



STATE MATCH

Illinois
Secondary School
Learning Standards
English Language Arts,
Mathematics, and Science

and

ACT[®]
EXPLORE, PLAN,
and the ACT

May 2006

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About This Report

EXECUTIVE SUMMARY

(pp. 1–2)

This portion summarizes the findings of the alignment between ACT's Educational Planning and Assessment System (EPAS™) tests—EXPLORE® (8th and 9th grades); PLAN® (10th grade); and the ACT® (11th and 12th grades)—and Illinois's Learning Standards. It also presents ACT's involvement in meeting NCLB requirements and describes additional critical information that ACT could provide to Illinois.

SECTION A

(pp. 3–6)

This section provides tables by content area (English Language Arts, Mathematics, and Science) listing the precise number of Illinois Learning Standards measured by ACT's EPAS tests by grade level.

SECTION B

(pp. 7–24)

All Illinois Learning Standards are listed here; each one highlighted is measured by ACT's EPAS tests. Illinois Standards listed here are from the following documents:

<i>Illinois Learning Standards for English Language Arts</i>	1997
<i>Illinois Learning Standards for Mathematics</i>	1997
<i>Illinois Learning Standards for Science</i>	1997

Underlined science content indicates that the content topics are included in, but not directly measured by, ACT's EPAS Science Tests.

SECTION C

(pp. 25–34)

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

NOTE

An alignment of the Illinois Grade 11 Assessment Frameworks and the ACT Tests was also conducted. The results of that study are presented in a side-by-side format contained in the Supplement document described below.

A supplement is available that identifies the specific ACT College Readiness Standard(s) corresponding to each Illinois Learning Standard in a side-by-side format. To request this supplement, please e-mail ACT at statematch@act.org.



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 Educational Planning and Assessment System (EPAS) tests—EXPLORE (8th and 9th grades); PLAN (10th grade); and the ACT (11th and 12th grades)—measure Illinois's Learning Standards?
2. Can ACT's EPAS test results be used to meet Illinois's NCLB requirement?
3. Why should Illinois choose ACT?

1. Match Results: Comparisons conducted by our content specialists show that ACT's Reading, English, Writing, Mathematics and Science tests measure many of Illinois's English Language Arts, Mathematics, and Science Learning Standard State Goals (with Benchmark match totals appearing in Section A):

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

- English Language Arts: 3 out of 5 State Goals
Many important English Language Arts standards are covered by ACT's English, Reading, and Writing tests.
- Mathematics: 5 out of 5 State Goals
All of Illinois's Mathematics Learning Standards are covered by ACT's Mathematics tests.
- Science: *Process* State Goals: 1 out of 1
(*Content* State Goals: 2 out of 3)

Most of Illinois's Science standards are covered by ACT's Science tests.

(A note about science content: ACT's 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 ACT Science Test covers some, but not all, of the discrete science content knowledge specifically described in the Illinois Science Learning Standards.

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 Benchmarks measured by ACT's tests), 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 ACT's tests and Illinois's Learning Standards arise from standards not being assessable in group settings, standards that are personal in nature, and standards requiring measurement over extended time. If additional testing is deemed necessary, ACT would be interested in working with Illinois on developing any necessary augmentation.



**STATES CHOOSE ACT
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.**

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

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

2. NCLB requirement? Yes; states like Illinois intend to use ACT components as part of testing that will be submitted to the U.S. Department of Education for NCLB approval.

3. Why choose ACT? States and school districts choose ACT's EPAS programs 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*. 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.

- **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 worked backwards to develop data-driven, empirically derived statements of what students typically know and are able to do in various score ranges on ACT's English, Reading, Writing, Mathematics, and Science tests. These statements provide specific details about students' college readiness and can be used to identify next steps for improvement.

In sum, the ACT's EPAS programs provide abundant data relevant to Illinois's Learning Standards and to Illinois students' readiness for college and work.



Section A: Number of Illinois Goals, Standards, and Benchmarks Measured by EXPLORE, PLAN, and the ACT

Table A-1. Number of Illinois English Language Arts Benchmarks Measured by EXPLORE, PLAN, and the ACT

Illinois Goals and Standards*		Number of Illinois Benchmarks Measured by ACT's tests	Aspects of Not-Measured Illinois Benchmarks
1. Reading	A. Word analysis and Vocabulary	MS-JH: 1 out of 2 Early HS: 0 out of 2 Late HS: 2 out of 2	Apply knowledge of word origins
	B. Reading strategies	MS-JH: 4 out of 4 Early HS: 3 out of 3 Late HS: 3 out of 4	Relate to prior knowledge
	C. Comprehension	MS-JH: 4 out of 6 Early HS: 3 out of 6 Late HS: 3 out of 6	Compare authors Interpret tables Evaluate information from multiple sources
2. Literature	A. Literary elements, techniques	MS-JH: 3 out of 4 Early HS: 4 out of 4 Late HS: 2 out of 4	Identify characteristics of authors Compare themes across societies Evaluate effect of historical context on form
	B. Literary works	MS-JH: 2 out of 3 Early HS: 1 out of 3 Late HS: 1 out of 2	Critique ideas Analyze form
3. Writing	A. Grammar, punctuation, structure	MS-JH: 1 out of 1 Early HS: 1 out of 1 Late HS: 1 out of 1	
	B. Compose writing	MS-JH: 2 out of 2 Early HS: 2 out of 3 Late HS: 1 out of 1	Produce work for publication
	C. Communicate ideas	MS-JH: 0 out of 2 Early HS: 0 out of 2 Late HS: 1 out of 2	Use technology Write for real situation
4. Listening & Speaking	A. Listen effectively	MS-JH: 0 out of 4 Early HS: 0 out of 4 Late HS: 0 out of 2	Listen
	B. Speak effectively	MS-JH: 0 out of 4 Early HS: 0 out of 4 Late HS: 0 out of 4	Speak effectively
5. Research	A. Locate, organize, use sources	MS-JH: 0 out of 2 Early HS: 0 out of 2 Late HS: 0 out of 2	Develop research plan
	B. Analyze, evaluate information	MS-JH: 0 out of 2 Early HS: 0 out of 2 Late HS: 0 out of 2	Analyze information from various sources
	C. Apply acquired information	MS-JH: 0 out of 3 Early HS: 0 out of 3 Late HS: 0 out of 2	Create research presentation Support and defend a thesis

TOTALS	MS-JH: 17 out of 39
3 out of 5 Goals	Early HS: 14 out of 39
8 out of 13 Standards	Late HS: 14 out of 34

*Refer to Illinois's English Language Arts Learning Standards on pages 7–12



Table A-2. Number of Illinois Mathematics Benchmarks Measured by EXPLORE, PLAN, and the ACT

Illinois Goals and Standards*		Number of Illinois Benchmarks Measured by ACT's tests	Aspects of Not-Measured Illinois Benchmarks
6. Number Sense	A. Representation, ordering	MS-JH: 1 out of 1 Early HS: 1 out of 1 Late HS: 1 out of 1	
	B. Problem solving	MS-JH: 3 out of 3 Early HS: 1 out of 1 Late HS: 1 out of 1	
	C. Compute, estimate	MS-JH: 2 out of 2 Early HS: 1 out of 1 Late HS: 1 out of 1	
	D. Comparison	MS-JH: 1 out of 1 Early HS: 1 out of 1 Late HS: 1 out of 1	
7. Estimation, Measurement	A. Measure	MS-JH: 1 out of 2 Early HS: 2 out of 2 Late HS: 1 out of 1	Use protractor
	B. Estimate	MS-JH: 1 out of 1 Early HS: 0 out of 1 Late HS: 1 out of 1	Use scientific instruments including timers, calculators, computers
	C. Use instruments to solve problems	MS-JH: 2 out of 2 Early HS: 3 out of 3 Late HS: 2 out of 2	
8. Algebra, Analytical Methods	A. Numerical relationships	MS-JH: 2 out of 2 Early HS: 2 out of 2 Late HS: 1 out of 1	
	B. Interpret	MS-JH: 1 out of 1 Early HS: 2 out of 2 Late HS: 1 out of 1	
	C. Systems	MS-JH: 1 out of 1 Early HS: 2 out of 2 Late HS: 1 out of 1	
	D. Algebraic concepts	MS-JH: 3 out of 3 Early HS: 1 out of 1 Late HS: 1 out of 1	
9. Geometry	A. Concepts	MS-JH: 3 out of 3 Early HS: 2 out of 2 Late HS: 1 out of 1	
	B. Relationships	MS-JH: 1 out of 1 Early HS: 1 out of 1 Late HS: 1 out of 1	
	C. Construct arguments	MS-JH: 2 out of 2 Early HS: 3 out of 3 Late HS: 1 out of 2	
	D. Trigonometry	MS-JH: 1 out of 1 Early HS: 1 out of 1 Late HS: 1 out of 1	



Table A-2. Number of Illinois Mathematics Benchmarks Measured by EXPLORE, PLAN, and the ACT

Illinois Goals and Standards*		Number of Illinois Benchmarks Measured by ACT's tests	Aspects of Not-Measured Illinois Benchmarks
10. Data Analysis & Probability	A. Data analysis	MS-JH: 3 out of 3 Early HS: 3 out of 3 Late HS: 0 out of 1	Construct a presentation
	B. Conclusions	MS-JH: 1 out of 1 Early HS: 0 out of 1 Late 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 Late HS: 3 out of 3	Design and conduct simulations
TOTALS 5 out of 5 Goals 18 out of 18 Standards		MS-JH: 31 out of 32 Early HS: 28 out of 31 Late HS: 19 out of 22	

*Refer to Illinois's Mathematics Learning Standards on pages 13–18



**Table A-3. Number of Illinois Science Benchmarks
Measured by EXPLORE, PLAN, and the ACT**

Illinois Goals and Standards*		Number of Illinois Benchmarks Measured by ACT's tests	Aspects of Not-Measured Illinois Benchmarks
11. Inquiry	A. Concepts of inquiry	MS-JH: 7 out of 7 Early HS: 6 out of 6 Late HS: 5 out of 5	
	B. Technological design	MS-JH: 0 out of 6 Early HS: 0 out of 6 Late HS: 0 out of 6	Identify problem Sketch Build and test prototype Evaluate test results Use technology
TOTALS 1 out of 1 Goals 1 out of 2 Standards		MS-JH: 7 out of 13 Early HS: 6 out of 12 Late HS: 5 out of 11	Science Process Benchmarks
12. Content	A. Life science changes	MS-JH: (3) out of (3) Early HS: (3) out of (3) Late HS: (2) out of (2)	
	B. Interactions of living things	MS-JH: (2) out of (2) Early HS: (2) out of (2) Late HS: (2) out of (2)	
	C. Matter and energy	MS-JH: (2) out of (2) Early HS: (2) out of (2) Late HS: (2) out of (2)	
	D. Force and motion	MS-JH: (2) out of (2) Early HS: (2) out of (2) Late HS: (2) out of (2)	
	E. Earth processes	MS-JH: (2) out of (3) Early HS: (3) out of (2) Late HS: (1) out of (1)	
	F. Earth composition	MS-JH: (3) out of (3) Early HS: (2) out of (2) Late HS: (2) out of (2)	
13. STS	A. Science practices	MS-JH: (0) out of (3) Early HS: (1) out of (4) Late HS: (1) out of (4)	Suggest ways to reduce risk in science Describe how science knowledge changes over time Explain how peer review helps assure accuracy
	B. STS	MS-JH: (0) out of (6) Early HS: (0) out of (5) Late HS: (0) out of (5)	Contrast science and technology Analyze an occupation Analyze resource management Evaluate claims used in advertisements
TOTALS 2 out of 2 Goals 1 out of 2 Standards		MS-JH: (15) out of (24) Early HS: (14) out of (22) Late HS: (12) out of (20)	Science Content Benchmarks

*Refer to Illinois's Science Learning Standards on pages 19–24



Section B: Illinois's Secondary School Learning Standards and Grade 11 Assessment Frameworks Measured by EXPLORE, PLAN, and the ACT

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 English Language Arts

Late 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.5a.** Identify and analyze new terminology applying knowledge of word origins and derivations in a variety of practical settings.
- 1.A.5b.** Analyze the meaning of abstract concepts and the effects of particular word and phrase choices.
- B.** Apply reading strategies to improve understanding and fluency.
- 1.B.5a.** Relate reading to prior knowledge and experience and make connections to related information.
- 1.B.5b.** Analyze the defining characteristics and structures of a variety of complex literary genres and describe how genre affects the meaning and function of the texts.
- 1.B.5c.** Evaluate a variety of compositions for purpose, structure, content and details for use in school or at work.
- 1.B.5d.** Read age-appropriate material with fluency and accuracy.
- C.** Comprehend a broad range of reading materials.
- 1.C.5a.** Use questions and predictions to guide reading across complex materials.
- 1.C.5b.** Analyze and defend an interpretation of text.
- 1.C.5c.** Critically evaluate information from multiple sources.
- 1.C.5d.** Summarize and make generalizations from content and relate them to the purpose of the material.
- 1.C.5e.** Evaluate how authors and illustrators use text and art across materials to express their ideas (e.g., complex dialogue, persuasive techniques).
- 1.C.5f.** Use tables, graphs and maps to challenge arguments, defend conclusions and persuade others.

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.5a.** Compare and evaluate oral, written or viewed works from various eras and traditions and analyze complex literary devices (e.g., structures, images, forms, foreshadowing, flashbacks, stream of consciousness).
- 2.A.5b.** Evaluate relationships between and among character, plot, setting, theme, conflict and resolution and their influence on the effectiveness of a literary piece.

2.A.5c. Analyze the development of form (e.g., short stories, essays, speeches, poetry, plays, novels) and purpose in American literature and literature of other countries.

2.A.5d. Evaluate the influence of historical context on form, style and point of view for a variety of literary works.

B. Read and interpret a variety of literary works.

2.B.5a. Analyze and express an interpretation of a literary work.

2.B.5b. Apply knowledge gained from literature as a means of understanding contemporary and historical economic, social and political issues and perspectives.

Writing

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

- A.** Use correct grammar, spelling, punctuation, capitalization and structure.
- 3.A.5.** Produce grammatically correct documents using standard manuscript specifications for a variety of purposes and audiences.
- B.** Compose well-organized and coherent writing for specific purposes and audiences.
- 3.B.5.** Using contemporary technology, produce documents of publication quality for specific purposes and audiences; exhibit clarity of focus, logic of organization, appropriate elaboration and support and overall coherence.
- C.** Communicate ideas in writing to accomplish a variety of purposes.
- 3.C.5a.** Communicate information and ideas in narrative, informative and persuasive writing with clarity and effectiveness in a variety of written forms using appropriate traditional and/or electronic formats; adapt content, vocabulary, voice and tone to the audience, purpose and situation.
- 3.C.5b.** Write for real or potentially real situations in academic, professional and civic contexts (e.g., applications, job applications, business letters, resume, petitions).

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.5a.** Use criteria to evaluate a variety of speakers' verbal and nonverbal messages.
- 4.A.5b.** Use techniques for analysis, synthesis, and evaluation of oral messages.
- B.** Speak effectively using language appropriate to the situation and audience.
- 4.B.5a.** Deliver planned and impromptu oral presentations, as individuals and members of a group,

conveying results of research, projects or literature studies to a variety of audiences (e.g., peers, community, business/industry, local organizations) using appropriate visual aids and available technology.

4.B.5b. Use speaking skills to participate in and lead group discussions; analyze the effectiveness of the spoken interactions based upon the ability of the group to achieve its goals.

4.B.5c. Implement learned strategies to self-monitor communication anxiety and apprehension (e.g., relaxation and transference techniques, scripting, extemporaneous outlining, repetitive practice).

4.B.5d. Use verbal and nonverbal strategies to maintain communication and to resolve individual, group and workplace conflict (e.g., mediation skills, formal and informal bargaining skills).

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.5a. Develop a research plan using multiple forms of data.

5.A.5b. Research, design and present a project to an academic, business or school community audience on a topic selected from among contemporary issues.

B. Analyze and evaluate information acquired from various sources.

5.B.5a. Evaluate the usefulness of information, synthesize information to support a thesis, and present information in a logical manner in oral and written forms.

5.B.5b. Credit primary and secondary sources in a form appropriate for presentation or publication for a particular audience.

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

5.C.5a. Using contemporary technology, create a research presentation or prepare a documentary related to academic, technical or occupational topics and present the findings in oral or multimedia formats.

5.C.5b. Support and defend a thesis statement using various references including media and electronic resources.

Mathematics

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.

ILLINOIS Mathematics
Early 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.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 Mathematics
Late 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.5. Perform addition, subtraction and multiplication of complex numbers and graph the results in the complex plane.
- B. Investigate, represent and solve problems using number facts, operations (addition, subtraction, multiplication, division) and their properties, algorithms and relationships.
 - 6.B.5. Identify, represent and apply numbers expressed in exponential, logarithmic and scientific notation using contemporary technology.
- C. Compute and estimate using mental mathematics, paper-and-pencil methods, calculators and computers.
 - 6.C.5. Determine the level of accuracy needed for computations involving measurement and irrational numbers.
- D. Solve problems using comparison of quantities, ratios, proportions and percents.
 - 6.D.5. Solve problems involving loans, mortgages and other practical applications involving geometric patterns of growth.

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.5. Apply nonlinear scales (e.g., Richter, decibel, pH) to solve practical problems.
- B. Estimate measurements and determine acceptable levels of accuracy.
 - 7.B.5. Estimate perimeter, area, volume, and capacity of irregular shapes, regions and solids and explain the reasoning supporting the estimate.
- C. Select and use appropriate technology, instruments and formulas to solve problems, interpret results and communicate findings.
 - 7.C.5a. Use dimensional analysis to determine units and check answers in applied measurement problems.
 - 7.C.5b. Determine how changes in one measure may affect other measures (e.g., what happens to the volume and surface area of a cube when the side of the cube is halved).

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.5. Solve mathematical problems involving recursive patterns and use models that employ such relationships.
- B. Interpret and describe numerical relationships using tables, graphs and symbols.
 - 8.B.5. Use functions including exponential, polynomial, rational, parametric, logarithmic, and trigonometric to describe numerical relationships.
- C. Solve problems using systems of numbers and their properties.
 - 8.C.5. Use polynomial, exponential, logarithmic and trigonometric functions to model situations.
- D. Use algebraic concepts and procedures to represent and solve problems.
 - 8.D.5. Formulate and solve nonlinear equations and systems including problems involving inverse variation and exponential and logarithmic growth and decay.

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.5. Use geometric figures and their properties to solve problems in the arts, the physical and life sciences and the building trades, with and without the use of technology.
- B. Identify, describe, classify and compare relationships using points, lines, planes and solids.
 - 9.B.5. Construct and use two - and three - dimensional models of objects that have practical applications (e.g., blueprints, topographical maps, scale models).
- C. Construct convincing arguments and proofs to solve problems
 - 9.C.5a. Perform and describe an original investigation of a geometric problem and verify the analysis and conclusions to an audience.
 - 9.C.5b. Apply physical models, graphs, coordinate systems, networks and vectors to develop solutions in applied contexts (e.g., bus routing, areas of irregular shapes, describing forces and other physical quantities).
- D. Use trigonometric ratios and circular functions to solve problems.

9.D.5. Analyze and solve problems involving periodic patterns (e.g., sound waves, tide variations) using circular functions and communicate results orally and in writing.

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.5. Construct a statistics-based presentation, individually and as members of a team, to communicate and justify the results of a project.

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

10.B.5. Design a statistical experiment to answer a question about a realistic situation, conduct the experiment, use statistics to interpret the data, and communicate the results, individually and as members of a team.

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

10.C.5a. Compute conditional probabilities and the probabilities of independent events.

10.C.5b. Compute probabilities in counting situations involving permutations and combinations.

10.C.5c. Make predictions using probabilities associated with normally distributed events.

Science

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.

Inquiry and Design

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).

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).

Inquiry and Design

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).

ILLINOIS Science
Early High School Learning Standards

Concepts and Principles

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).

Concepts and Principles

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.

ILLINOIS Science
Late High School Learning Standards

Science, Technology, and Society

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.5a. Formulate hypotheses referencing prior research and knowledge.

11.A.5b. Design procedures to test the selected hypotheses.

11.A.5c. Conduct systematic controlled experiments to test the selected hypotheses.

11.A.5d. Apply statistical methods to make predictions and to test the accuracy of results.

11.A.5e. Report, display and defend the results of investigations to audiences that may include professionals and technical experts.

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

11.B.5a. Identify a design problem that has practical applications and propose possible solutions, considering such constraints as available tools, materials, time and costs.

11.B.5b. Select criteria for a successful design solution to the identified problem.

11.B.5c. Build and test different models or simulations of the design solution using suitable materials, tools and technology.

11.B.5d. Choose a model and refine its design based on the test results.

11.B.5e. Apply established criteria to evaluate the suitability, acceptability, benefits, drawbacks and consequences for the tested design solution and recommend modifications and refinements.

11.B.5f. Using available technology, prepare and present findings of the tested design solution to an audience that may include professional and technical experts.

Science, Technology, and Society

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.5a. Explain changes within cells and organisms in response to stimuli and changing environmental conditions (e.g., homeostasis, dormancy).

12.A.5b. Analyze the transmission of genetic traits, diseases and defects.

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

12.B.5a. Analyze and explain biodiversity issues and the causes and effects of extinction.

12.B.5b. Compare and predict how life forms can adapt to changes in the environment by applying concepts of change and constancy (e.g., variations within a population increase the likelihood of survival under new conditions).

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

12.C.5a. Analyze reactions (e.g., nuclear reactions, burning of fuel, decomposition of waste) in natural and man-made energy systems.

12.C.5b. Analyze the properties of materials (e.g., mass, boiling point, melting point, hardness) in relation to their physical and/or chemical structures.

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

12.D.5a. Analyze factors that influence the relative motion of an object (e.g., friction, wind shear, cross currents, potential differences).

12.D.5b. Analyze the effects of gravitational, electromagnetic and nuclear forces on a physical system.

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

12.E.5. Analyze the processes involved in naturally occurring short-term and long-term Earth events (e.g., floods, ice ages, temperature, sea-level fluctuations).

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

12.F.5a. Compare the processes involved in the life cycle of stars (e.g., gravitational collapse, thermonuclear fusion, nova) and evaluate the supporting evidence.

12.F.5b. Describe the size and age of the universe and evaluate the supporting evidence (e.g., red-shift, Hubble's constant).

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.5a. Design procedures and policies to eliminate or reduce risk in potentially hazardous science activities.

13.A.5b. Explain criteria that scientists use to evaluate the validity of scientific claims and theories.

13.A.5c. Explain the strengths, weaknesses and uses of research methodologies including observational

studies, controlled laboratory experiments, computer modeling and statistical studies.

13.A.5d. Explain, using a practical example (e.g., cold fusion), why experimental replication and peer review are essential to scientific claims.

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

13.B.5a. Analyze challenges created by international competition for increases in scientific knowledge and technological capabilities (e.g., patent issues, industrial espionage, technology obsolescence).

13.B.5b. Analyze and describe the processes and effects of scientific and technological breakthroughs.

13.B.5c. Design and conduct an environmental impact study, analyze findings and justify recommendations.

13.B.5d. Analyze the costs, benefits and effects of scientific and technological policies at the local, state, national and global levels (e.g., genetic research, Internet access).

13.B.5e. Assess how scientific and technological progress has affected other fields of study, careers and job markets and aspects of everyday life.

Section C: **ACT's College Readiness Standards Included in Illinois's Secondary School Learning Standards and Grade 11 Assessment Frameworks**

Using thousands of student records and responses, content and measurement experts worked backwards to develop data-driven, empirically derived statements of what students know and are typically able to do in various score ranges on the English, Reading, Writing, Mathematics, and Science tests on the EXPLORE, PLAN, and ACT tests. These empirically derived score descriptors are called **ACT's College Readiness Standards**. Because of this unique way the ACT Standards were derived, ACT's Standards contain specific descriptions of proficiency and content, including descriptions of the complexity of the test material. The ACT Standards prove to be an effective way to communicate the skills and knowledge measured by our EXPLORE, PLAN, and ACT tests.

In this section (Section C), the ACT Standards that are highlighted are those that are included in Illinois's Standards. ACT Standards not highlighted are those statements that include specific content, complexity and/or proficiency level descriptions that were not described in Illinois's Standards.

Because Illinois educators are the experts on the Illinois Learning Standards, we would strongly encourage them to examine this document and offer their interpretations.



Table C-1. ACT’s College Readiness Standards — English

	Topic Development in Terms of Purpose and Focus	Organization, Unity, and Coherence	Word Choice in Terms of Style, Tone, Clarity, and Economy
13–15		Use conjunctive adverbs or phrases to show time relationships in simple narrative essays (e.g., <i>then, this time</i>)	Revise sentences to correct awkward and confusing arrangements of sentence elements Revise vague nouns and pronouns that create obvious logic problems
16–19	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., <i>first, afterward, in response</i>) 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., <i>therefore, however, in addition</i>) 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

Table C-1. ACT’s College Readiness Standards — English (continued)

	Sentence Structure and Formation	Conventions of Usage	Conventions of Punctuation
13–15	<p>Use conjunctions or punctuation to join simple clauses</p> <p>Revise shifts in verb tense between simple clauses in a sentence or between simple adjoining sentences</p>	<p>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</p>	<p>Delete commas that create basic sense problems (e.g., between verb and direct object)</p>
16–19	<p>Determine the need for punctuation and conjunctions to avoid awkward-sounding sentence fragments and fused sentences</p> <p>Decide the appropriate verb tense and voice by considering the meaning of the entire sentence</p>	<p>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</p> <p>Recognize and use the appropriate word in frequently confused pairs such as <i>there</i> and <i>their</i>, <i>past</i> and <i>passed</i>, and <i>led</i> and <i>lead</i></p>	<p>Provide appropriate punctuation in straightforward situations (e.g., items in a series)</p> <p>Delete commas that disturb the sentence flow (e.g., between modifier and modified element)</p>
20–23	<p>Recognize and correct marked disturbances of sentence flow and structure (e.g., participial phrase fragments, missing or incorrect relative pronouns, dangling or misplaced modifiers)</p>	<p>Use idiomatically appropriate prepositions, especially in combination with verbs (e.g., <i>long for</i>, <i>appeal to</i>)</p> <p>Ensure that a verb agrees with its subject when there is some text between the two</p>	<p>Use commas to set off simple parenthetical phrases</p> <p>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)</p>
24–27	<p>Revise to avoid faulty placement of phrases and faulty coordination and subordination of clauses in sentences with subtle structural problems</p> <p>Maintain consistent verb tense and pronoun person on the basis of the preceding clause or sentence</p>	<p>Ensure that a pronoun agrees with its antecedent when the two occur in separate clauses or sentences</p> <p>Identify the correct past and past participle forms of irregular and infrequently used verbs and form present-perfect verbs by using <i>have</i> rather than <i>of</i></p>	<p>Use punctuation to set off complex parenthetical phrases</p> <p>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 <i>and</i>)</p> <p>Use apostrophes to indicate simple possessive nouns</p> <p>Recognize inappropriate uses of colons and semicolons</p>
28–32	<p>Use sentence-combining techniques, effectively avoiding problematic comma splices, run-on sentences, and sentence fragments, especially in sentences containing compound subjects or verbs</p> <p>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</p>	<p>Correctly use reflexive pronouns, the possessive pronouns <i>its</i> and <i>your</i>, and the relative pronouns <i>who</i> and <i>whom</i></p> <p>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)</p>	<p>Use commas to set off a nonessential/nonrestrictive appositive or clause</p> <p>Deal with multiple punctuation problems (e.g., compound sentences containing unnecessary commas and phrases that may or may not be parenthetical)</p> <p>Use an apostrophe to show possession, especially with irregular plural nouns</p> <p>Use a semicolon to indicate a relationship between closely related independent clauses</p>
33–36	<p>Work comfortably with long sentences and complex clausal relationships within sentences, avoiding weak conjunctions between independent clauses and maintaining parallel structure between clauses</p>	<p>Provide idiomatically and contextually appropriate prepositions following verbs in situations involving sophisticated language or ideas</p> <p>Ensure that a verb agrees with its subject when a phrase or clause between the two suggests a different number for the verb</p>	<p>Use a colon to introduce an example or an elaboration</p>

Table C-2. ACT's College Readiness Standards — Reading

	Main Ideas and Author's Approach	Supporting Details
13–15	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	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	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

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.

Table C-2. ACT’s College Readiness Standards — Reading (continued)

	Sequential, Comparative, and Cause-Effect Relationships	Meanings of Words	Generalizations and Conclusions
13–15	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	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	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

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.

Table C-3. ACT’s College Readiness Standards — Writing

	Expressing Judgments	Focusing on the Topic	Developing a Position
3–4	<p>Show a little understanding of the persuasive purpose of the task but neglect to take or to maintain a position on the issue in the prompt</p> <p>Show limited recognition of the complexity of the issue in the prompt</p>	<p>Maintain a focus on the general topic in the prompt through most of the essay</p>	<p>Offer a little development, with one or two ideas; if examples are given, they are general and may not be clearly relevant; resort often to merely repeating ideas</p> <p>Show little or no movement between general and specific ideas and examples</p>
5–6	<p>Show a basic understanding of the persuasive purpose of the task by taking a position on the issue in the prompt but may not maintain that position</p> <p>Show a little recognition of the complexity of the issue in the prompt by acknowledging, but only briefly describing, a counterargument to the writer’s position</p>	<p>Maintain a focus on the general topic in the prompt throughout the essay</p>	<p>Offer limited development of ideas using a few general examples; resort sometimes to merely repeating ideas</p> <p>Show little movement between general and specific ideas and examples</p>
7–8	<p>Show understanding of the persuasive purpose of the task by taking a position on the issue in the prompt</p> <p>Show some recognition of the complexity of the issue in the prompt by</p> <ul style="list-style-type: none"> acknowledging counterarguments to the writer’s position providing some response to counterarguments to the writer’s position 	<p>Maintain a focus on the general topic in the prompt throughout the essay and attempt a focus on the specific issue in the prompt</p> <p>Present a thesis that establishes focus on the topic</p>	<p>Develop ideas by using some specific reasons, details, and examples</p> <p>Show some movement between general and specific ideas and examples</p>
9–10	<p>Show clear understanding of the persuasive purpose of the task by taking a position on the specific issue in the prompt and offering a broad context for discussion</p> <p>Show recognition of the complexity of the issue in the prompt by</p> <ul style="list-style-type: none"> partially evaluating implications and/or complications of the issue, and/or posing and partially responding to counterarguments to the writer’s position 	<p>Maintain a focus on discussion of the specific topic and issue in the prompt throughout the essay</p> <p>Present a thesis that establishes a focus on the writer’s position on the issue</p>	<p>Develop most ideas fully, using some specific and relevant reasons, details, and examples</p> <p>Show clear movement between general and specific ideas and examples</p>
11–12	<p>Show clear understanding of the persuasive purpose of the task by taking a position on the specific issue in the prompt and offering a critical context for discussion</p> <p>Show understanding of the complexity of the issue in the prompt by</p> <ul style="list-style-type: none"> examining different perspectives, and/or evaluating implications or complications of the issue, and/or posing and fully discussing counterarguments to the writer’s position 	<p>Maintain a clear focus on discussion of the specific topic and issue in the prompt throughout the essay</p> <p>Present a critical thesis that clearly establishes the focus on the writer’s position on the issue</p>	<p>Develop several ideas fully, using specific and relevant reasons, details, and examples</p> <p>Show effective movement between general and specific ideas and examples</p>

Table C-3. ACT's College Readiness Standards — Writing (continued)

	Organizing Ideas	Using Language
3–4	<p>Provide a discernible organization with some logical grouping of ideas in parts of the essay</p> <p>Use a few simple and obvious transitions</p> <p>Present a discernible, though minimally developed, introduction and conclusion</p>	<p>Show limited control of language by</p> <ul style="list-style-type: none"> correctly employing some of the conventions of standard English grammar, usage, and mechanics, but with distracting errors that sometimes significantly impede understanding using simple vocabulary using simple sentence structure
5–6	<p>Provide a simple organization with logical grouping of ideas in parts of the essay</p> <p>Use some simple and obvious transitional words, though they may at times be inappropriate or misleading</p> <p>Present a discernible, though underdeveloped, introduction and conclusion</p>	<p>Show a basic control of language by</p> <ul style="list-style-type: none"> correctly employing some of the conventions of standard English grammar, usage, and mechanics, but with distracting errors that sometimes impede understanding using simple but appropriate vocabulary using a little sentence variety, though most sentences are simple in structure
7–8	<p>Provide an adequate but simple organization with logical grouping of ideas in parts of the essay but with little evidence of logical progression of ideas</p> <p>Use some simple and obvious, but appropriate, transitional words and phrases</p> <p>Present a discernible introduction and conclusion with a little development</p>	<p>Show adequate use of language to communicate by</p> <ul style="list-style-type: none"> correctly employing many of the conventions of standard English grammar, usage, and mechanics, but with some distracting errors that may occasionally impede understanding using appropriate vocabulary using some varied kinds of sentence structures to vary pace
9–10	<p>Provide unity and coherence throughout the essay, sometimes with a logical progression of ideas</p> <p>Use relevant, though at times simple and obvious, transitional words and phrases to convey logical relationships between ideas</p> <p>Present a somewhat developed introduction and conclusion</p>	<p>Show competent use of language to communicate ideas by</p> <ul style="list-style-type: none"> correctly employing most conventions of standard English grammar, usage, and mechanics, with a few distracting errors but none that impede understanding using some precise and varied vocabulary using several kinds of sentence structures to vary pace and to support meaning
11–12	<p>Provide unity and coherence throughout the essay, often with a logical progression of ideas</p> <p>Use relevant transitional words, phrases, and sentences to convey logical relationships between ideas</p> <p>Present a well-developed introduction and conclusion</p>	<p>Show effective use of language to clearly communicate ideas by</p> <ul style="list-style-type: none"> correctly employing most conventions of standard English grammar, usage, and mechanics, with just a few, if any, errors using precise and varied vocabulary using a variety of kinds of sentence structures to vary pace and to support meaning

Table C-4. ACT's College Readiness Standards — Mathematics

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

Table C-4. 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	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	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

Table C-5. ACT’s College Readiness Standards — Science

	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	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	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

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
<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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