STATE MATCH

Alabama
Courses of Study
English Language Arts,
Mathematics, and Science
Grades 8–12

and

EXPLORE®, PLAN®, the ACT®, and WorkKeys®

April 2010

ACT®

About This Report

EXECUTIVE SUMMARY
(pp. 1–5)

This portion summarizes the findings of the alignment between Alabama's Content Standards and 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 ACT's WorkKeys® assessments (Reading for Information, Applied Mathematics, and Locating Information). It also presents ACT's involvement in meeting NCLB requirements and includes additional information about the unique programs and services ACT can provide to Alabama.

SECTION A
(pp. 7–10)

This section provides tables by content area (English Language Arts, Mathematics, and Science), listing the precise number of Alabama Content Standards measured by ACT's EPAS tests and/or WorkKeys assessments by grade level.

SECTION B
(pp. 11–35)

All Alabama Content Standards are listed here; each one highlighted is measured by ACT's EPAS tests and/or WorkKeys assessments. Underlined science content indicates that the content topics are included in, but not directly measured by, ACT's EPAS Science tests. Alabama standards listed here are from the Alabama Courses of Study as presented on the Alabama Department of Education website in March 2010:

Alabama Courses of Study	Year Adopted
English Language Arts	2007
Mathematics	2009
Science	2005

SECTION C
(pp. 36–46)

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

SECTION D
(pp. 47–48)

WorkKeys skills appear here. Highlighting indicates that a statement reflects one or more statements in the Alabama Content Standards. Skills not highlighted are not addressed in the Alabama Content Standards.

A supplement that identifies the specific ACT College Readiness Standard(s) and WorkKeys Skill(s) corresponding to each Alabama Content Standard in a side-by-side format is available at **www.act.org/education/statematch**.

Executive Summary

We at ACT believe our programs offer many advantages to Alabama students and educators, and this report offers strong evidence for this belief. This alignment analysis clearly answers four 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)—and ACT's WorkKeys® assessments (Reading for Information, Applied Mathematics, and Locating Information) measure Alabama's Content Standards?

2. Can the results from ACT's testing programs be used to meet Alabama's NCLB requirement?

3. Why should Alabama choose EPAS?

4. Why choose to include WorkKeys assessments?

> **ACT'S TESTS MEASURE MOST ALABAMA CONTENT STANDARDS IN ENGLISH LANGUAGE ARTS, MATHEMATICS, AND SCIENCE.**

1. Match Results: Comparisons conducted by our content specialists show that ACT's English, Reading, Writing, Mathematics, and Science tests and WorkKeys Reading for Information and Applied Mathematics assessments measure most Alabama English Language Arts, Mathematics, and Science Content Standards. WorkKeys Locating Information assessment measures those skills contained in Alabama's Science Standards that are associated with a student's ability to interpret and analyze graphic material.

■ English Language Arts Grade 8: 3 out of 5 Strands
                      High School: 3 out of 5 Strands

   Many important Alabama English Language Arts Content Standards in Reading, Literature, and Research and Inquiry are covered by ACT's English, Reading, and Writing tests and WorkKeys Reading for Information (RI) assessment.

■ Mathematics Grade 8: 5 out of 5 Strands
                High School: 5 out of 5 Strands

   Almost all Alabama Mathematics Content Standards are covered by ACT's Mathematics tests and WorkKeys Applied Mathematics (AM) assessment.

■ Science: Process Standards: 11 out of 11
              Core Content Areas: 5 out of 5

   All Alabama Science Process and Content Standards are covered by ACT's EPAS Science tests and WorkKeys Locating Information (LI) assessment.

   (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 Alabama Science Content Standards.

ACT®

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 Alabama standards 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.) The same approach applies to match results for WorkKeys Locating Information test, which measures a student's ability to interpret and analyze graphic material and may present science content in the figures or tables used as the basis for assessing these skills.

Most exceptions to a match between ACT's tests and the Alabama Content 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 Alabama on developing any necessary augmentation.

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

3. Why implement EXPLORE, PLAN and the ACT? ACT's EPAS tests provide a longitudinal, systematic approach to educational and career planning, assessment, instructional support, and evaluation. The system focuses on the integrated, higher-order thinking skills students develop in grades K–12 that are important for success both during and after high school.

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

States and school districts choose the EPAS system because student motivation is high, and EPAS is the *only curriculum-based assessment system that measures student readiness along a continuum of empirically derived college readiness benchmarks*. ACT's College Readiness Standards are precise descriptors of the essential skills and knowledge that students need to become ready for college and career, beginning in grade 8 and continuing through grade 12. Various groups claim to describe what students truly need to know and be able to do for college and/or workplace readiness. Such groups typically ask individual

experts in education to gather and discuss what they feel is important for students to understand. Not surprisingly, the answers vary. In contrast, ACT defines college readiness through a unique and rigorous empirical process:

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

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

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

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

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

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

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

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

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

The ACT test assesses high school students' general educational development and provides unparalleled information about a student's readiness for entry-level college coursework and ability to make successful transitions to college and work after high school.

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

4. Why choose to include WorkKeys assessments? Students can use WorkKeys to help determine the skill levels and education required for various jobs. Educators can use WorkKeys to ensure that students enter the work world with the foundational skills needed in any field they choose.

Further, the WorkKeys scores offer a clear way for students to demonstrate their knowledge and skills to prospective employers. WorkKeys is at the center of the nationwide Career Readiness System that links qualified individuals with employers who recognize the value of skilled job applicants. ACT's National Career Readiness Certificate (NCRC) ensures that an individual has certain foundational skills that are important across a range of positions. The NCRC is a portable credential that employees can use anywhere in the nation. Individuals seeking employment gain a competitive edge with an NCRC because they are able to provide prospective employers with clear evidence that their knowledge and skills align with the requirements of the job they are applying for. The NCRC offers job seekers, employers, and educators an easily understood, conveniently attained, and universally valued credential.

Test takers are most commonly certified in the skills areas of Applied Mathematics, Locating Information, and Reading for Information. Higher scores qualify students for more jobs than do lower scores. New Jersey, Virginia, Louisiana, Kentucky, North Carolina, and New Mexico have already initiated certificate programs, and many other states are in the process of developing similar programs.

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

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

Table A-1. Number of Alabama English Language Arts Content Standards Measured by EXPLORE, PLAN, the ACT, and WorkKeys

Alabama Strands*	Number of Alabama Content Standards Measured by ACT's tests	Aspects of Alabama Content Standards that are Not Measured
Reading	Gr 8: 2 out of 4 Gr 9: 1 out of 3 Gr 10: 4 out of 4 Gr 11: 2 out of 3 Gr 12: 1 out of 2	Apply self-monitoring strategies Distinguish among the subcategories of poetry Compare the use of language and literary elements and devices in various selections, cultures, and genres
Literature	Gr 8: 1 out of 2 Gr 9: 1 out of 3 Gr 10: 0 out of 2 Gr 11: 0 out of 4 Gr 12: 0 out of 4	Explain distinguishing characteristics of odes, ballads, epic poetry, historical documents, essays, letters to the editor, and editorials Compare literary components of various pre-twentieth century American authors' styles Analyze British literature
Writing and Language	Gr 8: 2 out of 6 Gr 9: 4 out of 6 Gr 10: 5 out of 8 Gr 11: 4 out of 4 Gr 12: 3 out of 3	Compose a business letter Identify factors that influence the development of language Write in expository and narrative modes Justify a thesis statement with supporting details from American literature prior to the twentieth century
Research and Inquiry		
Oral and Visual Communication		
TOTALS **3 out of 5 Strands**	Gr 8: 5 out of 12 Gr 9: 6 out of 12 Gr 10: 9 out of 14 Gr 11: 6 out of 11 Gr 12: 4 out of 9	

*Refer to Alabama's English Language Arts Content Standards on pages 11–16

     = EPAS tests do not assess this material.

ACT

Table A-2. Number of Alabama Mathematics Content Standards Measured by EXPLORE, PLAN, the ACT, and WorkKeys

Alabama Strands*	Number of Alabama Content Standards Measured by ACT's tests			Aspects of Alabama Content Standards that are Not Measured
Number and Operations	Gr 8:	3 out of	3	Critique ancient numeration systems and applications
	Alg I:	1 out of	1	Analyze mathematical relationships in music
	Geom:	N/A out of	N/A	Explain the development and uses of sets of numbers
	Alg Con:	N/A out of	N/A	
	Alg II:	2 out of	2	
	Alg II + T:	2 out of	2	
	Discrete:	4 out of	4	
	Math Inv:	1 out of	4	
	Precalc:	2 out of	3	
	Prob/stat:	N/A out of	N/A	
Algebra	Gr 8:	3 out of	3	Analyze determinants and inverses of 2 × 2, 3 × 3, and larger matrices
	Alg I:	8 out of	8	Identify beginnings of algebraic symbolism and structure through the works of European mathematicians
	Geom:	1 out of	1	Justify the historical significance of the development of multiple perspectives in mathematics
	Alg Con:	7 out of	7	Compare effects of parameter changes on graphs of transcendental functions
	Alg II:	8 out of	8	Utilize parametric equations by graphing and by converting to rectangular form
	Alg II + T:	10 out of	10	
	Discrete:	4 out of	5	
	Math Inv:	0 out of	3	
	Precalc:	9 out of	11	
	Prob/stat:	1 out of	1	
Geometry	Gr 8:	2 out of	2	Analyze works of visual art and architecture for mathematical relationships
	Alg I:	1 out of	1	Determine the mathematical impact of the ancient Greeks
	Geom:	14 out of	14	
	Alg Con:	2 out of	2	
	Alg II:	1 out of	1	
	Alg II + T:	3 out of	3	
	Discrete:	2 out of	2	
	Math Inv:	1 out of	3	
	Precalc:	1 out of	1	
	Prob/stat:	N/A out of	N/A	
Measurement	Gr 8:	4 out of	4	Describe the development of mathematical tools and their applications
	Alg I:	1 out of	1	
	Geom:	2 out of	2	
	Alg Con:	2 out of	2	
	Alg II:	N/A out of	N/A	
	Alg II + T:	N/A out of	N/A	
	Discrete:	N/A out of	N/A	
	Math Inv:	0 out of	1	
	Precalc:	N/A out of	N/A	
	Prob/stat:	N/A out of	N/A	

ACT

Table A-2. Number of Alabama Mathematics Content Standards Measured by EXPLORE, PLAN, the ACT, and WorkKeys		
Alabama Strands*	**Number of Alabama Content Standards Measured by ACT's tests**	**Aspects of Alabama Content Standards that are Not Measured**
Data Analysis and Probability	Gr 8: 2 out of 2 Alg I: 4 out of 4 Geom: 1 out of 1 Alg Con: 1 out of 1 Alg II: 3 out of 3 Alg II + T: 3 out of 3 Discrete: 2 out of 2 Math Inv: 0 out of 1 Precalc: 1 out of 1 Prob/stat: 5 out of 10	Summarize the history of probability Determine the probability of an event using a frequency distribution curve Determine the validity of a hypothesis for a study involving one or two populations Describe methods of data collection Develop a method of solution for an application-based problem Apply the binomial probability distribution for discrete random variables
TOTALS 5 out of 5 Strands	Gr 8: 12 out of 12 Alg I: 15 out of 15 Geom: 18 out of 18 Alg Con: 12 out of 12 Alg II: 14 out of 14 Alg II + T: 18 out of 18 Discrete: 12 out of 13 Math Inv: 2 out of 12 Precalc: 13 out of 16 Prob/stat: 6 out of 10	

*Refer to Alabama's Mathematics Content Standards on pages 17–28

Table A-3. Number of Alabama Science Content Standards Measured by EXPLORE, PLAN, the ACT, and WorkKeys		
Alabama Core Content Areas*	**Number of Alabama Content Standards Measured by ACT's tests**	**Aspects of Alabama Content Standards that are Not Measured**
Grade 8 Physical Science	(11) out of (11)	
Physical Science Core	(12) out of (12)	
Biology Core	(15) out of (15)	
Chemistry Core	(9) out of (9)	
Physics Core	(9) out of (9)	
TOTALS **5 out of 5 Core Content Areas**	(56) out of (56)	
Scientific Process and Application Skills	11 out of 11	
TOTALS	11 out of 11	

*Refer to Alabama's Science Content Standards on pages 29–35

ACT

English Language Arts

ALABAMA Grade 8 English Language Arts
Content Standards

Reading

1. Apply strategies, including making inferences to determine theme, confirming or refuting predictions, and using specific context clues, to comprehend eighth-grade recreational reading materials.

   • Applying self-monitoring strategies for text understanding

   • Distinguishing fact from fiction to enhance understanding

   • Determining sequence in recreational reading materials

2. Evaluate the impact of setting, mood, and characterization on theme in specific literary selections.

   • Identifying components of plot

3. Distinguish among the subcategories of poetry, such as ballads, lyric poems, epics, haiku, and limericks, based on their characteristics.

   • Identifying rhythm and rhyme scheme

4. Apply strategies appropriate to type of reading material, including making inferences to determine bias or theme and using specific context clues, to comprehend eighth-grade informational and functional reading materials.

   • Applying self-monitoring strategies for text understanding

   • Comparing predicted with actual content in informational and functional reading materials

   • Distinguishing fact from opinion in informational reading materials

   • Confirming author's credentials

   • Determining sequence of steps, events, or information

Literature

5. Explain distinguishing characteristics of odes, ballads, epic poetry, historical documents, essays, letters to the editor, and editorials.

6. Analyze works of literature for character motivation, mood, tone, theme, similarities across texts, and literary devices.

Writing and Language

7. Compose a business letter, including heading, inside address, salutation, body, closing, and signature.

8. Write in narrative, expository, and persuasive modes with attention to descriptive elements.

9. Apply mechanics in writing, including using quotation marks, underlining, and italics to punctuate titles and using semicolons, conjunctive adverbs, and commas to join two independent clauses or to correct run-on sentences.

   • Demonstrating correct sentence structure by avoiding comma splices in writing

   • Using commas to set off nonessential clauses and appositives in writing

10. Use prepositional phrases and compound, complex, and compound-complex sentences to vary sentence structure.

    • Using gerunds, infinitives, and participles in writing

    • Recognizing active and passive voice in writing

    • Applying subject-verb agreement rules with collective nouns, nouns compound in form but singular in meaning, compound subjects joined by correlative and coordinating conjunctions, and subjects plural in form but singular in meaning

11. Write sentence patterns common to English construction.

12. Identify the correct use of degrees of comparison, adjectives and adverb forms, and subject-verb agreement with collective nouns when verb forms depend on the rest of the sentence and with compound subjects, including those joined by *or* with the second element as singular or plural.

    • Recognizing parallelism in phrases and clauses

Research and Inquiry

13. Combine all aspects of the research process to compose a report.

    • Taking notes to gather and summarize information

    • Using paraphrasing and documentation of sources to avoid plagiarism

Oral and Visual Communication

14. Identify characteristics of spoken formal and informal language.

ALABAMA Grade 9 English Language Arts
Content Standards

Reading

1. Identify genre, tone, and plot in short stories, drama, and poetry and identify organizational structure in essays and other nonfiction text to comprehend ninth-grade recreational reading materials.

   • Reading predominantly world literature

2. Compare the use of language and literary elements and devices, including rhythm, rhyme scheme, tone, and plot, in various selections, cultures, and genres.

   • Interpreting symbolism and other figurative language

   • Recognizing foreshadowing to anticipate events

   • Making inferences about characters and their motives

   • Determining effectiveness of diction

   • Recognizing use of analogy

3. Read with comprehension a variety of ninth-grade informational and functional reading materials, including recognizing tone and propaganda.

   • Organizing steps of a process and other sequences

   • Identifying organizational structure

   • Recognizing fallacies in logic

   • Following complex written directions

Literature

4. Identify literary components that contribute to authors' styles.

5. Identify persuasive strategies, including propaganda, in world literature selections.

6. Determine word meaning in world literature selections using word analysis and context clues.

   • Identifying the etymology of words

Writing and Language

7. Write in narrative, expository, and persuasive modes using figurative language and imagery, including simile and metaphor, when effective and appropriate.

   • Using an abbreviated writing process to write an essay in timed and untimed situations

   • Using verbals to increase sentence complexity

   • Using a variety of patterns to organize information in multi-paragraph writings

   • Developing an effective voice suitable for audience and purpose

   • Using a variety of sentence patterns

   • Using active and passive voice when appropriate

8. Critique paragraphs for logical progression of sentences.

9. Identify factors that influence the development of language.

10. Determine correct use of commas with appositives and direct quotations, colons to introduce lists, semicolons with a series of elements separated by commas, and punctuation for a divided quotation.

11. Identify correct use of parallel words; incorrect verb tense shifts within sentences; correct number and tense in verb forms, including regular and irregular verbs; and correct forms of compound nouns, including singular, plural, and possessive forms.

    • Identifying correct parallelism in phrases and clauses

    • Identifying incorrect verb tense shifts within paragraphs

    • Recognizing subject-verb agreement with indefinite pronouns

    • Using parallel structure with verbals

12. Apply the correct use of subject-verb agreement with collective nouns when verb forms depend on the rest of the sentence; with compound subjects, including those joined by *or* with the second element as singular or plural; and with the subjunctive mood.

Research and Inquiry

13. Demonstrate paraphrasing, quoting, and summarizing of primary and secondary sources and various methods of note taking.

14. Use the research process to locate, select, retrieve, evaluate, and organize information to support a thesis on a nonliterary topic.

    • Following a style format to standardize the presentation of information

    • Managing information by using available technology

    • Using paraphrasing and documentation of sources to avoid plagiarism

Oral and Visual Communication

15. Identify persuasive strategies in oral and visual presentations.

    • Identifying types of propaganda

16. Evaluate a speech for use of presentation skills, including use of visual aids.

    • Applying oral presentation skills in formal and informal situations

17. Use supporting details to present a position and to respond to an argument.

= Measured by EXPLORE English and/or Reading tests

ALABAMA Grade 10 English Language Arts
Content Standards

Reading

1. Apply both literal and inferential comprehension strategies, including drawing conclusions and making inferences about characters, motives, intentions, and attitudes in short stories, drama, poetry, novels, and essays and other nonfiction texts.
    - Identifying major historical developments in language and literature in America from the beginnings to 1900
    - Using context clues to determine meaning
    - Identifying sequences to enhance understanding
    - Summarizing passages to share main ideas or events
    - Drawing other kinds of conclusions from recreational reading texts

2. Identify and interpret literary elements and devices, including analogy, personification, and implied purpose.
    - Identifying and interpreting figurative language and imagery, including symbolism and metaphors
    - Interpreting tone from author's word choice

3. Read with literal and inferential comprehension a variety of informational and functional reading materials, including making inferences about effects when passage provides cause; inferring cause when passage provides effect; making inferences, decisions, and predictions from tables, charts, and other text features; and identifying the outcome or product of a set of directions.
    - Following complex or embedded directions
    - Distinguishing author's opinion from factual statements
    - Determining main idea and supporting details in informational and functional reading materials
    - Summarizing passages of informational and functional reading materials
    - Determining sequence of events

4. Recognize fallacious or illogical thought in essays, editorials, and other informational texts.
    - Evaluating strength of argument in informational texts
    - Recognizing propaganda in informational texts

Literature

5. Compare literary components of various pre-twentieth century American authors' styles.
    - Identifying examples of differences in language usage among several authors

6. Determine word meaning in pre-twentieth century American literature using word structure and context clues.

Writing and Language

7. Write in persuasive, expository, and narrative modes using an abbreviated writing process in timed and untimed situations.
    - Critiquing content, literary elements, and word choice, including addressing clear, precise, and vivid language
    - Using a variety of sentence patterns
    - Evaluating opinions, including personal opinions, for supporting details and bias
    - Using active and passive voice when appropriate

8. Write in a variety of genres for various audiences and occasions, both formal and informal, using an attention-getting opening and an effective conclusion.
    - Developing an effective voice suitable for audience and purpose

9. Apply principles of Standard English by adjusting vocabulary and style for the occasion.

10. Justify a thesis statement with supporting details from American literature prior to the twentieth century.

11. Demonstrate correct use of commas with parenthetical expressions and after introductory adverbial clauses and correct use of semicolons before conjunctive adverbs and in compound sentences with no conjunction.

12. Demonstrate correct use of singular and plural collective nouns and words with alternate accepted forms; pronoun-antecedent agreement in number and gender; and nominative, objective, and possessive pronoun cases.

13. Apply the correct use of subject-verb agreement with singular and plural subjects, including subjects compound in form and singular in meaning and subjects plural in form and singular in meaning; intervening prepositional and appositive phrases; and correlative conjunctions.

14. Edit for incorrect shifts in verb tense in paragraphs, use of verbals, use of dangling participles and misplaced modifiers, and parallelism in phrases.

Research and Inquiry

15. Use the research process to document and organize information to support a thesis on a literary or nonliterary topic.
    - Managing information by locating, selecting, retrieving, and evaluating primary and secondary sources while using available technology responsibly
    - Differentiating among plagiarized, paraphrased, and appropriately cited selections

16. Explain the purpose and benefits of using predicting, summarizing, underlining, outlining, note taking, and reviewing as part of personal study skills.

- Explaining when skimming and scanning are appropriate in studying materials

Oral and Visual Communication

17. Critique oral and visual presentations for fallacies in logic

ALABAMA Grade 11 English Language Arts
Content Standards

Reading

1. Analyze authors' use of literary elements, including characterization, theme, tone, setting, mood, plot, and literary point of view, in American short stories, drama, poetry, or essays and other nonfiction literature, predominantly from 1900 to the present.

    -   Identifying major historical developments of language and literature in America from 1900 to the present

    -   Evaluating author technique

2. Analyze use of figurative language and literary devices, including hyperbole, simile, metaphor, personification, and other imagery, to enhance specific literary passages.

    -   Explaining use of allusions

    -   Analyzing use of analogies for meaning

    -   Interpreting irony

    -   Analyzing poetry for rhythm and rhyme schemes

3. Read with comprehension a variety of informational and functional reading materials, including recognizing organizational patterns, evaluating strengths and weaknesses of argument, and identifying directions implied or embedded in a passage.

    -   Recognizing fallacies in logic

    -   Drawing conclusions to determine author intent

    -   Applying advanced knowledge of context clues and structural analysis to determine word meaning

    -   Evaluating quality of writing

Literature

4. Analyze twentieth and twenty-first century American literary selections for plot structure, cultural significance, and use of propaganda.

5. Evaluate twentieth and twenty-first century American authors' use of language, including length and complexity of sentences, diction, and Standard English versus dialect.

6. Determine word meaning in twentieth and twenty-first century American literature using word structure and context clues.

7. Compare writing styles of two or more American authors or public figures.

Writing and Language

8. Write the text for an oral presentation with attention to word choice, organizational patterns, transitional devices, and tone.

    -   Using a variety of sentence patterns

    -   Developing an effective voice suitable for audience and purpose

9. Analyze writing for parallelism in literary selections and student writing.

10. Edit writings, including student papers, for correct parallel form in clauses in a series and with correlative conjunctions and for correct use of subject-verb agreement with subjects with intervening phrases, collective nouns as subjects, indefinite pronouns as subjects when the verb form depends on the rest of the sentence, and subjects in sentences with correlative conjunctions or in inverted order.

    -   Editing writings for mechanics, usage, grammar, and style

    -   Demonstrating appropriate use of ellipses, parentheses, hyphens and suspended hyphens, hyphenation of number-and-noun modifiers, slashes, and use of commas with subordinate clauses and nominative absolutes

11. Differentiate between the use of active and passive voice.

Research and Inquiry

12. Use the research process to manage, document, organize, and present information to support a thesis on a literary topic.

    -   Using paraphrasing and documentation of sources to avoid plagiarism

Oral and Visual Communication

13. Compare the use of oral presentation skills of self and others.

14. Identify propaganda in nonprint media.

= Measured by ACT English, Reading, and/or Writing tests and/or WorkKeys RI

ALABAMA Grade 12 English Language Arts
Content Standards

Reading

1. Compare organizational structure, figurative language, and literary devices, including use of paradox, among predominantly British short stories, drama, poetry, essays, and other nonfiction literature.

   • Explaining use of allusions

   • Interpreting irony

   • Analyzing poetry for rhyme schemes

   • Identifying use of parody

   • Analyzing major historical developments in language and literature in the British Isles

2. Read with comprehension a variety of informational and functional reading materials, including comparing bias and persuasive techniques in passages.

   • Recognizing faulty logic or organization

   • Analyzing charts and tables for conclusions

Literature

3. Analyze British literature for style, audience appeal, cultural significance, and plot structure.

   • Distinguishing between parallel and circular plots

4. Identify literary elements in British literary selections from various genres.

5. Determine word meaning in British literature using word structure and context clues.

6. Compare writing styles of two or more British authors.

Writing and Language

7. Write for a variety of purposes, including critical essays on literary topics, college application essays, résumé cover letters, and résumés.

   • Editing drafts for appropriate style

   • Developing an effective voice suitable for audience and purpose

8. Demonstrate appropriate use of ellipses, parentheses, hyphens and suspended hyphens, hyphenation of number-and-noun modifiers, slashes, and use of commas with subordinate clauses and nominative absolutes.

9. Revise drafts to increase sentence complexity.

Research and Inquiry

10. Use the research process to manage, document, organize, and present information to support a thesis on a teacher-approved topic of student interest.

    • Editing drafts to avoid plagiarism

Oral and Visual Communication

11. Critique visual communication for effectiveness.

    • Using available technology for various communication purposes, including multimedia presentations

12. Evaluate oral presentation skills of self and others for effectiveness.

13. Analyze nonprint media for use of propaganda.

Mathematics
ALABAMA Pre-Algebra (Grade 8)
Content Standards

Number and Operations

1. Use various strategies and operations to solve problems involving real numbers.

   - Applying GCF, LCM, and prime and composite numbers, including justification for the reasonableness of results, when working with rational numbers
   - Using vocabulary associated with sets, including union, subsets, empty sets, and intersection
   - Utilizing alternative representations to solve problems involving rational numbers
   - Applying proportional reasoning to application-based situations

2. Apply one or more of the laws of exponents to simplify expressions containing natural number exponents.

   - Writing numbers using scientific notation

3. Use order of operations to evaluate and simplify algebraic expressions.

   - Applying the substitution principle to evaluate algebraic expressions

Algebra

4. Graph linear relations by plotting points or by using the slope and *y*-intercept.

   - Determining slopes and *y*-intercepts of lines
   - Calculating the slope of a linear relation given as a table or graph
   - Graphing linear relations by plotting *x*- and *y*-intercepts

5. Solve problems involving linear functions.

   - Classifying variables in a function as independent or dependent
   - Classifying relations as linear or nonlinear by examining tables, graphs, or simple equations
   - Determining if a relation is a function from information in tables, sets of ordered pairs, equations, graphs, or mappings

6. Solve multistep linear equations, including equations requiring the use of the distributive property.

Geometry

7. Solve problems using the Pythagorean Theorem.

   - Verifying the Pythagorean Theorem
   - Applying the Pythagorean Theorem to determine if a triangle is a right triangle
   - Applying the Pythagorean Theorem to solve multistep application-based problems

   - Applying the Triangle Inequality Theorem
   - Calculating distances on the coordinate plane using the Pythagorean Theorem

8. Compare quadrilaterals, triangles, and solids using their properties and characteristics.

   - Formulating mathematical arguments about the relationships among types of quadrilaterals and triangles
   - Identifying angle bisectors, perpendicular bisectors, congruent angles, and congruent shapes
   - Constructing congruent and similar polygons, congruent angles, congruent segments, and parallel and perpendicular lines

Measurement

9. Determine measures of special angle pairs, including adjacent, vertical, supplementary, complementary angles, and angles formed by parallel lines cut by a transversal.

10. Determine the perimeter and area of regular and irregular plane shapes.

11. Determine surface area and volume of rectangular prisms, cylinders, and pyramids.

    - Determining surface area and volume of solid figures, including cones and spheres
    - Estimating surface area and volume of solid figures, including cones and spheres
    - Determining appropriate units of measure to describe surface area and volume
    - Developing formulas for determining surface area and volume of rectangular prisms, cylinders, and pyramids

12. Determine lengths of missing sides and measures of angles in similar and congruent shapes.

    - Applying proportional reasoning to identify similar and congruent shapes
    - Using dilations on the coordinate plane to determine measures of similar shapes
    - Determining ratios of perimeters and areas of similar triangles, trapezoids, and parallelograms

Data Analysis and Probability

13. Use given and collected data from samples or populations to construct graphs and interpret data.

    - Estimating a line of best fit from a scatterplot to make predictions
    - Determining the measure of central tendency that is the most appropriate for a given situation

14. Determine the theoretical probability of an event.
   - Calculating the probability of complementary events and mutually exclusive events
   - Determining the probability of two independent events or two dependent events
   - Determining the probability of an event through simulation

Number and Operations

1. Simplify numerical expressions, including those involving square roots, radical form, and decimal approximations using properties of real numbers and order of operations.

   • Applying laws of exponents to simplify expressions, including those containing zero and negative integral exponents

Algebra

2. Analyze linear functions from their equations for their characteristics, including slopes and intercepts.

   • Determining the slope of a line from its equation or by applying the slope formula

   • Determining equations of linear functions given two points, a point and the slope, tables of values, graphs, or ordered pairs

   • Graphing two-variable linear equations and inequalities on the Cartesian plane

3. Determine properties of a relation, including domain, range, and whether it is a function, when given graphs, tables of values, mappings, or sets of ordered pairs.

   • Finding the range of a function when given its domain

4. Construct graphs of common relations, including x = constant, y = constant, $y = x$, $y = \sqrt{x}$, $y = x^2$, and $y = |x|$.

   • Identifying applications modeled by common relations, including x = constant, y = constant, $y = x$, $y = \sqrt{x}$, $y = x^2$, and $y = |x|$

5. Perform operations of addition, subtraction, and multiplication on polynomial expressions.

   • Dividing a polynomial by a monomial

   • Evaluating polynomial functions

6. Use GCF, difference of squares, perfect square trinomials, and grouping to factor binomials, trinomials, and other polynomials.

7. Solve multistep equations and inequalities, including linear, radical, absolute value, and literal equations.

   • Writing the solution of an equation or inequality in set notation

   • Formulating the design of application-based problems by developing and solving equations and inequalities, including those involving direct and inverse variation, distance, uniform motion, and mixture

8. Solve systems of linear equations and inequalities in two variables graphically and algebraically.

   • Designing models of application-based problems by developing and solving systems of linear equations and inequalities

9. Solve quadratic equations using the zero product property.

   • Determining approximate solutions of quadratic equations graphically and numerically

   • Solving quadratic equations using the quadratic formula and completing the square

Geometry

10. Calculate length, midpoint, and slope of a line segment when given coordinates of its endpoints on the Cartesian plane.

    • Deriving distance, midpoint, and slope formulas for line segments

    • Utilizing the Pythagorean Theorem to solve application-based problems

Measurement

11. Solve problems algebraically involving area and perimeter of a polygon, area and circumference of a circle, and volume and surface area of right circular cylinders or right rectangular prisms.

    • Applying area and volume formulas to solve application-based problems

Data Analysis and Probability

12. Compare various methods of data reporting, including scatterplots, stem-and-leaf plots, histograms, box-and-whisker plots, and line graphs, to make inferences or predictions.

    • Determining effects of linear transformations of data

    • Determining effects of outliers

    • Critiquing the design of a survey

13. Identify characteristics of a data set, including numerical or categorical and univariate or bivariate.

14. Use a scatterplot and its line of best fit or a specific line graph to determine the correlation existing between two sets of data, including positive, negative, or no correlation.

15. Calculate probabilities given data in lists or graphs.

    • Comparing theoretical and experimental probabilities for data in lists or graphs

= Measured by EXPLORE and/or PLAN Mathematics tests

Number and Operations

[No standards in this strand for this course]

Algebra

1. Determine the equation of a line given two points, a point and a slope, a table of values, a graph, ordered pairs, or the equation of a line parallel or perpendicular to another line through a given point.

Geometry

2. Prove theorems related to pairs of angles, including vertical, adjacent, complementary, and supplementary, as well as those formed by parallel lines cut by a transversal and perpendicular lines.

3. Justify relationships among different classes of polygons by using their properties.

4. Apply proportional reasoning to determine missing lengths of sides, measures of angles, and ratios of perimeters and areas of similar polygons.

5. Determine the measure of interior and exterior angles associated with polygons.
   - Verifying formulas for measures of interior and exterior angles of polygons inductively and deductively

6. Solve problems, including application-based problems, using properties and theorems related to circles, quadrilaterals, and other geometric shapes.
   - Determining the center and radius of a circle given its equation
   - Determining the equation of a circle given its center and radius

7. Apply the Pythagorean Theorem and its converse to solve application problems, including expressing answers in simplified radical form or as decimal approximations and using Pythagorean triples where applicable.
   - Proving the Pythagorean Theorem

8. Apply properties of special right triangles, including 30-60-90 and 45-45-90 triangles, to find missing side lengths.

9. Determine relationships between two triangles, including proving congruence or similarity of the triangles from given information, using the relationships to solve problems and to establish other relationships.
   - Calculating the geometric mean to find missing lengths in right triangles

10. Use inductive reasoning to make conjectures and deductive reasoning to justify conclusions.
    - Recognizing limitations of a conclusion through inductive reasoning
    - Using deductive reasoning to prove theorems
    - Using proof by negation to prove theorems
    - Writing conditional statements of a given conjecture

11. Solve for missing measures of sides and angles in right triangles by applying the right triangle ratios of sine, cosine, and tangent.

12. Determine areas and perimeters of regular polygons, including inscribed or circumscribed polygons, given the coordinates of vertices or other characteristics.

13. Apply distance, midpoint, and slope formulas to solve problems and to confirm properties of polygons.

14. Identify coordinates of vertices of the image of a given polygon that is translated, rotated, reflected, or dilated.

15. Classify polyhedra according to properties, including the number of faces.
    - Identifying Euclidean solids

Measurement

16. Calculate measures of arcs and sectors of a circle from given information.

17. Calculate surface areas and volumes of solid figures, including spheres, cones, and pyramids.
    - Deriving formulas for surface area and volume of spheres, cones, and pyramids
    - Calculating specific missing dimensions of solid figures from surface area or volume
    - Determining the relationship between surface areas of similar figures and volumes of similar figures

Data Analysis and Probability

18. Calculate probabilities arising in geometric contexts.

ALABAMA Algebraic Connections
Content Standards

Number and Operations

[No standards in this strand for this course]

Algebra

1. Create algebraic models for application-based problems by developing and solving equations and inequalities, including those involving direct, inverse, and joint variation.

2. Solve application-based problems by developing and solving systems of linear equations and inequalities.

3. Use formulas or equations of functions to calculate outcomes of exponential growth or decay.

4. Determine maximum and minimum values of a function using linear programming procedures.

5. Determine approximate rates of change of nonlinear relationships from graphical and numerical data.

   • Creating graphical representations from tables, equations, or classroom-generated data to model consumer costs and to predict future outcomes

6. Use the extreme value of a given quadratic function to solve applied problems.

7. Use analytical, numerical, and graphical methods to make financial and economic decisions, including those involving banking and investments, insurance, personal budgets, credit purchases, recreation, and deceptive and fraudulent pricing and advertising.

   • Creating, manually or with technological tools, graphs and tables related to personal finance and economics

Geometry

8. Determine missing information in an application-based situation using properties of right triangles, including trigonometric ratios and the Pythagorean Theorem.

9. Analyze aesthetics of physical models for line symmetry, rotational symmetry, or the golden ratio.

Measurement

10. Critique measurements in terms of precision, accuracy, and approximate error.

11. Use ratios of perimeters, areas, and volumes of similar figures to solve applied problems.

Data Analysis and Probability

12. Create a model of a set of data by estimating the equation of a curve of best fit from tables of values or scatterplots.

   • Predicting probabilities given a frequency distribution

Number and Operations

1. Determine relationships among subsets of complex numbers.

2. Use order of operations, conjugates, and absolute value to simplify expressions involving complex numbers.

Algebra

3. Determine effects of shifts, reflections, and dilations on families of functions, including $y = \dfrac{k}{x}$ (inverse variation), $y = kx$ (direct variation/linear), $y = x^2$ (quadratic), $y = a^2$ (exponential), and $y = \log_a x$ (logarithmic).

   - Identifying the domain and range of a relation given its graph, a table of values, or its equation, including those with restricted domains

   - Identifying application-based situations corresponding to families of functions

4. Determine the nature of solutions of a quadratic equation.

5. Determine approximate real zeros of functions graphically and numerically and exact real zeros of polynomial functions by completing the square and applying the zero product property and the quadratic formula.

   - Deriving the quadratic formula

6. Identify characteristics, including maximum and minimum values, of quadratic functions from their roots, graphs, or equations.

   - Determining a quadratic equation when given its graph or roots

   - Constructing the graph of a function when given its equation

   - Using the maximum or minimum value of a quadratic function to solve application-based problems

7. Perform operations, including addition, subtraction, multiplication, division, and composition of functions, with polynomial and rational expressions containing variables.

   - Determining the inverse of a function or a relation

   - Evaluating rational functions

8. Apply laws of exponents to simplify expressions, including those containing zero and negative integral exponents.

   - Applying laws of logarithms to simplify expressions and solve equations

9. Solve equations, inequalities, and applied problems involving rational and irrational exponents, absolute values, radicals, and quadratics over complex numbers, as well as exponential and logarithmic functions with the solution represented as a graph on a number line, set notation, and interval notation.

10. Solve systems of linear equations or inequalities in two and three variables using algebraic techniques, including those involving matrices.

    - Calculating the determinant of a 2×2 and 3×3 matrix

    - Solving two- and three-variable word problems involving application-based situations

Geometry

11. Solve coordinate geometry problems using algebraic techniques.

Measurement

[No standards in this strand for this course]

Data Analysis and Probability

12. Use multiple representations, including graphical, numerical, analytical, and verbal, to compare characteristics of data gathered from two populations.

    - Identifying characteristics of the design of an experimental study

    - Describing effects of an experimental study design on its outcome

    - Predicting population characteristics using sample statistics

    - Identifying characteristics, including the mean and standard deviation, of a normal distribution

13. Analyze data to determine if a linear or quadratic relationship exists.

    - Determining an equation of linear regression from a set of data to predict outcomes

14. Calculate probabilities of events using permutations, combinations, the laws of probability, and the binomial theorem.

    - Calculating conditional probability

Number and Operations

1. Determine relationships among subsets of complex numbers.

2. Use order of operations, conjugates, and absolute value to simplify expressions involving complex numbers.

Algebra

3. Determine effects of shifts, reflections, and dilations on families of functions, including $y = \dfrac{k}{x}$ (inverse variation), $y = kx$ (direct variation/linear), $y = x^2$ (quadratic), $y = a^2$ (exponential), and $y = \log_a x$ (logarithmic).
   - Identifying the domain and range of a relation given its graph, a table of values, or its equation, including those with restricted domains
   - Identifying application-based situations corresponding to families of functions

4. Determine the nature of solutions of a quadratic equation.

5. Determine approximate real zeros of functions graphically and numerically and exact real zeros of polynomial functions by completing the square and applying the zero product property and the quadratic formula.
   - Deriving the quadratic formula

6. Identify characteristics, including maximum and minimum values, of quadratic functions from their roots, graphs, or equations.
   - Determining a quadratic equation when given its graph or roots
   - Constructing the graph of a function when given its equation
   - Using the maximum or minimum value of a quadratic function to solve application-based problems

7. Perform operations, including addition, subtraction, multiplication, division, and composition of functions, with polynomial and rational expressions containing variables.
   - Determining the inverse of a function or a relation
   - Evaluating rational functions

8. Apply laws of exponents to simplify expressions, including those containing zero and negative integral exponents.
   - Applying laws of logarithms to simplify expressions and solve equations

9. Solve equations, inequalities, and applied problems involving rational and irrational exponents, absolute values, radicals, and quadratics over complex numbers, as well as simple trigonometric, exponential, and logarithmic functions with the solution represented as a graph on a number line, set notation, and interval notation.

10. Solve systems of linear equations or inequalities in two and three variables using algebraic techniques, including those involving matrices.
    - Calculating the determinant of a 2×2 and 3×3 matrix
    - Solving two- and three-variable word problems involving application-based situations

11. Determine specific unit circle coordinates associated with special angles.
    - Converting angle measures from degrees to radians and from radians to degrees
    - Graphing angles in standard position
    - Determining the value of the six trigonometric functions for special angles

12. Graph trigonometric functions of the form $y = a\sin(bx)$, $y = a\cos(bx)$, $y = a\tan(bx)$, $y = a\sec(bx)$, $y = a\csc(bx)$, and $y = a\cot(bx)$.
    - Determining period and amplitude of sine, cosine, and tangent functions from graphs or basic equations
    - Graphing angles in standard position

Geometry

13. Solve coordinate geometry problems using algebraic techniques.

14. Define the six trigonometric functions using ratios of the sides of a right triangle, coordinates on the unit circle, and the reciprocal of other functions.
    - Applying the law of sines and the law of cosines to determine missing measures of triangles

15. Verify simple trigonometric identities using Pythagorean and reciprocal identities.

Measurement

[No standards in this strand for this course]

Data Analysis and Probability

16. Use multiple representations, including graphical, numerical, analytical, and verbal, to compare characteristics of data gathered from two populations.
    - Identifying characteristics of the design of an experimental study
    - Describing effects of an experimental study design on its outcome
    - Predicting population characteristics using sample statistics
    - Identifying characteristics, including the mean and standard deviation, of a normal distribution

17. Analyze data to determine if a linear, quadratic, or exponential relationship exists.
    - Determining an equation of linear regression from a set of data to predict outcomes

18. ==Calculate probabilities of events using permutations, combinations, the laws of probability, and the binomial theorem.==

- ==Calculating conditional probability==

ALABAMA Discrete Mathematics
Content Standards

Number and Operations

1. Analyze topics from elementary number theory, including perfect numbers and prime numbers, to determine properties of integers.

2. Determine characteristics of sequences, including the Fibonacci sequence, the triangular numbers, and pentagonal numbers.

3. Use the recursive process and difference equations to create fractals, population growth models, sequences, series, and compound interest models.

4. Convert between base ten and other bases.

Algebra

5. Determine results of operations upon 3 × 3 and larger matrices, including matrix addition and multiplication of a matrix by a matrix, vector, or scalar.

6. Analyze determinants and inverses of 2 × 2, 3 × 3, and larger matrices to determine the nature of the solution set of the corresponding system of equations, including solving systems of equations in three variables by echelon row reduction and matrix inverse.

7. Solve problems through investigation and application of existence and nonexistence of Euler paths, Euler circuits, Hamilton paths, and Hamilton circuits.

   • Developing optimal solutions of application-based problems using existing and student-created algorithms

8. Apply algorithms, including Kruskal's and Prim's, relating to minimum weight spanning trees, networks, flows, and Steiner trees.

   • Using shortest path techniques to find optimal shipping routes

9. Determine a minimum project time using algorithms to schedule tasks in order, including critical path analysis, the list-processing algorithm, and student-created algorithms.

Geometry

10. Use vertex-coloring techniques and matching techniques to solve application-based problems.

11. Solve application-based logic problems using Venn diagrams, truth tables, and matrices.

Measurement

[No standards in this strand for this course]

Data Analysis and Probability

12. Use combinatorial reasoning and counting techniques to solve application-based problems.

13. Analyze election data to compare election methods and voting apportionment, including determining strength within specific groups.

= Measured by PLAN and/or ACT Mathematics tests and/or WorkKeys AM

Number and Operations

1. Critique ancient numeration systems and applications, including astronomy and the development and use of money and calendars.

   • Determining relationships among mathematical achievements of ancient peoples, including the Sumerians, Babylonians, Egyptians, Mesopotamians, Chinese, Aztecs, and Incas

   • Explaining origins of the Hindu-Arabic numeration system

2. Analyze mathematical relationships in music to interpret frequencies of musical notes and to compare mathematical structures of various musical instruments.

   • Determining lengths of strings necessary to produce harmonic tones as in Pythagorean tuning

3. Use special numbers, including e, i, π and the golden ratio, to solve application-based problems.

   • Identifying transcendental numbers

4. Explain the development and uses of sets of numbers, including complex, real, rational, irrational, integer, whole, and natural numbers.

   • Analyzing contributions to the number system by well-known mathematicians, including Archimedes, John Napier, René Descartes, Sir Isaac Newton, Johann Carl Friedrich Gauss, and Julius Wilhelm Richard Dedekind

Algebra

5. Identify beginnings of algebraic symbolism and structure through the works of European mathematicians.

   • Creating a Fibonacci sequence when given two initial integers

   • Investigating Tartaglia's formula for solving cubic equations

6. Explain the development and applications of logarithms, including contributions of John Napier, Henry Briggs, and the Bernoulli family.

7. Justify the historical significance of the development of multiple perspectives in mathematics.

   • Summarizing the significance of René Descartes' Cartesian coordinate system

   • Interpreting the foundation of analytic geometry with regard to geometric curves and algebraic relationships

Geometry

8. Solve problems from non-Euclidean geometry, including graph theory, networks, topology, and fractals.

9. Analyze works of visual art and architecture for mathematical relationships.

   • Summarizing the historical development of perspective in art and architecture

10. Determine the mathematical impact of the ancient Greeks, including Archimedes, Eratosthenes, Euclid, Hypatia, Pythagoras, and the Pythagorean Society.

    • Constructing multiple proofs of the Pythagorean Theorem

    • Solving problems involving figurate numbers, including triangular and pentagonal numbers

Measurement

11. Describe the development of mathematical tools and their applications.

Data Analysis and Probability

12. Summarize the history of probability, including the works of Blaise Pascal; Pierre de Fermat; Abraham de Moivre; and Pierre-Simon, marquis de Laplace.

Number and Operations

1. Perform vector operations of addition, scalar multiplication, and absolute value.
   - Determining coincidence, parallelism, collinearity, or perpendicularity of vectors
   - Using vectors to model application-based and mathematical situations

2. Define e using the limit forms of $\sum\limits_{n=0}^{\infty} \frac{1}{n!}$, $\lim\limits_{n\to\infty}\left(1 + \frac{1}{n}\right)^n$, and $\lim\limits_{n\to 0}(1 + n)^{\frac{1}{n}}$.

3. Determine numerically, algebraically, and graphically the limits of functions at specific values and at infinity.
   - Applying limits in problems involving convergence and divergence

Algebra

4. Determine characteristics of arithmetic and geometric sequences and series, including those defined with recurrence relations, first terms, common differences or ratios, nth terms, limits, or statements of convergence or divergence.
   - Solving problems modeled by finite geometric series, including home mortgage problems
   - Expanding binomials raised to a whole number power using the binomial theorem

5. Create graphs of conic sections, including parabolas, hyperbolas, ellipses, circles, and degenerate conics, from second-degree equations.
   - Formulating equations of conic sections from their determining characteristics

6. Determine the inverse of a function and a relation.

7. Analyze rational, logarithmic, exponential, trigonometric, and piecewise-defined functions graphically and algebraically to determine the domain and range; to identify symmetries; to identify vertical, horizontal, or oblique asymptotes; to classify functions as increasing or decreasing, continuous or discontinuous; and to identify the type of discontinuity if one exists.
   - Using the difference quotient to approximate rates of change

8. Compare effects of parameter changes on graphs of transcendental functions.

9. Determine the amplitude, period, phase shift, domain, and range of trigonometric functions and their inverses.

10. Solve trigonometric equations using sum, difference, and half- and double-angle identities.
    - Verifying trigonometric identities

11. Apply the law of sines and the law of cosines to determine missing measures of triangles, including application-based problems.
    - Deriving formulas for the law of sines and the law of cosines
    - Determining the area of oblique triangles

12. Determine the value of the six trigonometric functions for special angles.
    - Using the sum, difference, and half-angle identities to find the exact value of a trigonometric function

13. Utilize parametric equations by graphing and by converting to rectangular form.
    - Solving application-based problems involving parametric equations
    - Solving applied problems that include sequences with recurrence relations

14. Apply laws of logarithms to simplify expressions and to solve equations using common logarithms, natural logarithms, and logarithms with other bases.

Geometry

15. Determine the location of polar coordinates and complex numbers on the complex plane and convert coordinates, equations, and complex numbers from Cartesian form to polar form and from polar form to Cartesian form.
    - Constructing graphs of simple polar equations on the polar coordinate plane

Measurement

[No standards in this strand for this course]

Data Analysis and Probability

16. Determine the equation of a curve of best fit from a set of data using exponential, quadratic, or logarithmic functions.

ALABAMA Probability and Statistics
Content Standards

Number and Operations

[No standards in this strand for this course]

Algebra

1. Use the binomial theorem to expand powers of binomials.
   - Using Pascal's triangle to expand powers of binomials

Geometry

[No standards in this strand for this course]

Measurement

[No standards in this strand for this course]

Data Analysis and Probability

2. Compare summary statistics for sets of data represented in a graph, a stem-and-leaf chart, a box-and-whisker graph, a histogram, a linear or quadratic equation of best fit of a scatterplot, and a frequency distribution.

3. Calculate descriptive statistics of univariate data, including measures of central tendency, measures of dispersion, and measures of position.
   - Defining vocabulary associated with probability and statistics, including descriptive and inferential statistics
   - Comparing descriptive statistics for samples of various sizes generated by simulation

4. Calculate probabilities of mutually exclusive, independent, and dependent events using permutations, combinations, and laws of probability.
   - Predicting outcomes of events involving conditional probabilities

5. Determine the probability of an event using a frequency distribution curve.
   - Comparing terms of a binominal expansion to terms of a binomial probability distribution

   - Analyzing data from a student-designed study to create a distribution curve, including determining the resulting confidence interval
   - Using data from a study in quality control applications to compute distributions and confidence intervals

6. Analyze experimental, simulation, and theoretical probability techniques for differences, including advantages and disadvantages of each.
   - Evaluating data-based reports by examining the design of the study, appropriateness of data analysis, and validity of conclusion

7. Determine the validity of a hypothesis for a study involving one or two populations, including generating appropriate descriptive statistics.
   - Designing a study to answer questions about characteristics of a population
   - Critiquing the instrument used in a study of populations
   - Using z-scores in a study of populations
   - Using a t-test, when appropriate, to test a hypothesis for a study

8. Interpret linear relationships of bivariate data using power and exponential regression and linear correlation.
   - Determining the validity of a hypothesis by displaying a scatterplot of experimental data and examining its correlation
   - Calculating the regression coefficient, regression equation, and the correlation coefficient

9. Describe methods of data collection in a census, sample survey, experiment, and observational study.

10. Develop a method of solution for an application-based problem.

11. Apply the binomial probability distribution for discrete random variables, including computing the mean and standard deviation for the binomial variable.

= Measured by PLAN and/or ACT Mathematics tests and/or WorkKeys AM

Science

ALABAMA Scientific Process and Application Skills

Observing

Using one or more of the senses to gather information about one's environment

Communicating

Conveying oral or written information verbally as well as visually through models, tables, charts, and graphs

Classifying

Utilizing simple groupings of objects or events based on common properties

Measuring

Using appropriate metric units for measuring length, volume, and mass

Predicting

Proposing possible results or outcomes of future events based on observations and inferences drawn from previous events

Inferring

Constructing an interpretation or explanation based on information gathered

Controlling Variables

Recognizing the many factors that affect the outcome of events and understanding their relationships to each other whereby one factor (variable) can be manipulated while others are controlled

Defining Operationally

Stating definitions of objects or events based on observable characteristics

Formulating Hypotheses

Making predictions of future events based on manipulation of variables

Experimenting (Controlled)

Conducting scientific investigations systematically, including identifying and framing the question carefully, forming a hypothesis, managing variables effectively, developing a logical experimental procedure, recording and analyzing data, and presenting conclusions based on investigation and previous research

Analyzing Data

Using collected data to accept or reject hypotheses

= Measured by EXPLORE, PLAN, and/or ACT Science tests and/or WorkKeys LI

ALABAMA Grade 8 Science (Physical Science)
Content Standards

1. Identify steps within the scientific process.
   - Applying process skills to interpret data from graphs, tables, and charts
   - Identifying controls and variables in a scientific investigation
   - Measuring dimension, volume, and mass using Système International d'Unités (SI units)
   - Identifying examples of hypotheses
   - Identifying appropriate laboratory glassware, balances, time measuring equipment, and optical instruments used to conduct an investigation

2. Describe the structure of atoms, including the location of protons, neutrons, and electrons.
   - Identifying the charge of each subatomic particle
   - Identifying Democritus and Dalton as contributors to the atomic theory

3. Determine the number of protons, neutrons, and electrons, and the mass of an element using the periodic table.
   - Locating metals, nonmetals, metalloids, and noble gases on the periodic table
   - Using data about the number of electrons in the outer shell of an atom to determine its reactivity

4. State the law of conservation of matter.
   - Balancing chemical equations by adjusting coefficients

5. Differentiate between ionic and covalent bonds.
   - Illustrating the transfer or sharing of electrons using electron dot diagrams

6. Define solution in terms of solute and solvent.
   - Defining diffusion and osmosis
   - Defining isotonic, hypertonic, and hypotonic solutions
   - Describing acids and bases based on their hydrogen ion concentration

7. Describe states of matter based on kinetic energy of particles in matter.
   - Explaining effects of temperature, concentration, surface area, and catalysts on the rate of chemical reactions

8. Identify Newton's three laws of motion.
   - Defining terminology such as action and reaction forces, inertia, acceleration, momentum, and friction
   - Interpreting distance–time graphs

9. Describe how mechanical advantages of simple machines reduce the amount of force needed for work.
   - Describing the effect of force on pressure in fluids

10. Differentiate between potential and kinetic energy.

11. Explain the law of conservation of energy and its relationship to energy transformation, including chemical to electrical, chemical to heat, electrical to light, electrical to mechanical, and electrical to sound.

12. Classify waves as mechanical or electromagnetic.
   - Describing how earthquake waves, sound waves, water waves, and electromagnetic waves can be destructive or beneficial due to the transfer of energy
   - Describing longitudinal and transverse waves
   - Describing how waves travel through different media
   - Relating wavelength, frequency, and amplitude to energy
   - Describing the electromagnetic spectrum in terms of frequencies

□ = Measured by EXPLORE Science Test
____ = Content sampled by EXPLORE Science Test

ALABAMA Physical Science Core
Content Standards

1. Recognize periodic trends of elements, including the number of valence electrons, atomic size, and reactivity.
   - Categorizing elements as metals, nonmetals, metalloids, and noble gases
   - Differentiating between families and periods
   - Using atomic number and mass number to identify isotopes

2. Identify solutions in terms of components, solubility, concentration, and conductivity.
   - Comparing saturated, unsaturated, and supersaturated solutions
   - Comparing characteristics of electrolytes and nonelectrolytes
   - Describing factors that affect solubility and rate of solution, including nature of solute and solvent, temperature, agitation, surface area, and pressure on gases

3. Contrast the formation of ionic and covalent bonds based on the transfer or sharing of valence electrons.
   - Demonstrating the formation of positive and negative monatomic ions by using electron dot diagrams

4. Use nomenclature and chemical formulas to write balanced chemical equations.
   - Explaining the law of conservation of matter
   - Identifying chemical reactions as composition, decomposition, single replacement, or double replacement
   - Defining the role of electrons in chemical reactions

5. Describe physical and chemical changes in terms of endothermic and exothermic processes.

6. Identify characteristics of gravitational, electromagnetic, and nuclear forces.

7. Relate velocity, acceleration, and kinetic energy to mass, distance, force, and time.
   - Interpreting graphic representations of velocity versus time and distance versus time
   - Solving problems for velocity, acceleration, force, work, and power

   - Describing action and reaction forces, inertia, acceleration, momentum, and friction in terms of Newton's three laws of motion
   - Determining the resultant of collinear forces acting on a body
   - Solving problems for efficiency and mechanical advantage of simple machines

8. Relate the law of conservation of energy to transformations of potential energy, kinetic energy, and thermal energy.
   - Identifying the relationship between thermal energy and the temperature of a sample of matter
   - Describing the flow of thermal energy between two samples of matter
   - Explaining how thermal energy is transferred by radiation, conduction, and convection
   - Relating simple formulas to the calculation of potential energy, kinetic energy, and work

9. Compare methods of energy transfer by mechanical and electromagnetic waves.
   - Distinguishing between transverse and longitudinal mechanical waves
   - Relating physical properties of sound and light to wave characteristics

10. Explain the relationship between electricity and magnetism.
    - Differentiating between induction and conduction
    - Identifying mechanical, magnetic, and chemical methods used to create an electrical charge
    - Describing electrical circuits in terms of Ohm's law

11. Describe the nuclear composition of unstable isotopes and the resulting changes to their nuclear composition.
    - Identifying types of nuclear emissions, including alpha particles, beta particles, and gamma radiation
    - Differentiating between fission and fusion
    - Identifying uses and possible negative side effects of nuclear technology

12. Identify metric units for mass, distance, time, temperature, velocity, acceleration, density, force, energy, and power.

1. ==Select appropriate laboratory glassware, balances, time measuring equipment, and optical instruments to conduct an experiment.==

   • Describing the steps of the scientific method

   • ==Comparing controls, dependent variables, and independent variables==

   • Identifying safe laboratory procedures when handling chemicals and using Bunsen burners and laboratory glassware

   • ==Using appropriate SI units for measuring length, volume, and mass==

2. Describe cell processes necessary for achieving homeostasis, including active and passive transport, osmosis, diffusion, exocytosis, and endocytosis.

   • Identifying functions of carbohydrates, lipids, proteins, and nucleic acids in cellular activities

   • Comparing the reaction of plant and animal cells in isotonic, hypotonic, and hypertonic solutions

   • Explaining how surface area, cell size, temperature, light, and pH affect cellular activities

   • Applying the concept of fluid pressure to biological systems

3. Identify reactants and products associated with photosynthesis and cellular respiration and the purposes of these two processes.

4. Describe similarities and differences of cell organelles, using diagrams and tables.

   • Identifying scientists who contributed to the cell theory

   • Distinguishing between prokaryotic and eukaryotic cells

   • Identifying various technologies used to observe cells

5. Identify cells, tissues, organs, organ systems, organisms, populations, communities, and ecosystems as levels of organization in the biosphere.

   • Recognizing that cells differentiate to perform specific functions

6. Describe the roles of mitotic and meiotic divisions during reproduction, growth, and repair of cells.

   • Comparing sperm and egg formation in terms of ploidy

   • Comparing sexual and asexual reproduction

7. Apply Mendel's law to determine phenotypic and genotypic probabilities of offspring.

   • Defining important genetic terms, including dihybrid cross, monohybrid cross, phenotype, genotype, homozygous, heterozygous, dominant trait, recessive trait, incomplete dominance, codominance, and allele

   • Interpreting inheritance patterns shown in graphs and charts

   • Calculating genotypic and phenotypic percentages and ratios using a Punnett square

8. Identify the structure and function of DNA, RNA, and protein.

   • Explaining relationships among DNA, genes, and chromosomes

   • Listing significant contributions of biotechnology to society, including agricultural and medical practices

   • Relating normal patterns of genetic inheritance to genetic variation

   • Relating ways chance, mutagens, and genetic engineering increase diversity

   • Relating genetic disorders and disease to patterns of genetic inheritance

9. Differentiate between the previous five-kingdom and current six-kingdom classification systems.

   • Sequencing taxa from most inclusive to least inclusive in the classification of living things

   • Identifying organisms using a dichotomous key

   • Identifying ways in which organisms from the Monera, Protista, and Fungi kingdoms are beneficial and harmful

   • Justifying the grouping of viruses in a category separate from living things

   • Writing scientific names accurately by using binomial nomenclature

10. Distinguish between monocots and dicots, angiosperms and gymnosperms, and vascular and nonvascular plants.

    • Describing the histology of roots, stems, leaves, and flowers

    • Recognizing chemical and physical adaptations of plants

11. Classify animals according to type of skeletal structure, method of fertilization and reproduction, body symmetry, body coverings, and locomotion.

12. Describe protective adaptations of animals, including mimicry, camouflage, beak type, migration, and hibernation.

    • Identifying ways in which the theory of evolution explains the nature and diversity of organisms

    • Describing natural selection, survival of the fittest, geographic isolation, and fossil record

13. Trace the flow of energy as it decreases through the trophic levels from producers to the quaternary level in food chains, food webs, and energy pyramids.

    • Describing the interdependence of biotic and abiotic factors in an ecosystem

    • Contrasting autotrophs and heterotrophs

    • Describing the niche of decomposers

    • Using the ten percent law to explain the decreasing availability of energy through the trophic levels

    = Measured by EXPLORE, PLAN, and/or ACT Science tests and WorkKeys LI

    = Content sampled by EXPLORE, PLAN, and/or ACT Science tests and WorkKeys LI

14. Trace biogeochemical cycles through the environment, including water, carbon, oxygen, and nitrogen.

    • Relating natural disasters, climate changes, nonnative species, and human activity to the dynamic equilibrium of ecosystems

    • Describing the process of ecological succession

15. Identify biomes based on environmental factors and native organisms.

16. Identify density-dependent and density-independent limiting factors that affect populations in an ecosystem.

    • Discriminating among symbiotic relationships, including mutualism, commensalism, and parasitism

ALABAMA Chemistry Core
Content Standards

1. Differentiate among pure substances, mixtures, elements, and compounds.
   - Distinguishing between intensive and extensive properties of matter
   - Contrasting properties of metals, nonmetals, and metalloids
   - Distinguishing between homogeneous and heterogeneous forms of matter

2. Describe the structure of carbon chains, branched chains, and rings.

3. Use the periodic table to identify periodic trends, including atomic radii, ionization energy, electronegativity, and energy levels.
   - Utilizing electron configurations, Lewis dot structures, and orbital notations to write chemical formulas
   - Calculating the number of protons, neutrons, and electrons in an isotope
   - Utilizing benchmark discoveries to describe the historical development of atomic structure, including photoelectric effect, absorption, and emission spectra of elements

4. Describe solubility in terms of energy changes associated with the solution process.
   - Using solubility curves to interpret saturation levels
   - Explaining the conductivity of electrolytic solutions
   - Describing acids and bases in terms of strength, concentration, pH, and neutralization reactions
   - Describing factors that affect the rate of solution
   - Solving problems involving molarity, including solution preparation and dilution

5. Use the kinetic theory to explain states of matter, phase changes, solubility, and chemical reactions.

6. Solve stoichiometric problems involving relationships among the number of particles, moles, and masses of reactants and products in a chemical reaction.
   - Predicting ionic and covalent bond types and products given known reactants
   - Assigning oxidation numbers for individual atoms of monatomic and polyatomic ions
   - Identifying the nomenclature of ionic compounds, binary compounds, and acids
   - Classifying chemical reactions as composition, decomposition, single replacement, or double replacement
   - Determining the empirical or molecular formula for a compound using percent composition data

7. Explain the behavior of ideal gases in terms of pressure, volume, temperature, and number of particles using Charles's law, Boyle's law, Gay-Lussac's law, the combined gas law, and the ideal gas law.

8. Distinguish among endothermic and exothermic physical and chemical changes.
   - Calculating temperature change by using specific heat
   - Using Le Châtelier's principle to explain changes in physical and chemical equilibrium

9. Distinguish between chemical and nuclear reactions.
   - Identifying atomic and subatomic particles, including mesons, quarks, tachyons, and baryons
   - Calculating the half-life of selective radioactive isotopes
   - Identifying types of radiation and their properties
   - Contrasting fission and fusion
   - Describing carbon-14 decay as a dating method

ALABAMA Physics Core
Content Standards

1. Explain linear, uniform circular, and projectile motions using one- and two-dimensional vectors.
   - Explaining the significance of slope and area under a curve when graphing distance-time or velocity-time data
   - Describing forces that act on an object

2. Define the law of conservation of momentum.
   - Calculating the momentum of a single object
   - Calculating momenta of two objects before and after collision in one-dimensional motion

3. Explain planetary motion and navigation in space in terms of Kepler's and Newton's laws.

4. Describe quantitative relationships for velocity, acceleration, force, work, power, potential energy, and kinetic energy.

5. Explain the concept of entropy as it relates to heating and cooling, using the laws of thermodynamics.
   - Using qualitative and quantitative methods to show the relationship between changes in heat energy and changes in temperature

6. Describe wave behavior in terms of reflection, refraction, diffraction, constructive and destructive wave interference, and the Doppler effect.
   - Explaining reasons for differences in speed, frequency, and wavelength of a propagating wave in varying materials
   - Describing uses of different components of the electromagnetic spectrum, including radio waves, microwaves, infrared radiation, visible light, ultraviolet radiation, X rays, and gamma radiation
   - Demonstrating particle and wave duality
   - Describing the change of wave speed in different media

7. Describe properties of reflection, refraction, and diffraction.
   - Demonstrating the path of light through mirrors, lenses, and prisms
   - Describing the effect of filters and polarization on the transmission of light

8. Summarize similarities in the calculation of electrical, magnetic, and gravitational forces between objects.
   - Determining the force on charged particles using Coulomb's law

9. Describe quantitative relationships among charge, current, electrical potential energy, potential difference, resistance, and electrical power for simple series, parallel, or combination direct current (DC) circuits.

Section C: ACT's College Readiness Standards Included in Alabama's Grade 8–12 Content Standards

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

How ACT College Readiness Standards Work with ACT College Readiness Benchmarks

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

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

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

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

ACT

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

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

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

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

☐ = Included in Alabama Content Standards

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

* Statements apply to PLAN & ACT only

† Statements apply to the ACT only

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

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

Descriptions of the ACT Reading Passages

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

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

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

= Included in Alabama Content Standards

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

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

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

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

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

= Included in Alabama Content Standards

	Table C-3. ACT's College Readiness Standards — Writing*		
Score Ranges	**Expressing Judgments**	**Focusing on the Topic**	**Developing a Position**
3–4	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 Show limited recognition of the complexity of the issue in the prompt	Maintain a focus on the general topic in the prompt through most of the essay	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 Show little or no movement between general and specific ideas and examples
5–6	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 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	Maintain a focus on the general topic in the prompt throughout the essay	Offer limited development of ideas using a few general examples; resort sometimes to merely repeating ideas Show little movement between general and specific ideas and examples
7–8	Show understanding of the persuasive purpose of the task by taking a position on the issue in the prompt Show some recognition of the complexity of the issue in the prompt by • acknowledging counterarguments to the writer's position • providing some response to counter-arguments to the writer's position	Maintain a focus on the general topic in the prompt throughout the essay and attempt a focus on the specific issue in the prompt Present a thesis that establishes focus on the topic	Develop ideas by using some specific reasons, details, and examples Show some movement between general and specific ideas and examples
9–10	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 Show recognition of the complexity of the issue in the prompt by • partially evaluating implications and/or complications of the issue, and/or • posing and partially responding to counter-arguments to the writer's position	Maintain a focus on discussion of the specific topic and issue in the prompt throughout the essay Present a thesis that establishes a focus on the writer's position on the issue	Develop most ideas fully, using some specific and relevant reasons, details, and examples Show clear movement between general and specific ideas and examples
11–12	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 Show understanding of the complexity of the issue in the prompt by • examining different perspectives, and/or • evaluating implications or complications of the issue, and/or • posing and fully discussing counter-arguments to the writer's position	Maintain a clear focus on discussion of the specific topic and issue in the prompt throughout the essay Present a critical thesis that clearly establishes the focus on the writer's position on the issue	Develop several ideas fully, using specific and relevant reasons, details, and examples Show effective movement between general and specific ideas and examples

*The shaded row in this table shows the minimum level of writing skills needed by students to be ready for college-level writing assignments.

	Table C-3. ACT's College Readiness Standards — Writing* (continued)	
Score Ranges	**Organizing Ideas**	**Using Language**
3–4	Provide a discernible organization with some logical grouping of ideas in parts of the essay Use a few simple and obvious transitions Present a discernible, though minimally developed, introduction and conclusion	Show limited control of language by • 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	Provide a simple organization with logical grouping of ideas in parts of the essay Use some simple and obvious transitional words, though they may at times be inappropriate or misleading Present a discernible, though underdeveloped, introduction and conclusion	Show a basic control of language by • 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	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 Use some simple and obvious, but appropriate, transitional words and phrases Present a discernible introduction and conclusion with a little development	Show adequate use of language to communicate by • 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	Provide unity and coherence throughout the essay, sometimes with a logical progression of ideas Use relevant, though at times simple and obvious, transitional words and phrases to convey logical relationships between ideas Present a somewhat developed introduction and conclusion	Show competent use of language to communicate ideas by • 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	Provide unity and coherence throughout the essay, often with a logical progression of ideas Use relevant transitional words, phrases, and sentences to convey logical relationships between ideas Present a well-developed introduction and conclusion	Show effective use of language to clearly communicate ideas by • 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

Score Ranges / Benchmarks	Table C-4. ACT's College Readiness Standards — Mathematics			
	Basic Operations & Applications	**Probability, Statistics, & Data Analysis**	**Numbers: Concepts & Properties**	**Expressions, Equations, & Inequalities**
13–15	Perform one-operation computation with whole numbers and decimals Solve problems in one or two steps using whole numbers Perform common conversions (e.g., inches to feet or hours to minutes)	Calculate the average of a list of positive whole numbers Perform a single computation using information from a table or chart	Recognize equivalent fractions and fractions in lowest terms	Exhibit knowledge of basic expressions (e.g., identify an expression for a total as $b + g$) Solve equations in the form $x + a = b$, where a and b are whole numbers or decimals
16–19 *EXPL: 17* *PLAN: 19*	Solve routine one-step arithmetic problems (using whole numbers, fractions, and decimals) such as single-step percent Solve some routine two-step arithmetic problems	Calculate the average of a list of numbers Calculate the average, given the number of data values and the sum of the data values Read tables and graphs Perform computations on data from tables and graphs Use the relationship between the probability of an event and the probability of its complement	Recognize one-digit factors of a number Identify a digit's place value	Substitute whole numbers for unknown quantities to evaluate expressions Solve one-step equations having integer or decimal answers Combine like terms (e.g., $2x + 5x$)
20–23 *ACT: 22*	Solve routine two-step or three-step arithmetic problems involving concepts such as rate and proportion, tax added, percentage off, and computing with a given average	Calculate the missing data value, given the average and all data values but one Translate from one representation of data to another (e.g., a bar graph to a circle graph) Determine the probability of a simple event Exhibit knowledge of simple counting techniques*	Exhibit knowledge of elementary number concepts including rounding, the ordering of decimals, pattern identification, absolute value, primes, and greatest common factor	Evaluate algebraic expressions by substituting integers for unknown quantities Add and subtract simple algebraic expressions Solve routine first-degree equations Perform straightforward word-to-symbol translations Multiply two binomials*
24–27	Solve multistep arithmetic problems that involve planning or converting units of measure (e.g., feet per second to miles per hour)	Calculate the average, given the frequency counts of all the data values Manipulate data from tables and graphs Compute straightforward probabilities for common situations Use Venn diagrams in counting*	Find and use the least common multiple Order fractions Work with numerical factors Work with scientific notation Work with squares and square roots of numbers Work problems involving positive integer exponents* Work with cubes and cube roots of numbers* Determine when an expression is undefined* Exhibit some knowledge of the complex numbers†	Solve real-world problems using first-degree equations Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions) Identify solutions to simple quadratic equations Add, subtract, and multiply polynomials* Factor simple quadratics (e.g., the difference of squares and perfect square trinomials)* Solve first-degree inequalities that do not require reversing the inequality sign*
28–32*	Solve word problems containing several rates, proportions, or percentages	Calculate or use a weighted average Interpret and use information from figures, tables, and graphs Apply counting techniques Compute a probability when the event and/or sample space are not given or obvious	Apply number properties involving prime factorization Apply number properties involving even/odd numbers and factors/multiples Apply number properties involving positive/negative numbers Apply rules of exponents Multiply two complex numbers†	Manipulate expressions and equations Write expressions, equations, and inequalities for common algebra settings Solve linear inequalities that require reversing the inequality sign Solve absolute value equations Solve quadratic equations Find solutions to systems of linear equations
33–36†	Solve complex arithmetic problems involving percent of increase or decrease and problems requiring integration of several concepts from pre-algebra and/or pre-geometry (e.g., comparing percentages or averages, using several ratios, and finding ratios in geometry settings)	Distinguish between mean, median, and mode for a list of numbers Analyze and draw conclusions based on information from figures, tables, and graphs Exhibit knowledge of conditional and joint probability	Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers Exhibit knowledge of logarithms and geometric sequences Apply properties of complex numbers	Write expressions that require planning and/or manipulating to accurately model a situation Write equations and inequalities that require planning, manipulating, and/or solving Solve simple absolute value inequalities

* Statements apply to PLAN & ACT only
ACT's Mathematics College Readiness Standards

44

† Statements apply to the ACT only

▢ = Included in Alabama Content Standards

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

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

* Statements apply to PLAN & ACT only

† Statements apply to the ACT only

ACT's Mathematics College Readiness Standards

= Included in Alabama Content Standards

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

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

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

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

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

= Included in Alabama Content Standards

Working with Charter States, national education organizations, educators, employers, and experts in employment and training requirements, ACT identified workplace skills that help individuals successfully perform a wide range of jobs. These skills form the basis of the WorkKeys assessments.

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

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

Level	Reading for Information	Applied Mathematics	Locating Information
3	Identify main ideas and clearly stated details Choose the correct meaning of a word that is clearly defined in the reading Choose the correct meaning of common, everyday and workplace words Choose when to perform each step in a short series of steps Apply instructions to a situation that is the same as the one in the reading materials	Solve problems that require a single type of mathematics operation (addition, subtraction, multiplication, and division) using whole numbers Add or subtract negative numbers Change numbers from one form to another using whole numbers, fractions, decimals, or percentages Convert simple money and time units (e.g., hours to minutes)	Find one or two pieces of information in a graphic Fill in one or two pieces of information that are missing from a graphic
4	Identify important details that may not be clearly stated Use the reading material to figure out the meaning of words that are not defined Apply instructions with several steps to a situation that is the same as the situation in the reading materials Choose what to do when changing conditions call for a different action (follow directions that include "if-then" statements)	Solve problems that require one or two operations Multiply negative numbers Calculate averages, simple ratios, simple proportions, or rates using whole numbers and decimals Add commonly known fractions, decimals, or percentages (e.g., ½, .75, 25%) Add three fractions that share a common denominator Multiply a mixed number by a whole number or decimal Put the information in the right order before performing calculations	Find several pieces of information in one or two graphics Understand how graphics are related to each other Summarize information from one or two straightforward graphics Identify trends shown in one or two straightforward graphics Compare information and trends shown in one or two straightforward graphics
5	Figure out the correct meaning of a word based on how the word is used Identify the correct meaning of an acronym that is defined in the document Identify the paraphrased definition of a technical term or jargon that is defined in the document Apply technical terms and jargon and relate them to stated situations Apply straightforward instructions to a new situation that is similar to the one described in the material Apply complex instructions that include conditionals to situations described in the materials	Decide what information, calculations, or unit conversions to use to solve the problem Look up a formula and perform single-step conversions within or between systems of measurement Calculate using mixed units (e.g., 3.5 hours and 4 hours 30 minutes) Divide negative numbers Find the best deal using one- and two-step calculations and then comparing results Calculate perimeters and areas of basic shapes (rectangles and circles) Calculate percentage discounts or markups	Sort through distracting information Summarize information from one or more detailed graphics Identify trends shown in one or more detailed or complicated graphics Compare information and trends from one or more complicated graphics
6	Identify implied details Use technical terms and jargon in new situations Figure out the less common meaning of a word based on the context Apply complicated instructions to new situations Figure out the principles behind policies, rules, and procedures Apply general principles from the materials to similar and new situations Explain the rationale behind a procedure, policy, or communication	Use fractions, negative numbers, ratios, percentages, or mixed numbers Rearrange a formula before solving a problem Use two formulas to change from one unit to another within the same system of measurement Use two formulas to change from one unit in one system of measurement to a unit in another system of measurement Find mistakes in items that belong at Levels 3, 4, and 5 Find the best deal and use the result for another calculation Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations Find the volume of rectangular solids Calculate multiple rates	Draw conclusions based on one complicated graphic or several related graphics Apply information from one or more complicated graphics to specific situations Use the information to make decisions
7	Figure out the definitions of difficult, uncommon words based on how they are used Figure out the meaning of jargon or technical terms based on how they are used Figure out the general principles behind the policies and apply them to situations that are quite different from any described in the materials	Solve problems that include nonlinear functions and/or that involve more than one unknown Find mistakes in Level 6 items Convert between systems of measurement that involve fractions, mixed numbers, decimals, and/or percentages Calculate multiple areas and volumes of spheres, cylinders, or cones Set up and manipulate complex ratios or proportions Find the best deal when there are several choices Apply basic statistical concepts	