matter and energy	(37) out of (37)	
	D. Force and motion	(8) out of (8)	
	E. Earth science	(20) out of (20)	
	F. Astronomy	(5) out of (5)	
	Content TOTALS 1 out of 1 Goal 6 out of 6 Standards	(106) out of (106)	

*Refer to Illinois Grade 11 Science Assessment Framework objectives on pages 59–63

Section B-3: Illinois Grade 11 Assessment Frameworks Measured by PLAN

Reading

ILLINOIS Reading

Grade 11 Assessment Framework Objectives

STATE GOAL 1: Read with understanding and fluency.

A. VOCABULARY DEVELOPMENT

Words in Context

1.11.01. Determine the connotation of a familiar or unfamiliar word using word, sentence, and cross-sentence clues.

1.11.02. Determine the meaning of a word in context when the word has multiple meanings.

1.11.03. Determine the meaning of jargon and/or technical terms used independent of context.

1.11.04. Determine the meaning of jargon and/or technical terms in context.

1.11.05. Determine what an acronym stands for in context.

1.11.06. Determine the meaning of figurative words and phrases.

B. READING STRATEGIES

1.11.07. Infer target audiences for passages.

C. READING COMPREHENSION

Literal or Simple Inference

1.11.08. Infer the meaning of a passage.

1.11.09. Identify significant details.

1.11.10. Identify implied details.

1.11.11. Identify subtly-stated details.

Summarizing and Main Idea

1.11.12. Summarize a complex story or nonfiction passage.

1.11.13. Identify the main idea when it is not explicitly stated.

Sequencing and Ordering

1.11.14. Identify the causes of events in a passage.

1.11.15. Identify the outcome or conclusion of a passage, based on previous occurrences or events in the text.

1.11.16. Sequence steps in instructions.

1.11.17. Identify cause and effect organization patterns in fiction and nonfiction passages.

Drawing Conclusions Based on Evidence

1.11.18. Draw inferences, conclusions, or generalizations about text and support them with textual evidence and/or prior knowledge.

1.11.19. Draw conclusions about general conditions/situations/events based on information in a passage.

1.11.20. Understand the rationale behind a policy or procedure.

1.11.21. Differentiate between reasoning based on fact versus reasoning based on opinions, emotional appeals, or other persuasive techniques.

1.11.22. Apply information to a described situation.

1.11.23. Use comparison/contrast to identify how information in a passage has similar or different characteristics.

Interpreting Instructions

1.11.24. Apply instructions with conditionals.

1.11.25. Apply information to new situations.

1.11.26. Generalize from text to situations not described.

1.11.27. Identify underlying principles and apply them to dissimilar situations.

Author's Purpose and Design

1.11.28. Identify and interpret the author's purpose and point of view in expository texts and literary passages.

1.11.29. Explain how dialogue is used in a given passage to develop characters and create mood.

1.11.30. Determine an author's implied meaning by drawing conclusions based on facts, events, images, patterns, symbols, etc. found in the text.

ILLINOIS Writing
Grade 11 Assessment Framework Objectives

STATE GOAL 3: Write to communicate for a variety of purposes.

GRAMMAR, SENTENCE STRUCTURE, AND PUNCTUATION (Standard A)

Grammar and Sentence Structure

3.11.01. Recognize correct subject verb agreement.

3.11.02. Recognize appropriate use of subordinating conjunctions and relative pronouns.

3.11.03. Edit sentences to create or maintain parallelism between phrases.

3.11.04. Select prepositions and pronouns precisely and in keeping with established idioms (e.g., going *to* the store, rather than going *at* the store).

3.11.05. Recognize subject verb agreement in sentences with collective nouns and indefinite pronouns as subjects.

3.11.06. Recognize the distinctions between adjective and adverbial forms of words and when each is appropriate for a given context (e.g., With a dreamy—*not "dreamily"*—look in his eye, he made a wish.).

3.11.07. Recognize the correct form of regular and irregular verbs including how they should be formed in different tenses (e.g., The book should have—*not "of"*—been returned by now.).

3.11.08. Recognize the proper form of possessive pronouns, and distinguish them from adverbs and contractions (e.g., They need their—*not "there"*—buckets to play in the sand. The movie has a charm all its—*not "it's"*—own.).

3.11.09. Recognize the proper case of a pronoun in a given context (e.g., She—*not "Her"*—and I went to the math contest.).

3.11.10. Recognize the correct form of words used to create a comparison (e.g., They are the fastest—*not "most fastest"*—swimmers.).

3.11.11. Recognize the idioms of standard written English (e.g., I felt as if I had walked a mile in his shoes. You won't get away with that easily.).

3.11.12. Avoid run-on sentences, fused sentences, comma splices, and sentence fragments.

3.11.13. Recognize sentences in which modifiers are properly placed in order to avoid ambiguity or confusion (e.g., They thought the room filled with flowers was lovely. *Not:* Filled with flowers, they thought the room was lovely.).

3.11.14. Maintain consistency of person within a sentence and between sentences (e.g., You may spend the time riding your bike or jogging around the track. You—*not "One"*—may also lift weights.).

3.11.15. Maintain consistency of voice within a sentence.

3.11.16. Maintain the proper verb tense within a sentence and between sentences.

3.11.17. Recognize the mood in which a verb should be placed to create a coherent sentence (e.g., They told Mr. Liu that his car had been fixed and he can—*not " were to"*—pick it up at the garage.).

Punctuation

3.11.18. Recognize when commas are needed to set off independent modifiers.

3.11.19. Recognize when semicolons are needed and/or effective between two closely related clauses.

3.11.20. Identify and omit misplaced commas, colons, dashes, and semicolons.

3.11.21. Recognize whether the end of a sentence should be punctuated with a period, question mark, or exclamation point.

3.11.22. Recognize the correct use of apostrophes.

3.11.23. Recognize when information within a sentence should be identified, through punctuation, as parenthetical and how to identify it as such with the correct use of commas, dashes, or parentheses.

3.11.24. Understand how to use punctuation to avoid ambiguity in a sentence (e.g., The boys say the girls are talented. The boys, say the girls, are talented.).

3.11.25. Recognize the correct way to punctuate items or simple phrases in a series.

3.11.26. Recognize the correct way to use punctuation to indicate restrictive or nonrestrictive clauses.

COMPOSITION

Organization and Paragraphs (Standard B)

3.11.27. Recognize and eliminate wordiness or redundancy.

3.11.28. Recognize the best order of words in a sentence or of sentences in a paragraph to maintain or establish clarity and coherence.

3.11.29. Recognize the word or phrase that creates the most logical and effective transition between parts of a sentence, between sentences, or between paragraphs.

3.11.30. Identify the best sentence to be added to a paragraph (e.g., a sentence, from a list, that adds something significant and relevant to a paragraph).

3.11.31. Decide the best place to divide one paragraph into two paragraphs to create coherent paragraphs, each with a distinct focus, mood, or other specified purpose.

3.11.32. Identify additional information most relevant to a paragraph (e.g., information, from a list, that adds something to a paragraph).

3.11.33. Recognize the best analysis of the effect of removing specified words or phrases from sentences or of removing specified words, phrases, or sentences from paragraphs.

3.11.34. Recognize words that maintain the style and tone of a paragraph or essay (e.g., avoiding words that are too formal, casual, old-fashioned, academic, technical for an established context).

3.11.35. Select words that establish or maintain clarity rather than words that result in mixed metaphors or other nonsensical or confusing statements.

Writing Prompt (Standards B/C)

3.11.36. Persuasive Writing: Take a position on the question stated in the prompt. Write about one of the two points given or present a different point of view. Use specific reasons and examples to support your position.

ILLINOIS Mathematics
Grade 11 Assessment Framework Objectives

STATE GOAL 6: Number Sense. Demonstrate and apply a knowledge and sense of numbers, including numeration and operations (addition, subtraction, multiplication, division), patterns, ratios and proportions.

A. Representations and Ordering

6.11.01. Recognize, represent, order, compare real numbers, and locate real numbers on a number line (e.g., π, $\sqrt{2}$, $\sqrt{5}$, 2/3, –1.6).

6.11.02. Represent numbers in equivalent forms (e.g., fraction/decimal/percent, exponential/logarithmic, radical/rational exponents, absolute value, scientific notation).

6.11.03. Use matrices to organize data.

B & C. Computation, Operations, Estimation, and Properties

6.11.04. Apply the rules of order of operations to real-number expressions.

6.11.05. Simplify or test expressions by applying field properties (commutative, associative, distributive), order properties (transitive, reflexive, symmetric), and properties of equality for the set of real numbers.

6.11.06. Apply number theory concepts to the solution of problems (e.g., prime and composite numbers, prime factorization, greatest common factor, least common multiple, divisibility rules).

6.11.07. Determine the effects of operations on the magnitudes of quantities (e.g., multiplication, division, powers, roots).

6.11.08. Determine the appropriate solution, including rounding, from a context (e.g., rounding up, down, to the nearest integer).

6.11.09. Solve problems involving estimates or data (e.g., use averages to estimate the cost of a job that includes labor and materials).

6.11.10. Perform numerical computations with real numbers.

6.11.11. Perform numerical computations with non-real complex numbers.

6.11.12. Solve problems using simple matrix operations (addition, subtraction, multiplication, scalar multiplication).

6.11.13. Set up, evaluate, or solve single- and multi-step number sentences and word problems with rational numbers using the four basic operations.

6.11.14. Determine the most cost effective option using single- and multi-step calculations and then comparing results.

6.11.15. Judge the reasonableness of solutions, and find mistakes in calculation, logic, and formula application.

6.11.16. Simplify numerical problems involving absolute value.

D. Ratios, Proportions, and Percents

6.11.17. Set up, evaluate, or solve number sentences or word problems involving ratios and proportions with rational numbers (e.g., scale drawing, unit rate, scale factor, rate of change).

6.11.18. Set up, evaluate, or solve common problems involving percent (e.g., sales tax, tip, interest, discount, markup, commission, compound interest).

6.11.19. Set up, evaluate, or solve problems stated in terms of direct and inverse variation of simple quantities.

STATE GOAL 7: Measurement. Estimate, make and use measurements of objects, quantities and relationships and determine acceptable levels of accuracy.

A, B, & C. Units, Tools, Estimation, and Applications

7.11.01. Change from one unit to another within the same system of measurement, including calculations with mixed units (e.g., 3½ hours plus 4 hours and 20 minutes; 2½ feet minus 16 inches).

7.11.02. Change from one unit in one system of measurement to a unit in another system of measurement, given a conversion factor.

7.11.03. Determine and calculate to an indicated precision the length, width, height, perimeter/circumference, area, volume, surface area, angle measures, or sums of angle measures of common geometric figures or combinations of common geometric figures.

7.11.04. Describe the general trends of how the change in one measure affects other measures in the same figure (e.g., length, area, volume).

7.11.05. Determine the linear measure, perimeter, area, surface area, and volume of similar figures.

7.11.06. Determine the ratio of perimeters, areas, and volumes of figures.

7.11.07. Use measures expressed as rates (e.g., speed, density), measures expressed as products (e.g., person-days), and dimensional analysis (e.g., converting ft/sec to yards/min) to solve problems.

STATE GOAL 8: Algebra. Use algebraic and analytical methods to identify and describe patterns and relationships in data, solve problems and predict results.

A. Representations, Patterns, and Expressions

8.11.01. Simplify or identify equivalent algebraic expressions (e.g., exponential, rational, logarithmic, factored, polynomial).

8.11.02. Represent mathematical relationships using symbolic algebra.

8.11.03. Identify essential quantitative relationships in a situation, and determine the class or classes of functions (e.g., linear, quadratic, exponential) that model the relationships.

8.11.04. Determine a specific term, a finite sum, or a rule that generates terms of a pattern.

8.11.05. Model and describe slope as a constant rate of change.

8.11.06. Evaluate variable expressions and functions.

B. Connections Using Tables, Graphs, and Symbols

8.11.07. Identify an equation of a line or an equation of a line of best fit from given information (e.g., from a set of ordered pairs, graphs, tables).

8.11.08. Recognize and describe the general shape and properties of functions from graphs, tables, or equations (e.g., linear, absolute value, quadratic, exponential, logarithmic).

8.11.09. Identify slope from an equation, table of values, or graph.

8.11.10. Interpret the role of the coefficients and constants on the graphs of linear and quadratic functions, given a set of equations.

8.11.11. Analyze functions by investigating domain, range, rates of change, intercepts, and zeros.

8.11.12. Create and connect representations that are tabular, graphic, numeric, and symbolic from a set of data.

8.11.13. Represent quantitative relationships graphically, and interpret the meaning of the graph or a specific part of the graph as it relates to the situation represented by the graph.

C & D. Writing, Interpreting, and Solving Equations

8.11.14. Model problems using mathematical functions and relations (e.g., linear, non-linear).

8.11.15. Interpret the graph of a system of equations and inequalities, including cases where there are no solutions.

8.11.16. Solve linear equations and inequalities, including selecting and evaluating formulas.

8.11.17. Solve systems of equations and inequalities.

8.11.18. Solve quadratic equations over the complex number system, including selecting and evaluating formulas.

8.11.19. Solve problems that include nonlinear functions, including selecting and evaluating formulas (i.e., absolute value, trigonometric, logarithmic, exponential).

8.11.20. Identify, interpret, and write equations for circles and other conic sections.

8.11.21. Recognize and apply mathematical and algebraic axioms, theorems of algebra, and deductive reasoning.

8.11.22. Identify equivalent forms of equations, inequalities, and systems of equations.

STATE GOAL 9: Geometry. Use geometric methods to analyze, categorize and draw conclusions about points, lines, planes and space.

A. Properties of Single Figures and Coordinate Geometry

9.11.01. Apply the Pythagorean theorem.

9.11.02. Identify and represent transformations (rotations, reflections, translations, dilations) of an object in the plane, and describe the effects of transformations on points in words or coordinates.

9.11.03. Determine how changing the scale factor affects the size and position of a figure in the plane.

9.11.04. Classify plane figures according to their properties.

9.11.05. Identify, apply, or solve problems that require knowledge of geometric properties of plane figures (e.g., triangles, quadrilaterals, parallel lines cut by a transversal, angles, diagonals, triangle inequality).

9.11.06. Identify a three-dimensional object from different perspectives.

9.11.07. Identify the relationship between two-dimensional patterns (e.g., nets) and related three-dimensional objects (e.g., cylinders, prisms, cones).

9.11.08. Identify two- and three-dimensional figures that would match a set of given conditions.

9.11.09. Solve problems that involve calculating distance, midpoint, and slope using coordinate geometry.

9.11.10. Identify, apply, and solve problems that require knowledge of geometric relationships of circles (e.g. arcs, chords, tangents, secants, central angles, inscribed angles).

9.11.11. Graph, locate, and identify points on a coordinate system.

B. Relationships Between and Among Multiple Figures

9.11.12. Solve problems involving similar figures.

9.11.13. Solve problems using triangle congruence.

9.11.14. Describe how two or more objects are related in space (e.g., skew lines, the possible ways three planes might intersect).

9.11.15. Identify relationships between circles and other objects in the plane (e.g., inscribed circles, concentric circles, internal/external tangency).

C. Justifications of Conjectures and Conclusions

9.11.16. Recognize and apply the conditions that assure congruence and similarity.

9.11.17. Recognize and apply mathematical and geometric axioms, fundamental theorems of geometry, and deductive reasoning.

9.11.18. Identify a counter-example to disprove a conjecture.

D. Trigonometry

9.11.19. Determine distances and angle measures using indirect measurement (e.g., properties of right triangles, Law of Sines, Law of Cosines).

9.11.20. Solve problems using 45°-45°-90° and 30°-60°-90° triangles.

9.11.21. Identify graphs of a given trigonometric function (sin x, cos x) using its characteristics (e.g., period, amplitude).

9.11.22. Define, identify, and evaluate trigonometric ratios.

9.11.23. Use trigonometric identities (e.g., $\sin^2 x + \cos^2 x = 1$)

STATE GOAL 10: Data Analysis, Statistics, and Probability. Collect, organize and analyze data using statistical methods; predict results; and interpret uncertainty using concepts of probability.

A & B. Data Analysis and Statistics

10.11.01. Read, interpret, predict, interpolate, extrapolate, and use information from a variety of graphs, charts, and tables.

10.11.02. Translate from one representation of data to another (e.g., a bar graph to a circle graph).

10.11.03. Solve problems involving Venn diagrams.

10.11.04. Find an unknown value in a dataset given information about descriptive statistics.

10.11.05. Calculate, interpret, and use measures of central tendency and dispersion.

10.11.06. Compare two or more data sets on measures of central tendency and dispersion.

C. Probability

10.11.07. Compute the probability of an event composed of single or repeated trials with or without replacement.

10.11.08. Compute probabilities for compound events.

10.11.09. Determine geometric probability based on area.

10.11.10. Apply counting techniques (e.g., permutations, combinations, Fundamental Counting Principle).

ILLINOIS Science
Grade 11 Assessment Framework Objectives

STATE GOAL 11: Understand the processes of scientific inquiry and technological design to investigate questions, conduct experiments and solve problems.

A. Scientific Inquiry

11.11.01. Understand and follow procedures relating to scientific investigations, including understanding the design and procedures used to test a hypothesis, organizing and analyzing data accurately and precisely, producing and interpreting data tables and graphs, performing appropriate calculations, applying basic statistical methods to the data, identifying appropriate conclusions, making predictions, and evaluating competing models.

11.11.02. Distinguish among the following: observing, drawing a conclusion based on observation, forming a hypothesis, conducting an experiment, organizing data, comparing data.

11.11.03. Identify possible sources of error in an experiment.

11.11.04. Distinguish and define the following components of typical experiments: constants, variables, experimental group, control group (or control setup).

B. Technological Design

11.11.05. Identify a technological design problem inherent in a given product.

11.11.06. Out of different lists of criteria, select the list of criteria outlining a successful design solution to a given problem.

11.11.07. Given test results on different models, choose the model which best solves the design problem.

11.11.08. Given a description of a test to be performed on a model, select from a list of options what are the possible sources of error in conducting the test.

STATE GOAL 12: Understand the fundamental concepts, principles and interconnections of the life, physical and earth/space sciences.

A. Living Things

Classification

12.11.01. Identify the major categories (taxa) of biological classification: kingdom, phylum, class, order, family, genus, and species.

12.11.02. Understand the kingdoms used by taxonomists: a 5-kingdom system; monera, protista, fungi, plantae, and animalia and a 6-kingdom system; eubacteria, archaebacteria, protista, fungi, plantae, and animalia. Students should be able to identify organisms within the systems. Understand how to read a cladogram and a dichotomous key.

12.11.03. Identify the following basic animal types by their common characteristics: sponges, cnidarians, flatworms and roundworms, mollusks, arthropods, echinoderms, invertebrate chordates, and vertebrates.

Cell Biology

12.11.04. Identify the similarities and differences between plant and animal cells (i.e., know the various fundamental organelles of plant and animal cells and be able to distinguish these organelles in diagrams).

12.11.05. Understand how the semi-permeable membranes regulate the flow of substances in and out of the cell body.

12.11.06. Understand the role of the endoplasmic reticulum and Golgi apparatus in the secretion of proteins.

12.11.07. Understand that chloroplasts in plant cells capture useable energy from sunlight and store it for future use by synthesizing sugar out of carbon dioxide and water.

12.11.08. Understand the role of mitochondria in making stored chemical-bond energy available to cells by completing the breakdown of glucose to carbon dioxide and water.

12.11.09. Understand that the chief energy-storing compound used by organisms is ATP (adenosine triophosphate).

12.11.10. Understand that enzymes are proteins that catalyze biochemical reactions and that the activity of enzymes depends on the temperature, ionic conditions, and the pH of the surroundings.

12.11.11. Understand how prokaryotic cells, eukaryotic cells (whether of animals or plants and whether unicellular or multicellular), and viruses differ in complexity and structure. In particular:
1. Prokaryotes are organisms whose cells lack nuclei. They are usually small and unicellular.
2. Eukaryotes are organisms whose cells have nuclei and membrane bound organelles.
3. A virus is a non-cellular particle usually made up of genetic material and protein that can invade living cells. Viruses are also much smaller than any unicellular organism (such as a bacterium) and cannot be seen with light microscopes but only with electron microscopes.

Genetics and Reproduction

12.11.12. Understand Mendel's law of segregation and also that genes do not always separate as hypothesized by Mendel's law of segregation. Understand that if genes are located close to each other on the same chromosome, then they are linked and may undergo independent assortment.

12.11.13. Identify and be able to apply the following concepts: trait, alleles, dominant allele, recessive allele,

= Measured by PLAN Science Test
_____ = Content sampled by PLAN Science Test

gametes, genotype, homozygous, heterozygous, chromosome, meiosis, and mitosis.

12.11.14. Answer questions about given Punnett squares.

12.11.15. Understand that meiosis is an early step in sexual reproduction in which the pairs of chromosomes separate and segregate randomly during cell division to produce gametes containing one chromosome of each pair. Understand that only certain cells in a multicellular organism undergo meiosis.

12.11.16. Understand how random chromosome segregation explains the probability that a particular allele will be in a gamete.

12.11.17. Know why about half of an individual's DNA sequence comes from each parent. Understand that most of the cells in a human contain pairs of 22 different autosomes and one pair of sex chromosomes.

12.11.18. Understand that in humans there is a pair of chromosomes that determines sex: a female usually contains two X chromosomes and a male usually contains one X and one Y chromosome.

12.11.19. Understand how to predict possible combinations of alleles in a zygote from the genetic makeup of the parents for simple dominant/recessive traits.

12.11.20. Understand that a multicellular organism develops from a single zygote, and its phenotype (i.e. its outward appearance) depends on its genotype (i.e. its genetic makeup), which is established at fertilization.

12.11.21. Understand that, in all living things, DNA (deoxy-ribonucleic acid) carries the instructions for specifying the characteristics of each organism. Understand that DNA is a large polymer formed from four subunits: A, G, C, and T (adenine, guanine, cytosine, thymine, a 5-carbon sugar and a phosphate). The chemical and structural properties of DNA explain how the genetic information that underlies heredity is both encoded in genes (as a string of molecular letters) and replicated (by a templating mechanism). Know that each DNA molecule in a cell is a single chromosome.

12.11.22. Understand that a gene is a set of instructions in the DNA sequence of each organism that specifies the sequence of amino acids in polypeptides characteristic of that organism.

12.11.23. Understand the general steps by which ribosomes synthesize proteins, using information from mRNA and from amino acids delivered by tRNA.

12.11.24. Understand that specialization of cells in multicellular organisms is usually due to different patterns of gene expression rather than to differences of the genes themselves.

Change Over Time

12.11.25. Understand that natural selection acts on the phenotype, not the genotype, of an organism.

12.11.26. Understand that alleles that are lethal in a homozygous individual may be carried in a heterozygote and thus maintained in a gene pool.

12.11.27. Understand that variation within a species increases the likelihood that at least some members of a species will survive and reproduce under changed environmental conditions.

12.11.28. Understand that reproductive or geographic isolation can lead to speciation.

12.11.29. Understand that the millions of different species of plants, animals, and microorganisms that live on Earth today are related to each other by descent from common ancestors and that biological classifications are based on how organisms are related.

12.11.30. Understand how to analyze fossil evidence with regard to mass extinction, episodic speciation, and biological diversity.

B. Environment And Interaction Of Living Things

Ecology and Adaptation

12.11.31. Understand the causes of ecosystem disruptions: changes in climate, human activity, introduction of a nonnative species, changes in population size, sudden natural disasters.

12.11.32. Know that fluctuations in population size are determined by the relative rates of birth, immigration, emigration, and death.

12.11.33. Know that concentrations of nonbiodegradable pollutants (e.g., pesticides) increase as we go up in a particular food chain (i.e., that the further we go in the direction of consumers whose food is tainted with pesticide, the more concentrated the levels of the pesticide). Understand that this process is called biological magnification.

12.11.34. Understand how agricultural run-off and pollution entering groundwater and surface water can affect drinking water and local wildlife.

12.11.35. Understand that a vital part of an ecosystem is the stability of its producers and decomposers.

12.11.36. Understand the effects upon the population of a species caused by various ecological factors, particularly (a) the presence of another species with competitive feeding habits, (b) the presence (or absence) of and number of predators, (c) the abundance or scarcity of food sources.

C. Matter and Energy

Properties of Matter

12.11.37. Identify the most familiar elements by name and some of their most familiar properties. Identify the chemical symbols for familiar elements.

12.11.38. Know that atoms are made of sub-atomic particles (protons, neutrons, electrons) which have positive, neutral, or negative charges. Understand that the periodic table displays the elements in increasing atomic number and shows how periodicity of the physical and chemical properties of the elements relates to atomic structure.

12.11.39. Understand how to relate the position of an element in the periodic table to its chemical properties.

12.11.40. Understand how to use the periodic table to identify the families of elements (and their properties)

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known as alkali metals, alkaline Earth metals, halogens, and noble gases.

12.11.41. Know that there is a kind of periodicity in the physical properties of chemical elements, that the periodic table arranges them accordingly, and that this way of ordering them corresponds to the order in their atomic structures. Understand that the major groups of chemical elements are: (1) alkali metals, (2) alkaline Earth metals, (3) transition metals, (4) nonmetals (boron family, carbon family, nitrogen family, oxygen family, halogen family, noble gases), (5) metalloids, and (6) rare Earth elements. Know why hydrogen is not in any of these groups.

12.11.42. Know that there are two major different kinds of bonds (ionic and covalent). Know the distinction between a compound and a mixture.

12.11.43. Understand how to use the periodic table to identify the trends in relative sizes of ions and atoms.

12.11.44. Understand how to use the periodic table to determine the number of electrons available for bonding.

12.11.45. Understand that the nucleus of the atom is much smaller than the whole atom yet contains most of its mass. Understand isotopes.

12.11.46. Understand that the transuranium elements were not discovered in nature but synthesized through the use of nuclear accelerators.

12.11.47. Understand the different states of matter: solid, liquid, gas, plasma. Define freezing, melting, boiling, condensing, and sublimation.

12.11.48. Understand that the temperature of water (or any substance) is constant during phase changes, even when heat is being added or removed.

12.11.49. Understand that the kinetic molecular theory explains the properties of gases by the random motion of molecules in them. For example, the collisions of these particles with a surface create an observable pressure on that surface, and their motion explains the diffusion of gases.

12.11.50. Understand how to apply the gas laws to relations between pressure, temperature, and volume of any amount of an ideal gas. Understand Boyle's Law and Charles' Law and how to logically solve problems.

12.11.51. Understand the values of standard temperature and pressure (STP): 0° Celsius and 1 atm.

12.11.52. Understand how to convert between Celsius and Kelvin temperature scales. Understand that there is no temperature lower than 0 Kelvin, or absolute zero.

The Atom

12.11.53. Understand that in chemical reactions, atoms combine into molecules by means of bonds (e.g., by sharing electrons to form covalent or metallic bonds or by exchanging electrons to form ionic bonds).

12.11.54. Know that ions are atoms or groups of atoms that have a positive or negative charge and that polyatomic ions are a group of covalently bonded atoms that act like a single atom when combining with other atoms. Understand that metals tend to form positive ions, and nonmetals tend to form negative ions.

12.11.55. Understand that ionic solids like NaCl (sodium chloride, ordinary table salt) are formed from a three-dimensional repeating pattern of alternating positive and negative ions, held together by electrostatic forces (ionic bonds).

12.11.56. Understand that the conservation of atoms in a chemical reaction, as summarized in a balanced chemical equation, leads to the ability to calculate theoretical masses of reactants and products.

12.11.57. Understand how to read, interpret, and balance chemical equations.

12.11.58. Understand that the chemical quantity called "one mole" is set by calling the number of atoms in exactly 12 grams of carbon-12 atoms one mole. This number turns out to be 6.02×10^{23}, also known as Avogadro's Number.

12.11.59. Understand that energy is exchanged or transformed in all chemical reactions and physical changes of matter. Understand that chemical processes can either release (exothermic) or absorb (endothermic) thermal energy. Understand that energy is released when a material condenses or freezes and is absorbed when a material evaporates, melts, or sublimes.

Acids and Bases

12.11.60. Understand that most acids, bases, and salts, when dissolved in water, conduct electric current and form ions in water solutions. Understand the observable properties of acids, bases, and salt solutions.

12.11.61. Understand that among other definitions of acids and bases, acids are hydrogen-ion-donating and bases are hydrogen-ion-accepting substances.

12.11.62. Use the pH scale to characterize acidic and basic solutions. Understand the definition of pH as the negative logarithm of the hydronium ion concentration, and understand what the log scale means.

12.11.63. Distinguish between chemical compounds and solutions and mixtures. Differentiate between solute and solvent. Understand the concentration of a solute in terms of molarity, parts per million, and percent composition.

Energy

12.11.64. Understand that energy, defined somewhat circularly, is "the ability to change matter," or "the ability to do work." Understand that energy is defined by the way it is measured or quantified. Understand the difference between potential and kinetic energy.

12.11.65. Understand that a magnetic field is generated around an electrical current and that the motion of a conducting wire through a magnetic field generates a current through it. Understand that in some substances, such as metals, electrons flow easily, whereas in insulating materials such as glass they can hardly flow at all. Semiconducting materials have intermediate behavior. At very low temperatures, some materials offer no resistance to the flow of electrons and become superconductors.

12.11.66. Understand that an electrically neutral object has particles within it that are charged, but their charges balance each other out.

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12.11.67. Know the first two laws of thermodynamics: (1) Energy is conserved (neither created nor destroyed) and (2) Heat flows naturally from a hot object to a cold object; heat will not flow spontaneously from a cold object to a hot object. Understand that another statement of the Second Law is that no device is possible whose sole effect is to transform a given amount of heat completely into work.

12.11.68. Recount the concept of entropy and know that entropy in the universe considered as a whole always increases.

Light and Sound

12.11.69. Indicate that the speed of light differs in some material from its speed in a vacuum is given by the index of refraction for that material, n, where n is the ratio of the speed of light in a vacuum to the speed of light in the material. Also know that light follows the path of least time through various materials and that this is not the same as the shortest distance.

12.11.70. Understand the reflection, refraction, diffraction, interference, and frame of reference properties of waves.

12.11.71. Understand that sound causes molecules of a medium to vibrate back and forth. This series of compressions and rarefactions produces waves.

12.11.72. Understand how sound travels through different mediums.

12.11.73. Understand amplitude, frequency, wavelength, intensity, and quality. Know that intensity is measured in decibels.

D. FORCE AND MOTION

12.11.74. Understand that the magnitude of a force *F* is defined as $F = ma$ (Force equals Mass times Acceleration). Know how to perform such calculations. Understand that whenever one object exerts force on another, a force equal in magnitude and opposite in direction is exerted on the first object. Understand that when two objects exert forces on each other, momentum is conserved.

12.11.75. Understand that objects change their velocity only when a net force is applied (the law of inertia). Students will be able to distinguish between inertial mass and gravitational mass.

12.11.76. Understand simple machines and how they provide mechanical advantage. For example, know that a lever is like a balance and that to balance it requires the weights (or forces) applied on each end to be in the inverse ratio to that of their distances from the fulcrum. Thus the mechanical advantage increases with greater distance from the fulcrum.

12.11.77. Understand the principles of air pressure and fluid dynamics. Understand Archimedes' Principle and Bernoulli's Principle. Understand that air pressure decreases as altitude increases. Understand that pressure in a liquid increases as the depth increases. Understand how a hydraulic lift (such as the kind used to raise a car for repairs) confers mechanical advantage.

12.11.78. Understand the universal law of gravitation: that gravitation is a force that every mass exerts on every other mass. The strength of the gravitational attractive force between two masses is proportional to the masses and inversely proportional to the square of the distance between them (inverse square law).

12.11.79. Understand the types of motion such as linear, circular, parabolic, and periodic. Explain and predict motions in inertial and accelerated frames of reference.

12.11.80. Understand that the electrical force is a universal force that exists between any two charged objects. Opposite charges attract, like charges repel. The strength of the force is proportional to the charges, and, like gravity, it is inversely proportional to the square of the distance between the charged bodies.

12.11.81. Understand that between any two charged particles, the electrical force is vastly greater than the gravitational force. Most observable forces such as those exerted by a coiled spring or friction may be traced to electrical forces acting between atoms and molecules.

E. EARTH SCIENCE

The Earth's Structure

12.11.82. Indicate that the earth's crust is made from mostly igneous and metamorphic materials and was formed as a result of partial melting of part of the mantle rock. Know that there is a thin layer of sedimentary rock on top in many places.

12.11.83. Understand that geologic time can be estimated by observing rock sequences and using fossils to correlate the sequences at various locations. Understand that current methods include using the known decay rates of radioactive isotopes present in rocks to measure the time since the rock was formed.

12.11.84. Understand that most scientists believe that the sun, the earth, and the rest of the solar system formed from a nebular cloud of dust and gas 4.6 billion years ago.

12.11.85. Understand that interactions among the solid earth, the oceans, the atmosphere, and organisms have resulted in the ongoing transformation of the earth system. Understand that we can observe some changes (such as earthquakes and volcanic eruptions) on a human time-scale, but many processes (such as mountain building and plate movements) take place so sporadically or so slowly (over hundreds of millions of years) that we cannot observe them but only infer that they take place from other kinds of evidence.

The Earth's Dynamic Processes

12.11.86. Identify the various features of the ocean floor which furnish evidence for plate tectonics: magnetic patterns, age, and topographical features.

12.11.87. Identify the properties of rocks and minerals based on the physical and chemical conditions in which they are formed, including plate tectonic processes.

12.11.88. Understand why earthquakes occur and how scales are used to measure their intensity and magnitude, specifically the Richter and Mercalli scales.

12.11.89. Differentiate between the two main kinds of volcanoes: one kind with violent eruptions producing steep slopes and another kind with voluminous lava flows producing gentle slopes.

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12.11.90. Understand that energy enters the systems of Earth chiefly as solar radiation and eventually escapes again as heat.

12.11.91. Understand that incoming solar radiation is either reflected or absorbed.

12.11.92. Understand that non-uniform heating of the earth results in circulation patterns in the atmosphere and oceans that globally distribute heat (in the form of winds and ocean currents).

12.11.93. Understand the connection between the earth's rotation and the circular motion of ocean currents and air pressure centers.

12.11.94. Understand that biomes such as rain forests and deserts are distributed in bands at specific latitudes and how this results from the interaction of wind patterns, ocean currents, and mountain ranges.

12.11.95. Understand that weather (over a short time) and climate (over a long time) result from the transfer of energy and water in and out of the atmosphere. Understand the effects on climate of latitude, elevation, topography (especially the presence of mountains and valleys), and proximity to large bodies of water, and cold or warm ocean currents.

12.11.96. Understand that Earth's climate has changed over time, corresponding to changes in Earth's geography, atmospheric composition, plate movement, and the cyclic changes in the orientation of Earth's axis of rotation and the shape of its orbit around the sun.

The Atmosphere

12.11.97. Understand the major gases present in the earth's atmosphere, and the percentage which each represents in the composition of the atmosphere (i.e., nitrogen is about 80% and oxygen is about 20%), and that the atmosphere is a mixture, not a compound.

12.11.98. Understand that carbon dioxide increases the greenhouse effect in our atmosphere and that it is produced whenever carbon-containing fuels are burned (e.g., wood, coal, charcoal, oil, natural gas). Understand that removing forests removes trees which absorb carbon dioxide and release oxygen.

12.11.99. Analyze weather conditions of an area, given specific weather data.

Water

12.11.100 Understand that a water table marks the top of the zone of saturation of subsurface materials.

12.11.101 Understand at which places in a river or stream one is likely to find a build up of sediment. Understand why sediments of certain sizes build up in different locations in a stream and how this can alter its course over time. Understand how these processes can, over the course of time, change the location of rivers and streams (e.g., meanders).

F. ASTRONOMY

12.11.102 Understand and describe the physical characteristics of galaxies and the objects within galaxies (e.g., stars, pulsars, black holes, planets, comets, asteroids). Describe physical characteristics of the sun (e.g., corona, prominences, sunspots, solar flares), and know that solar events can cause phenomena such as auroras.

12.11.103 Analyze the life cycles of stars, and compare stars of different masses.

12.11.104 Know the theory that over 10 billion years ago the universe began in a huge expansion called the Big Bang. Understand that in this event, all matter, energy, space, and time were created as the universe expanded from a single point. Understand that one piece of evidence for this theory is the 3K background radiation.

12.11.105 Understand the Doppler effect with respect to light (red and blue shifts) and sound (e.g., the sound of an approaching train's whistle vs. the sound of the whistle moving away). Understand that astronomers use the Doppler shift to estimate the distance of objects millions and billions of light-years away.

12.11.106 Understand the effects of gravity within the solar system. Understand that the tides are caused by the gravitational interaction among the earth, moon, and sun.

STATE GOAL 13: Understand the relationships among science, technology and society in historical and contemporary contexts.

A. SAFETY AND PRACTICES OF SCIENCE

13.11.01. Understand basic rules of safety in conducting scientific experiments in a laboratory or in the field.

13.11.02. Understand why experimental replication is essential to scientific claims.

13.11.03. Understand how scientific knowledge, explanations, and technological designs may change with new information.

13.11.04. Understand that scientists must be responsible about how they conduct their experiments.

13.11.05. Determine the degree of accuracy in measurements. Identify possible sources of error in measurement.

B. SCIENCE, TECHNOLOGY, AND SOCIETY

13.11.06. Analyze scientific breakthroughs in terms of societal and technological effects.

13.11.07. Analyze examples of resource use, technology use or conservation program and make recommendations for improvements.

13.11.08. Analyze careers and occupations that are affected by knowledge of science.

Measurement

13.11.09. Select appropriate scientific instruments and technological devices to perform tests, measure, and collect data.

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Section C-3: ACT's College Readiness Standards Included in Illinois Grade 11 Assessment Frameworks

In recent years ACT has brought a distinctive voice to the debate on what it means to be truly ready for college. Using a wealth of longitudinal data—data that no one else possesses—ACT has pioneered empirical approaches to assessing students' college readiness. Using thousands of student records and responses, content and measurement experts at ACT have developed detailed statements that describe what students typically know and are able to do at different levels of test performance. These data-driven, empirically derived score descriptors, known as ACT's College Readiness Standards, describe student achievement within various score ranges on the English, Reading, Writing, Mathematics, and Science tests on EXPLORE, PLAN, and the ACT.

How ACT College Readiness Standards Work with ACT College Readiness Benchmarks

The ACT College Readiness Benchmarks are the minimum ACT test scores required for students to have a high probability of success in first-year, credit-bearing college courses—English Composition, Algebra, social sciences courses, or Biology. EXPLORE and PLAN Benchmarks provided minimum score targets for eighth- and tenth-grade students to gauge their progress in becoming college ready by the time they graduate from high school.

ACT's College Readiness Benchmarks				
Test	**College Course**	**ACT Test Score**	**PLAN Test Score**	**EXPLORE Test Score**
English	English Composition	18	15	13
Mathematics	College Algebra	22	19	17
Reading	College Social Studies/Humanities	21	17	15
Science	College Biology	24	21	20

Students who meet a Benchmark on the ACT have approximately a 50 percent chance of earning a B or better and approximately a 75 percent chance or better of earning a C or better in the corresponding entry-level college course or courses. Students who meet a Benchmark on EXPLORE or PLAN have a high chance of meeting the College Readiness Benchmarks for the ACT and of being ready for the corresponding college course(s) by the time they graduate from high school.

The knowledge and skills in the score ranges that include these Benchmark scores are shown in the tables on the following pages. Students who master these standards are more likely than those who do not to persist to the second year at the same institution; achieve a grade of B or higher in first-year college courses; achieve a first-year college GPA of 2.5 or higher; progress toward a college degree; and complete a college degree.

Research shows that the academic quality and intensity of the high school curriculum is a key determinant of success in postsecondary education. *States should ensure that high school coursework be of sufficient rigor to prepare their graduates for postsecondary education and workforce training.*

This section (Section C-3) provides information about the Illinois Grade 11 Assessment Frameworks as they relate to ACT's College Readiness Standards. The ACT College Readiness Standards included in the Illinois Grade 11 Assessment Frameworks are highlighted. College Readiness Standards not highlighted are those that include specific content, complexity, and/or proficiency level descriptors that ACT content experts determined were not included in the Illinois Grade 11 Assessment Frameworks.

Score Ranges	Table C-3a. ACT's College Readiness Standards — English		
Bench-marks	**Topic Development in Terms of Purpose and Focus**	**Organization, Unity, and Coherence**	**Word Choice in Terms of Style, Tone, Clarity, and Economy**
13–15 ***EXPL: 13*** ***PLAN: 15***		Use conjunctive adverbs or phrases to show time relationships in simple narrative essays (e.g., *then*, *this time*)	Revise sentences to correct awkward and confusing arrangements of sentence elements Revise vague nouns and pronouns that create obvious logic problems
16–19 ***ACT: 18***	Identify the basic purpose or role of a specified phrase or sentence Delete a clause or sentence because it is obviously irrelevant to the essay	Select the most logical place to add a sentence in a paragraph	Delete obviously synonymous and wordy material in a sentence Revise expressions that deviate from the style of an essay
20–23	Identify the central idea or main topic of a straightforward piece of writing Determine relevancy when presented with a variety of sentence-level details	Use conjunctive adverbs or phrases to express straightforward logical relationships (e.g., *first*, *afterward*, *in response*) Decide the most logical place to add a sentence in an essay Add a sentence that introduces a simple paragraph	Delete redundant material when information is repeated in different parts of speech (e.g., "alarmingly startled") Use the word or phrase most consistent with the style and tone of a fairly straightforward essay Determine the clearest and most logical conjunction to link clauses
24–27	Identify the focus of a simple essay, applying that knowledge to add a sentence that sharpens that focus or to determine if an essay has met a specified goal Delete material primarily because it disturbs the flow and development of the paragraph Add a sentence to accomplish a fairly straightforward purpose such as illustrating a given statement	Determine the need for conjunctive adverbs or phrases to create subtle logical connections between sentences (e.g., *therefore*, *however*, *in addition*) Rearrange the sentences in a fairly uncomplicated paragraph for the sake of logic Add a sentence to introduce or conclude the essay or to provide a transition between paragraphs when the essay is fairly straightforward	Revise a phrase that is redundant in terms of the meaning and logic of the entire sentence Identify and correct ambiguous pronoun references Use the word or phrase most appropriate in terms of the content of the sentence and tone of the essay
28–32*	Apply an awareness of the focus and purpose of a fairly involved essay to determine the rhetorical effect and suitability of an existing phrase or sentence, or to determine the need to delete plausible but irrelevant material Add a sentence to accomplish a subtle rhetorical purpose such as to emphasize, to add supporting detail, or to express meaning through connotation	Make sophisticated distinctions concerning the logical use of conjunctive adverbs or phrases, particularly when signaling a shift between paragraphs Rearrange sentences to improve the logic and coherence of a complex paragraph Add a sentence to introduce or conclude a fairly complex paragraph	Correct redundant material that involves sophisticated vocabulary and sounds acceptable as conversational English (e.g., "an aesthetic viewpoint" versus "the outlook of an aesthetic viewpoint") Correct vague and wordy or clumsy and confusing writing containing sophisticated language
33–36†	Determine whether a complex essay has accomplished a specific purpose Add a phrase or sentence to accomplish a complex purpose, often expressed in terms of the main focus of the essay	Consider the need for introductory sentences or transitions, basing decisions on a thorough understanding of both the logic and rhetorical effect of the paragraph and essay	Delete redundant material that involves subtle concepts or that is redundant in terms of the paragraph as a whole

*** Statements apply to PLAN & ACT only**

† Statements apply to the ACT only

Score Ranges / Bench-marks	Table C-3a. ACT's College Readiness Standards — English (continued)		
	Sentence Structure and Formation	**Conventions of Usage**	**Conventions of Punctuation**
13–15 ***EXPL: 13*** ***PLAN: 15***	Use conjunctions or punctuation to join simple clauses Revise shifts in verb tense between simple clauses in a sentence or between simple adjoining sentences	Solve such basic grammatical problems as how to form the past and past participle of irregular but commonly used verbs and how to form comparative and superlative adjectives	Delete commas that create basic sense problems (e.g., between verb and direct object)
16–19 ***ACT: 18***	Determine the need for punctuation and conjunctions to avoid awkward-sounding sentence fragments and fused sentences Decide the appropriate verb tense and voice by considering the meaning of the entire sentence	Solve such grammatical problems as whether to use an adverb or adjective form, how to ensure straightforward subject-verb and pronoun-antecedent agreement, and which preposition to use in simple contexts Recognize and use the appropriate word in frequently confused pairs such as *there* and *their*, *past* and *passed*, and *led* and *lead*	Provide appropriate punctuation in straightforward situations (e.g., items in a series) Delete commas that disturb the sentence flow (e.g., between modifier and modified element)
20–23	Recognize and correct marked disturbances of sentence flow and structure (e.g., participial phrase fragments, missing or incorrect relative pronouns, dangling or misplaced modifiers)	Use idiomatically appropriate prepositions, especially in combination with verbs (e.g., *long for*, *appeal to*) Ensure that a verb agrees with its subject when there is some text between the two	Use commas to set off simple parenthetical phrases Delete unnecessary commas when an incorrect reading of the sentence suggests a pause that should be punctuated (e.g., between verb and direct object clause)
24–27	Revise to avoid faulty placement of phrases and faulty coordination and subordination of clauses in sentences with subtle structural problems Maintain consistent verb tense and pronoun person on the basis of the preceding clause or sentence	Ensure that a pronoun agrees with its antecedent when the two occur in separate clauses or sentences Identify the correct past and past participle forms of irregular and infrequently used verbs and form present-perfect verbs by using *have* rather than *of*	Use punctuation to set off complex parenthetical phrases Recognize and delete unnecessary commas based on a careful reading of a complicated sentence (e.g., between the elements of a compound subject or compound verb joined by *and*) Use apostrophes to indicate simple possessive nouns Recognize inappropriate uses of colons and semicolons
28–32*	Use sentence-combining techniques, effectively avoiding problematic comma splices, run-on sentences, and sentence fragments, especially in sentences containing compound subjects or verbs Maintain a consistent and logical use of verb tense and pronoun person on the basis of information in the paragraph or essay as a whole	Correctly use reflexive pronouns, the possessive pronouns *its* and *your*, and the relative pronouns *who* and *whom* Ensure that a verb agrees with its subject in unusual situations (e.g., when the subject-verb order is inverted or when the subject is an indefinite pronoun)	Use commas to set off a nonessential/nonrestrictive appositive or clause Deal with multiple punctuation problems (e.g., compound sentences containing unnecessary commas and phrases that may or may not be parenthetical) Use an apostrophe to show possession, especially with irregular plural nouns Use a semicolon to indicate a relationship between closely related independent clauses
33–36†	Work comfortably with long sentences and complex clausal relationships within sentences, avoiding weak conjunctions between independent clauses and maintaining parallel structure between clauses	Provide idiomatically and contextually appropriate prepositions following verbs in situations involving sophisticated language or ideas Ensure that a verb agrees with its subject when a phrase or clause between the two suggests a different number for the verb	Use a colon to introduce an example or an elaboration

*** Statements apply to PLAN & ACT only**

† Statements apply to the ACT only

Score Ranges	Table C-3b. ACT's College Readiness Standards — Reading	
Bench-marks	**Main Ideas and Author's Approach**	**Supporting Details**
13–15 *EXPL: 15*	Recognize a clear intent of an author or narrator in uncomplicated literary narratives	Locate basic facts (e.g., names, dates, events) clearly stated in a passage
16–19 *PLAN: 17*	Identify a clear main idea or purpose of straightforward paragraphs in uncomplicated literary narratives	Locate simple details at the sentence and paragraph level in uncomplicated passages Recognize a clear function of a part of an uncomplicated passage
20–23 *ACT: 21*	Infer the main idea or purpose of straightforward paragraphs in uncomplicated literary narratives Understand the overall approach taken by an author or narrator (e.g., point of view, kinds of evidence used) in uncomplicated passages	Locate important details in uncomplicated passages Make simple inferences about how details are used in passages
24–27	Identify a clear main idea or purpose of any paragraph or paragraphs in uncomplicated passages Infer the main idea or purpose of straightforward paragraphs in more challenging passages Summarize basic events and ideas in more challenging passages Understand the overall approach taken by an author or narrator (e.g., point of view, kinds of evidence used) in more challenging passages	Locate important details in more challenging passages Locate and interpret minor or subtly stated details in uncomplicated passages Discern which details, though they may appear in different sections throughout a passage, support important points in more challenging passages
28–32*	Infer the main idea or purpose of more challenging passages or their paragraphs Summarize events and ideas in virtually any passage Understand the overall approach taken by an author or narrator (e.g., point of view, kinds of evidence used) in virtually any passage	Locate and interpret minor or subtly stated details in more challenging passages Use details from different sections of some complex informational passages to support a specific point or argument
33–36†	Identify clear main ideas or purposes of complex passages or their paragraphs	Locate and interpret details in complex passages Understand the function of a part of a passage when the function is subtle or complex

*** Statements apply to PLAN & ACT only** **† Statements apply to the ACT only**

Descriptions of the ACT Reading Passages

Uncomplicated Literary Narratives refers to excerpts from essays, short stories, and novels that tend to use simple language and structure, have a clear purpose and a familiar style, present straightforward interactions between characters, and employ only a limited number of literary devices such as metaphor, simile, or hyperbole.

More Challenging Literary Narratives refers to excerpts from essays, short stories, and novels that tend to make moderate use of figurative language, have a more intricate structure and messages conveyed with some subtlety, and may feature somewhat complex interactions between characters.

Complex Literary Narratives refers to excerpts from essays, short stories, and novels that tend to make generous use of ambiguous language and literary devices, feature complex and subtle interactions between characters, often contain challenging context-dependent vocabulary, and typically contain messages and/or meanings that are not explicit but are embedded in the passage.

Score Ranges	Table C-3b. ACT's College Readiness Standards — Reading (continued)		
Bench-marks	**Sequential, Comparative, and Cause-Effect Relationships**	**Meanings of Words**	**Generalizations and Conclusions**
13–15 ***EXPL: 15***	Determine when (e.g., first, last, before, after) or if an event occurred in uncomplicated passages Recognize clear cause-effect relationships described within a single sentence in a passage	Understand the implication of a familiar word or phrase and of simple descriptive language	Draw simple generalizations and conclusions about the main characters in uncomplicated literary narratives
16–19 ***PLAN: 17***	Identify relationships between main characters in uncomplicated literary narratives Recognize clear cause-effect relationships within a single paragraph in uncomplicated literary narratives	Use context to understand basic figurative language	Draw simple generalizations and conclusions about people, ideas, and so on in uncomplicated passages
20–23 ***ACT: 21***	Order simple sequences of events in uncomplicated literary narratives Identify clear relationships between people, ideas, and so on in uncomplicated passages Identify clear cause-effect relationships in uncomplicated passages	Use context to determine the appropriate meaning of some figurative and nonfigurative words, phrases, and statements in uncomplicated passages	Draw generalizations and conclusions about people, ideas, and so on in uncomplicated passages Draw simple generalizations and conclusions using details that support the main points of more challenging passages
24–27	Order sequences of events in uncomplicated passages Understand relationships between people, ideas, and so on in uncomplicated passages Identify clear relationships between characters, ideas, and so on in more challenging literary narratives Understand implied or subtly stated cause-effect relationships in uncomplicated passages Identify clear cause-effect relationships in more challenging passages	Use context to determine the appropriate meaning of virtually any word, phrase, or statement in uncomplicated passages Use context to determine the appropriate meaning of some figurative and nonfigurative words, phrases, and statements in more challenging passages	Draw subtle generalizations and conclusions about characters, ideas, and so on in uncomplicated literary narratives Draw generalizations and conclusions about people, ideas, and so on in more challenging passages
28–32*	Order sequences of events in more challenging passages Understand the dynamics between people, ideas, and so on in more challenging passages Understand implied or subtly stated cause-effect relationships in more challenging passages	Determine the appropriate meaning of words, phrases, or statements from figurative or somewhat technical contexts	Use information from one or more sections of a more challenging passage to draw generalizations and conclusions about people, ideas, and so on
33–36†	Order sequences of events in complex passages Understand the subtleties in relationships between people, ideas, and so on in virtually any passage Understand implied, subtle, or complex cause-effect relationships in virtually any passage	Determine, even when the language is richly figurative and the vocabulary is difficult, the appropriate meaning of context-dependent words, phrases, or statements in virtually any passage	Draw complex or subtle generalizations and conclusions about people, ideas, and so on, often by synthesizing information from different portions of the passage Understand and generalize about portions of a complex literary narrative

*** Statements apply to PLAN & ACT only**

† Statements apply to the ACT only

Uncomplicated Informational Passages refers to materials that tend to contain a limited amount of data, address basic concepts using familiar language and conventional organizational patterns, have a clear purpose, and are written to be accessible.

More Challenging Informational Passages refers to materials that tend to present concepts that are not always stated explicitly and that are accompanied or illustrated by more—and more detailed—supporting data, include some difficult context-dependent words, and are written in a somewhat more demanding and less accessible style.

Complex Informational Passages refers to materials that tend to include a sizable amount of data, present difficult concepts that are embedded (not explicit) in the text, use demanding words and phrases whose meaning must be determined from context, and are likely to include intricate explanations of processes or events.

Score Ranges	Table C-3c. ACT's College Readiness Standards — Mathematics			
Bench-marks	**Basic Operations & Applications**	**Probability, Statistics, & Data Analysis**	**Numbers: Concepts & Properties**	**Expressions, Equations, & Inequalities**
13–15	Perform one-operation computation with whole numbers and decimals Solve problems in one or two steps using whole numbers Perform common conversions (e.g., inches to feet or hours to minutes)	Calculate the average of a list of positive whole numbers Perform a single computation using information from a table or chart	Recognize equivalent fractions and fractions in lowest terms	Exhibit knowledge of basic expressions (e.g., identify an expression for a total as $b + g$) Solve equations in the form $x + a = b$, where a and b are whole numbers or decimals
16–19 ***EXPL: 17*** ***PLAN: 19***	Solve routine one-step arithmetic problems (using whole numbers, fractions, and decimals) such as single-step percent Solve some routine two-step arithmetic problems	Calculate the average of a list of numbers Calculate the average, given the number of data values and the sum of the data values Read tables and graphs Perform computations on data from tables and graphs Use the relationship between the probability of an event and the probability of its complement	Recognize one-digit factors of a number Identify a digit's place value	Substitute whole numbers for unknown quantities to evaluate expressions Solve one-step equations having integer or decimal answers Combine like terms (e.g., $2x + 5x$)
20–23 ***ACT: 22***	Solve routine two-step or three-step arithmetic problems involving concepts such as rate and proportion, tax added, percentage off, and computing with a given average	Calculate the missing data value, given the average and all data values but one Translate from one representation of data to another (e.g., a bar graph to a circle graph) Determine the probability of a simple event Exhibit knowledge of simple counting techniques*	Exhibit knowledge of elementary number concepts including rounding, the ordering of decimals, pattern identification, absolute value, primes, and greatest common factor	Evaluate algebraic expressions by substituting integers for unknown quantities Add and subtract simple algebraic expressions Solve routine first-degree equations Perform straightforward word-to-symbol translations Multiply two binomials*
24–27	Solve multistep arithmetic problems that involve planning or converting units of measure (e.g., feet per second to miles per hour)	Calculate the average, given the frequency counts of all the data values Manipulate data from tables and graphs Compute straightforward probabilities for common situations Use Venn diagrams in counting*	Find and use the least common multiple Order fractions Work with numerical factors Work with scientific notation Work with squares and square roots of numbers Work problems involving positive integer exponents* Work with cubes and cube roots of numbers* Determine when an expression is undefined* Exhibit some knowledge of the complex numbers†	Solve real-world problems using first-degree equations Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions) Identify solutions to simple quadratic equations Add, subtract, and multiply polynomials* Factor simple quadratics (e.g., the difference of squares and perfect square trinomials)* Solve first-degree inequalities that do not require reversing the inequality sign*
28–32*	Solve word problems containing several rates, proportions, or percentages	Calculate or use a weighted average Interpret and use information from figures, tables, and graphs Apply counting techniques Compute a probability when the event and/or sample space are not given or obvious	Apply number properties involving prime factorization Apply number properties involving even/odd numbers and factors/multiples Apply number properties involving positive/negative numbers Apply rules of exponents Multiply two complex numbers†	Manipulate expressions and equations Write expressions, equations, and inequalities for common algebra settings Solve linear inequalities that require reversing the inequality sign Solve absolute value equations Solve quadratic equations Find solutions to systems of linear equations
33–36†	Solve complex arithmetic problems involving percent of increase or decrease and problems requiring integration of several concepts from pre-algebra and/or pre-geometry (e.g., comparing percentages or averages, using several ratios, and finding ratios in geometry settings)	Distinguish between mean, median, and mode for a list of numbers Analyze and draw conclusions based on information from figures, tables, and graphs Exhibit knowledge of conditional and joint probability	Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers Exhibit knowledge of logarithms and geometric sequences Apply properties of complex numbers	Write expressions that require planning and/or manipulating to accurately model a situation Write equations and inequalities that require planning, manipulating, and/or solving Solve simple absolute value inequalities

*** Statements apply to PLAN & ACT only** **† Statements apply to the ACT only**

Score Ranges	Table C-3c. ACT's College Readiness Standards — Mathematics (continued)			
Bench-marks	**Graphical Representations**	**Properties of Plane Figures**	**Measurement**	**Functions†**
13–15	Identify the location of a point with a positive coordinate on the number line		Estimate or calculate the length of a line segment based on other lengths given on a geometric figure	
16–19 *EXPL: 17* *PLAN: 19*	Locate points on the number line and in the first quadrant	Exhibit some knowledge of the angles associated with parallel lines	Compute the perimeter of polygons when all side lengths are given Compute the area of rectangles when whole number dimensions are given	
20–23 *ACT: 22*	Locate points in the coordinate plane Comprehend the concept of length on the number line* Exhibit knowledge of slope*	Find the measure of an angle using properties of parallel lines Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°)	Compute the area and perimeter of triangles and rectangles in simple problems Use geometric formulas when all necessary information is given	Evaluate quadratic functions, expressed in function notation, at integer values
24–27	Identify the graph of a linear inequality on the number line* Determine the slope of a line from points or equations* Match linear graphs with their equations* Find the midpoint of a line segment*	Use several angle properties to find an unknown angle measure Recognize Pythagorean triples* Use properties of isosceles triangles*	Compute the area of triangles and rectangles when one or more additional simple steps are required Compute the area and circumference of circles after identifying necessary information Compute the perimeter of simple composite geometric figures with unknown side lengths*	Evaluate polynomial functions, expressed in function notation, at integer values Express the sine, cosine, and tangent of an angle in a right triangle as a ratio of given side lengths
28–32*	Interpret and use information from graphs in the coordinate plane Match number line graphs with solution sets of linear inequalities Use the distance formula Use properties of parallel and perpendicular lines to determine an equation of a line or coordinates of a point Recognize special characteristics of parabolas and circles (e.g., the vertex of a parabola and the center or radius of a circle)†	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles Use the Pythagorean theorem	Use relationships involving area, perimeter, and volume of geometric figures to compute another measure	Evaluate composite functions at integer values Apply basic trigonometric ratios to solve right-triangle problems
33–36†	Match number line graphs with solution sets of simple quadratic inequalities Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$ Solve problems integrating multiple algebraic and/or geometric concepts Analyze and draw conclusions based on information from graphs in the coordinate plane	Draw conclusions based on a set of conditions Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas Use relationships among angles, arcs, and distances in a circle	Use scale factors to determine the magnitude of a size change Compute the area of composite geometric figures when planning or visualization is required	Write an expression for the composite of two simple functions Use trigonometric concepts and basic identities to solve problems Exhibit knowledge of unit circle trigonometry Match graphs of basic trigonometric functions with their equations

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Score Ranges	Table C-3d. ACT's College Readiness Standards — Science		
Bench-marks	**Interpretation of Data**	**Scientific Investigation**	**Evaluation of Models, Inferences, and Experimental Results**
13–15	Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels)		
16–19	Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation	Understand the methods and tools used in a simple experiment	
20–23 *EXPL: 20* *PLAN: 21*	Select data from a complex data presentation (e.g., a table or graph with more than three variables; a phase diagram) Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram	Understand the methods and tools used in a moderately complex experiment Understand a simple experimental design Identify a control in an experiment Identify similarities and differences between experiments	Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model Identify key issues or assumptions in a model
24–27 *ACT: 24*	Compare or combine data from two or more simple data presentations (e.g., categorize data from a table using a scale from another table) Compare or combine data from a complex data presentation Interpolate between data points in a table or graph Determine how the value of one variable changes as the value of another variable changes in a complex data presentation Identify and/or use a simple (e.g., linear) mathematical relationship between data Analyze given information when presented with new, simple information	Understand the methods and tools used in a complex experiment Understand a complex experimental design Predict the results of an additional trial or measurement in an experiment Determine the experimental conditions that would produce specified results	Select a simple hypothesis, prediction, or conclusion that is supported by two or more data presentations or models Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Identify strengths and weaknesses in one or more models Identify similarities and differences between models Determine which model(s) is(are) supported or weakened by new information Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
28–32*	Compare or combine data from a simple data presentation with data from a complex data presentation Identify and/or use a complex (e.g., nonlinear) mathematical relationship between data Extrapolate from data points in a table or graph	Determine the hypothesis for an experiment Identify an alternate method for testing a hypothesis	Select a complex hypothesis, prediction, or conclusion that is supported by a data presentation or model Determine whether new information supports or weakens a model, and why Use new information to make a prediction based on a model
33–36†	Compare or combine data from two or more complex data presentations Analyze given information when presented with new, complex information	Understand precision and accuracy issues Predict how modifying the design or methods of an experiment will affect results Identify an additional trial or experiment that could be performed to enhance or evaluate experimental results	Select a complex hypothesis, prediction, or conclusion that is supported by two or more data presentations or models Determine whether given information supports or contradicts a complex hypothesis or conclusion, and why

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Science College Readiness Standards are measured in the context of science topics students encounter in science courses. These topics may include:

Life Science/Biology	Physical Science/Chemistry, Physics	Earth & Space Science
• Animal behavior • Animal development and growth • Body systems • Cell structure and processes • Ecology • Evolution • Genetics • Homeostasis • Life cycles • Molecular basis of heredity • Origin of life • Photosynthesis • Plant development, growth, structure • Populations • Taxonomy	• Atomic structure • Chemical bonding, equations, nomenclature, reactions • Electrical circuits • Elements, compounds, mixtures • Force and motions • Gravitation • Heat and work • Kinetic and potential energy • Magnetism • Momentum • The Periodic Table • Properties of solutions • Sound and light • States, classes, and properties of matter • Waves	• Earthquakes and volcanoes • Earth's atmosphere • Earth's resources • Fossils and geological time • Geochemical cycles • Groundwater • Lakes, rivers, oceans • Mass movements • Plate tectonics • Rocks, minerals • Solar system • Stars, galaxies, and the universe • Water cycle • Weather and climate • Weathering and erosion