

Alignment Guide: Arizona

ACT ASPIRE | THE ACT



ACT Assessments
Aligned to
Arizona Standards

About ACT

ACT is transforming college and career readiness pathways so that everyone can discover and fulfill their potential. Grounded in more than 65 years of research, ACT's learning resources, assessments, research, and work-ready credentials are trusted by students, job seekers, educators, schools, government agencies, and employers in the US and around the world to help people achieve their education and career goals at every stage of life. Visit us at www.act.org.

COMMITMENT TO FAIR TESTING

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

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I. College and Career Readiness

Grounded in over 60 years of research, ACT is a trusted leader in college and career readiness solutions. Each year, ACT serves millions of students, job seekers, schools, government agencies, and employers in the United States and around the world with learning resources, assessments, research, and credentials designed to help everyone succeed from elementary school through career.

The path to college and career success starts early. That is why ACT offers a continuum of sequential progress-monitoring learning tools and assessments that prepare students for a lifetime of success, in the classroom and beyond.

PreACT® 8/9: Prepares students for the important transition to high school by helping identify whether they are on track for college and career success. PreACT 8/9 includes multiple-choice items in the areas of English, reading, mathematics, and science and can serve as a strong diagnostic tool, helping to identify student strengths and weaknesses at a critical juncture.

PreACT 9 Secure: Measures student readiness by focusing on the standards and content most relevant at Grade 9. Data can be used to identify strengths and weaknesses and provide instructionally actionable information to students, families, and educators. PreACT 9 Secure includes multiple-choice items in English, mathematics, reading, and science subject tests.

PreACT®: Provides students a practice experience for the ACT that empowers them, their parents, and educators with valuable insights early in the college preparation process. PreACT includes multiple-choice items in the areas of English, reading, mathematics, and science. Test items are made available as a learning resource after testing.

PreACT® Secure: Offers the opportunity for states and districts to provide a higher-stakes version of the PreACT. Offered online, PreACT Secure contains multiple-choice test items in the areas of English, reading, mathematics, and science that are secured and not released after testing.

The ACT® test: Measures what students need to know to be ready for entry-level college-credit courses, providing critical feedback with extensive score reporting. The test is available via national weekend test administrations (online and paper-and-pencil format) or through weekday school-based test administrations (online and paper-and-pencil formats). The ACT includes multiple-choice items in the areas of English, reading, mathematics, and the optional science test. The optional writing test assesses a student's ability to compose an effective argumentative essay.

ACT® Online Prep (AOP), Powered by MasteryPrep: An engaging, interactive online test prep program that can be delivered in the classroom setting. All content is aligned to ACT College and Career Readiness Standards and multiple state standards, ensuring relevance and rigor. Instructors can identify skill gaps and personalize instruction with diagnostics and two full-length practice tests. Detailed reports offer skill metrics, performance insights, and data-driven recommendations. Interactive microvideos and contextual learning paths simulate a conversation—not a lecture—keeping students engaged while mastering critical ACT skills. Five-minute warmup exercises reinforce essential skills and build student confidence through scaffolded learning and easy-to-follow explanations.

ACT® WorkKeys® Assessments: Helps individuals demonstrate their job readiness while enabling communities, educators, and employers to build a skilled workforce in a rapidly changing environment. Individuals who successfully complete the WorkKeys assessments in Applied Math, Graphic Literacy, and Workplace Documents are eligible to earn the ACT® WorkKeys® National Career Readiness Certificate® (NCRC™), a valuable credential for students and job candidates seeking to verify foundational workplace skills. The other WorkKeys assessments include Applied Technology, Business Writing, Workplace Observation, Fit, and Talent. WorkKeys is available in online and paper-and-pencil formats.

ACT® WorkKeys® Curriculum: Offers individuals convenient, personalized courses to build the essential career-relevant skills needed for learning, personal development, and effective job performance. WorkKeys-aligned courses prepare individuals to take the WorkKeys

assessments (including the NCRC-aligned assessments) and take their workforce development even further.

II. Introduction

Assessments are only useful if those who could benefit from the information can access, interpret, and use the information to improve teaching and learning. Improving assessment literacy for all who interpret and make use of educational testing data is no small task.

Assessment literacy is an important part of equitable education systems. The National Academy of Education, in its vision for next-generation accountability assessments, calls for expanding assessment literacy in scope and application:

First, we need to ensure that the right people quickly gain access to and use testing data. Second, we need to ensure that teachers, administrators, parents and caregivers, and students are educated in how to interpret and use assessments to further teaching and learning and create equitable educational opportunities. For teachers, this may result in professional development and in-service opportunities. Like all aspects of education, parents and caregivers need to be seen as integral partners in using assessments to further learning. Finally, it is critical that policy makers and media outlets are provided with a framework and context to understand, interpret, and report results.

The Guide: Purpose, Elements, and Audience

This guide is intended to support assessment literacy by offering information about the content of ACT assessments and their alignment to Arizona academic standards. It also includes ideas for how to use the information in teaching and planning activities.

The guide uses the term *alignment* to describe the linkage between ACT assessments and state standards. This is an informational alignment and is intended to support educators and other stakeholders.

The methodology used to create this guide differs from an independent alignment study. In that type of study, test forms are

reviewed in order to judge the strength of alignment according to a number of different criteria.

What is in this guide?

The guide has the following elements:

- **Overview of ACT Aspire and the ACT:** Basic information about the knowledge and skills assessed by ACT Aspire and the ACT, the test reporting categories, and the process of alignment to your state standards.
- **Educator tips:** Ideas for how the alignment information can be applied to inform curriculum development and effective communication about ACT products and scores.
- **ACT Aspire and the ACT content descriptions:** Descriptions of the content and structure of each subject test (English, reading, mathematics, science, and writing), plus test blueprints for all but the writing test.
- **ACT Aspire and the ACT reporting categories descriptions:** Tables that list and describe the ACT Aspire and ACT reporting categories, subcategories, and skills.
- **Standards-to-assessment alignment:** Information in the form of a table, referred to as a crosswalk, showing which domains of ACT Aspire and the ACT (score reporting categories and subcategories) assess each standard.

Note: *Information provided for science is for the ACT only, not ACT Aspire.*

Who is this guide for?

The guide was developed for a variety of users:

- **District and school leaders:** These users can apply the information, including alignment tables, to help make decisions about curriculum and to inform design and development of professional learning.

- **Classroom teachers:** These users can reference the resources provided to inform design and delivery of daily lessons as well as design of classroom-based assessments.

Educators and state stakeholders will be able to use the information to support effective communication with students, their families, and the community. The information will help educators describe how a student's performance on an ACT assessment is tied to curriculum based on the state's standards.

III. Overview of ACT Assessments

Examining ACT assessments for alignment with state standards requires an understanding of what is on ACT Aspire and the ACT. The following provides a holistic overview of the assessments and then describes the content domains in detail, including test reporting categories and the granular knowledge and skills that are assessed in each domain.

Overview of ACT Aspire

Purpose

The principal purpose of ACT Aspire is to measure student achievement and progress toward meeting college and career readiness content standards. Secondary uses of the test are as follows:

- To provide instructionally actionable information to educators
- To inform evaluation of school and program effectiveness
- To help gauge students' readiness for advanced high school coursework
- To understand student and group performance relative to national norms

Subjects

ACT Aspire contains subject tests in the following content areas:

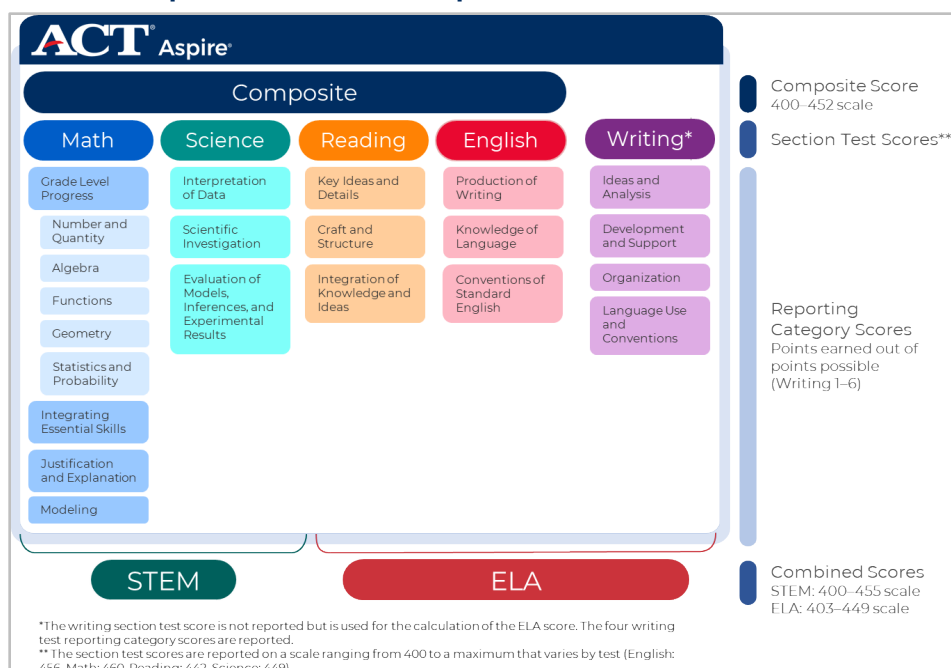
- English
- Reading
- Writing
- Mathematics
- Science

Scores

ACT Aspire provides a variety of scores, as described below and as shown in the diagram that follows:

- **Composite and subject scores:** Students receive a composite score as well as overall subject scores for English, mathematics, reading, and science. No overall score is reported for the writing test, but writing is included in the calculation of the score for English language arts (ELA).
- **Science, technology, engineering, and math (STEM) score:** Combines mathematics and science scores
- **ELA score:** Students who take ACT Aspire English, reading, and writing tests receive a composite ELA score that shows how their overall performance compares to the readiness benchmark at their grade. The composite ELA score is reported to provide insight about student skills that are integrated across the English language arts. This perspective aligns with the integrated approach to literacy education in leading achievement standards frameworks.
- **ACT Aspire reporting category scores:** Provides granular information about student performance in designated categories on each subject test

Scores Reported on ACT Aspire



Benefits

The intended benefits of using ACT Aspire include the following:

- ACT Aspire measures student progress toward college and career readiness as defined by the pioneering research, data, standards, and benchmarks of ACT.
- Based on ACT CCRS, ACT Aspire assessments are consistent with many state standards that are focused on college and career readiness.
- Scores reflect the knowledge and skills students develop over time—across grades—and link these results to readiness for college and career, providing an evolving picture of student growth.
- Educators receive valuable data about student readiness. Educators have greater visibility into specific areas of academic risk and can apply earlier intervention. This actionable information enables educators to address students' strengths, areas for improvement, and potential.

Overview of the ACT

Purpose

The primary purpose of the ACT is to measure a student's level of achievement in core academic areas taught in high school. Users apply the ACT test data, test scores, and interpretations for many different purposes:

- **College and career planning:** Students use their results to plan for further education and explore careers based on their own skills, interests, and aspirations.
- **Educational strategy:** High schools use ACT data in academic advising and counseling, evaluation studies, accreditation documentation, and public relations.
- **Educational measurement:** States use the ACT as part of their statewide assessments to measure students' educational achievement and to monitor educational improvement and achievement gaps over time.

- **Admission and placement:** Postsecondary institutions use ACT results for admission and course placement decisions.
- **Qualifications:** Many private, state, and national agencies that provide scholarships, loans, and other types of financial assistance to students tie such assistance to students' academic qualifications, which are partly measured by ACT test scores.

Subjects

The ACT contains subject tests in the following content areas:

- English
- Reading
- Mathematics
- Science (optional)
- Writing (optional)

The English, reading, and mathematics tests consist of multiple-choice items and are administered together as a battery. The optional science test consists of multiple-choice items. Students who opt to take the writing test complete a timed essay-writing task.

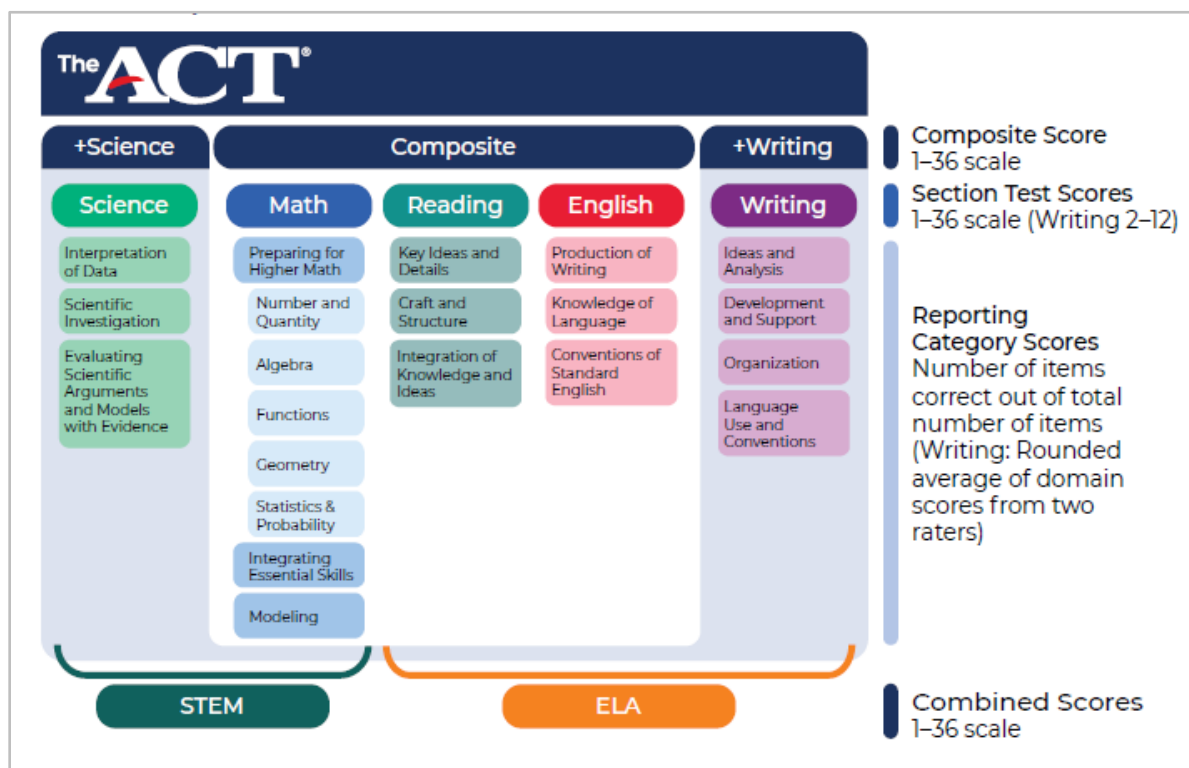
Scores

The ACT provides a variety of scores, as described below and as shown in the diagram that follows:

- **Composite and subject scores:** Students receive a Composite score; overall subject scores for English, mathematics, reading, science, and writing (optional); and scores in multiple reporting categories for each of the subject tests. Apart from the writing test, each subject test score is reported on a scale that ranges from 1 to 36. The writing score is reported on a 2–12 scale. The ACT 1–36 score scale is linked to the PreACT and PreACT 8/9 scores using common-item IRT pre-equating procedures. Therefore, corresponding test scores can be compared directly between the PreACT 8/9, PreACT, PreACT Secure, and ACT (e.g., PreACT English to ACT English).

- **Science, technology, engineering, and math (STEM) score:**
Combines mathematics and science scores, if the science test was taken
- **ELA score:** Combines English, reading, and writing scores (only reported for students who take the writing test)
- **ACT reporting category scores:** Provide granular information about student performance in a number of designated categories on each subject test

Scores Reported on the ACT



Benefits

The intended benefits of using the ACT test include the following:

- **For students:**
 - Allows them to demonstrate their knowledge and skills gained throughout educational course work in the four core content areas as well as writing

- Provides them with a profile of their relative strengths and weaknesses in the test content areas and informs them about what they know and can do, based on the ACT College Readiness Benchmarks (the minimum ACT test scores required for students to have a reasonable chance of success in first-year college courses) and the ACT College and Career Readiness Standards (CCRS), empirically derived descriptions of the essential skills and knowledge students need to be prepared for college and career
- Assists them in better preparing for college and careers through planning and studying subjects directly linked to successful outcomes
- **For parents and guardians:**
 - Provides them with insights about their child's knowledge and skills
- **For educators:**
 - Gives schools, districts, and states information about their students' knowledge and skills
 - Provides indicators as to whether a student is likely ready for college-level course work or a work training program, based on the ACT College and Career Readiness Benchmarks and progress towards the ACT WorkKeys National Career Readiness Certificate (WorkKeys NCRC)
- **For postsecondary educational organizations**
 - Presents colleges and universities, talent identification organizations, and scholarship agencies with information about a student's level of achievement in the subject areas assessed by the test

ACT Enhancements

The ACT test is undergoing enhancements to better support students' academic and college readiness goals while maintaining scale score stability. ACT scores continue to be interpreted through validated

benchmarks and standards, ensuring consistency over time. These scores are widely used for college admissions, scholarships, placement, academic support identification, and school accountability, with no changes to their intended uses.

Fairness remains central to ACT's design. The test incorporates universal design principles and accessibility features for students with diverse needs. Every item is reviewed by experts from varied backgrounds to ensure accuracy, fairness, and representation. These practices will continue with the enhanced ACT, preserving accommodations from the legacy version.

Format and Content

The enhanced ACT introduces a shorter format with more time per item, reducing total testing time by 10 minutes. Embedded field-test items are included but do not affect scores. The writing section remains unchanged.

Content updates improve alignment with industry standards and state curricula. The alignment information from this document was generated prior to the enhancements but the information is still correct and actionable. Educators can feel confident that the use of this information will still help you effectively prepare students for the ACT enhancements. This is because the enhancements have not changed what is tested; the enhancements have just rebalanced the content that is emphasized.

ELA: In English, some essays have been shortened, and every test form will feature informative, narrative, and argumentative essays to allow students to demonstrate writing strategies and skills for a variety of purposes. A higher percentage of items are focused on writing production and language knowledge, and a smaller percentage of items are focused on conventions. Stems are added to clarify item instructions. Reading adjustments include a smaller percentage of Key Ideas and Details reporting category items and the addition of some slightly shorter passages.

Mathematics: This subject test now offers four answer choices instead of five, reducing cognitive load and improving measurement quality. Real-world context items and advanced topics are slightly reduced.

Science: The science test now aligns more closely with national standards, featuring engineering topics and more items requiring three-dimensional integration of content knowledge and practices. Students taking the math and science sections will receive a STEM score, and science testing remains vital for college readiness and accountability systems. ACT encourages all students—especially those pursuing STEM fields or retaking the test—to include the science section. The enhanced ACT will have additional flexibilities regarding the administration of sections. Check with your state for additional details.

ACT Reporting Categories and Arizona Standards

Among the various scores reported for students who take ACT Aspire and the ACT are scores that detail student performance in the various content reporting categories of each subject test. Because these categories are important parts of the assessment content framework, it is helpful for stakeholders to know how they align with state standards.

This guide shows which reporting categories for ACT Aspire and the ACT are aligned with the following Arizona academic standards:

- Arizona English Language Arts Standards (adopted 2016)
- Arizona Mathematics Standards (adopted 2016)
- Arizona Science Standards (adopted 2018, modified 2023; ACT only)

Alignment Methodology

The alignment analyses documented in this guide were performed by groups of senior ACT subject matter experts in ELA and literacy, mathematics, and science who have years of experience aligning assessments to state-level college and career readiness standards. These experts also design and develop annual forms of ACT assessments, and they have deep knowledge of the task models, test

items, passages, and all aspects involved in constructing forms according to the test blueprint.

To conduct the alignment analyses for each subject area and assessment, groups of the subject matter experts worked individually and then reconciled results using the following procedure:

1. Arizona standards for the grade or grade band appropriate for each ACT assessment were reviewed, and global decisions were made about standards that would be included in the alignment (e.g., Speaking and Listening was excluded from ELA because of the test design).
2. Each Arizona standard statement was analyzed to determine if the expectation was assessed by one or more ACT assessment items on a recent ACT Aspire or ACT test form.
3. For standards judged to have a meaningful link, the reviewers determined which ACT reporting/content category includes the aligned item type. In many cases, multiple items from different ACT reporting/content categories were aligned.
4. Using deep knowledge of ACT test content, the reviewers indicated which ACT content skill areas include the aligned items (skill areas are used in the ACT content framework to organize families of test items within a test reporting category). For science standards, the reviewers evaluated the language in the standard for a direct or indirect linkage of the essential standards and each of the High School Plus (HS+) standards for chemistry, physics, biology, and Earth and space sciences for the ACT science test.
5. The groups of subject matter experts from each subject area performed a reconciliation process to discuss and resolve discrepancies.
6. The final consensus was recorded in the alignment tables.

Interpreting Results

The full set of alignment tables is provided in the subject-area sections following Educator Tips (the next section). These tables provide the view of alignment from the state standards as a crosswalk to ACT content reporting categories and detailed skill areas. Tables are

provided for ELA and mathematics for ACT Aspire and ELA, mathematics, and science for the ACT.

To interpret the alignment tables contained in the guide, it is helpful to review the ACT reporting category tables provided in the content descriptions in the subject-area sections. When an alignment linkage is indicated in the table, this means that one or more ACT items were identified in the designated test reporting category and skill area as requiring the knowledge or skill in the indicated standard. A student taking the test has a reasonable likelihood of encountering these items given the domain sampling design of the ACT blueprint. Students receive test scores in each score reporting category, and these scores reflect student learning of the knowledge and skills in the aligned state standards.

For example, in the following Arizona High School Mathematics standard, A1.A-CED.A.2, ACT mathematics items in two skill areas were found that link to the standard. One of the skill areas is in the Algebra test reporting category, and the other skill areas is in the Functions test reporting category. Scores in these two reporting categories partly reflect student proficiency with the aligned standard.

EXAMPLE 1: Arizona Mathematics Standards, High School

Standard Number	Standard	The ACT Mathematics Reporting Categories and Skill Areas
Algebra (A): Creating Equations (A-CED) A1.A-CED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities Functions: Exponential and Logarithmic Functions

In the following Arizona High School Essentials Science standard, HS.P1U1.1, the standard clearly involves constructing and using a model for explanation that requires data as supporting evidence in a scientific argument. It therefore aligns with Interpretation of Data (IOD) and Evaluating Scientific Arguments and Models with Evidence (EMI). It does not clearly indicate that a scientific experiment is needed, so there is no direct alignment to Scientific Investigation (SIN). An ACT science

test might include an experiment related to this learning objective, and it would be appropriate given the larger goals of three-dimensional scientific sense making in the standards; however, it would not directly align to the objective as written.

EXAMPLE 2: Arizona Science Standards, High School

Standard Category and Number	Standard	The ACT Mathematics Reporting Categories and Skill Areas
Essential HS.P1U1.1	Develop and use models to explain the relationship of the structure of atoms to patterns and properties observed within the Periodic Table and describe how these models are revised with new evidence.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending

Alignment decisions inherently involve subjective judgments, and differences in opinion are common even among educational experts. ACT has attempted to provide the information in this report through a process that is rigorous and transparent, in accordance with the professional standards to which the organization is committed. We believe that this information is an accurate indication of the links between the ACT system of assessments and Arizona academic standards.

IV. Educator Tips

This section is designed to help you use the following elements of this guide, which appear in each of the subject test sections in the following order:

- ACT Aspire Content Descriptions
- ACT Content Descriptions
- ACT Aspire Reporting Category Descriptions
- ACT Reporting Category Descriptions
- Crosswalk: Arizona Standards to ACT Aspire
- Crosswalk: Arizona Standards to the ACT

Tips are provided for three groups:

- District leaders
- School leaders
- Classroom teachers

Some tips are repeated, as they apply to more than one group or element. Tips fall into the following categories:

- Best practices
- Consistency of emphases
- Content coverage
- Curriculum and assessment design support
- Data for improvement
- Professional development planning
- Response opportunity
- Sharing with students and families
- Skills language
- Test frequency and design model

For District Leaders

ACT Assessment Content Descriptions

- **Curriculum and assessment design support:** The information on the structure of ACT assessments, plus the test blueprints, can be used to plan district supports for curriculum and assessment designs. Note that ACT assessments are based on empirical research indicating the knowledge and skills needed for college and career readiness. For that reason, make sure the curriculum includes sufficient opportunity for students to learn what is measured on relevant ACT assessments.
- **Content coverage:** Look closely at the test blueprints to gauge the emphases of knowledge and skills. Use the emphases to help decide expectations for mastery levels of each content area measured. Consult the ACT College and Career Readiness Standards (CCRS) to understand how student performance with the different knowledge areas and skills assessed varies across relevant ACT assessment score ranges.
- **Consistency of emphases:** Review district high school course syllabi to check consistency in emphases of relevant ACT assessment reporting categories content. For inconsistencies, consider how the ACT test blueprints might inform and help standardize content emphases.
- **Test frequency and design model:** Consider using the test blueprints to determine frequency and design of local assessments. For example, for end-of-course assessments in high school English courses, you might use reporting categories and emphases similar to those in the relevant ACT assessments.
- **Response opportunity:** Be sure to provide school leaders and classroom educators with an opportunity to read, review, and discuss relevant ACT assessment content descriptions in this guide.

ACT Assessment Reporting Category Descriptions

- **Curriculum and assessment design support:** Like the test content descriptions, the reporting category descriptions can be used to plan district supports for curriculum and assessment designs. Per

the test content description tip, make sure the curriculum includes sufficient opportunity for students to learn what is measured on relevant ACT assessments.

- **Skills language:** Consider using the reporting category tables to spark dialogue about skills language. Talk with school leaders, instructional coaches, and teachers about how educators describe their college and career preparation instruction. Suggest organizing a professional development activity on skills understanding and skills language consistency.
- **Skills language:** Look closely at the informal educator observation and coaching tools used in your district. Think about how the relevant ACT assessment tables language can help yield greater specificity in next-steps coaching (for example, using ACT assessment language to observe students working effectively to “manipulate and analyze scientific data presented in tables, graphs, and diagrams” rather than a broad focus on “improving student interpretations of data”).
- **Response opportunity:** Be sure to provide school leaders and classroom educators with an opportunity to read, review, and discuss relevant ACT assessment reporting category descriptions in this guide.

Crosswalk: Arizona Standards to ACT Assessments

- **Content coverage:** Does your district provide sufficient depth and breadth of content to meet both your state standards and ACT reporting categories? Consider reviewing curriculum, assessments, and instructional materials across the district to check that. The crosswalk alignment tables may help leaders identify strengths, redundancies, and gaps in programming by noting emphasis, duplication, and missing skills in the intersections of state standards and relevant ACT assessment content.
- **Skills language:** You may wish to provide school leaders and classroom educators with an opportunity to review the academic language represented in both your state standards and relevant ACT assessment reporting categories. Suggest developing a glossary to ensure consistency in interpretation of core skills instruction.

- **Response opportunity:** Be sure to provide school leaders and classroom educators with an opportunity to read, review, and discuss relevant ACT assessment content descriptions in this guide.

For School Leaders

ACT Assessment Content Descriptions

- **Consistency of emphases:** Review district high school course syllabi to check consistency in emphases relevant ACT assessment reporting categories content. For inconsistencies, consider how the ACT test blueprints might inform and help standardize content emphases.
- **Frequency and design model:** Consider coaching classroom teachers on using the test blueprints to determine frequency and design of local assessments. For example, for end-of-course assessments in high school English courses, you might use reporting categories and emphases similar to those in the relevant ACT assessments.
- **Sharing with students and families:** Consider excerpting sections of the test content descriptions information to share with students who are preparing to take an ACT assessment, as well as with the families of those students.

ACT Assessment Reporting Category Descriptions

- **Skills language:** As you observe classroom teaching, examine how educators define knowledge and skills. Consider coaching on how to build a consistent academic vocabulary across classrooms. This supports consistency in expectations and student understanding of core content. You may wish to provide classroom educators with an opportunity to review the academic language in both your state standards and ACT assessment reporting categories. Suggest developing a glossary to ensure consistency in interpretation of core skills instruction.
- **Best practices:** Provide time for educators to review the reporting category descriptions relevant to the content they teach. Then start a dialogue on the “best” instructional practices they use to support

learning for each relevant reporting category. Encourage them to share these practices via a research-based “best practices playbook.”

Crosswalk: Arizona Standards to ACT Assessments

- **Content coverage:** Does your district provide sufficient depth and breadth of content to meet both your state standards and relevant ACT assessment reporting categories? Consider reviewing curriculum, assessments, and instructional materials across the district to check that. The crosswalk alignment tables may help leaders identify strengths, redundancies, and gaps in programming.
- **Skills language:** As you observe classroom teaching, examine how educators define knowledge and skills. Consider coaching on how to build a consistent academic vocabulary across classrooms. This supports consistency in expectations and student understanding of core content. You may wish to provide classroom educators with an opportunity to review the academic language in both your state standards and ACT assessment reporting categories.
- **Professional development planning:** While planning professional development and next steps in coaching, examine the crosswalk tables. Consider strengthening educator knowledge of research-based strategies to teach skills represented by both your state standards and ACT assessment reporting categories. This is especially important for needs based on student performance data.

For Classroom Teachers

ACT Assessment Content Descriptions

- **Test prep for students:** Review your course syllabi to determine if there are ways to build student understanding of relevant ACT assessment reporting categories relevant to each course. Look for ways to show students who plan to take ACT assessments how the course content will prepare them for success on that assessment, as well as in meeting your state standards.
- **Content coverage:** Consider the emphases of content in the courses you teach: How do they compare to the emphases of content in relevant ACT assessment subject test blueprints? Do you have

sufficient time devoted to core skills? Time-on-task for core skills in the course and curriculum may be informed by the blueprints. Look specifically at the number of items and percentage of time for each relevant reporting category. For example, nearly one-third of the ACT mathematics test measures student performance in modeling, a higher-order skill that requires integration of content across multiple domains. This may prompt you to see if there is sufficient time devoted to instruction on modeling.

- **Sharing with students and families:** Consider excerpting sections of the test content descriptions information to share with students who are preparing to take an ACT assessment, as well as with the families of those students.

ACT Assessment Reporting Category Descriptions

- **Content coverage:** Review your course syllabi to determine if all relevant skills assessed on an ACT assessment are represented in the plan for instruction. Also consider the emphases of course content in relation to the emphases of content in the related test blueprints. Depth and breadth of content coverage as well as time-on-task for core skills in the course syllabi and curriculum may be informed by the reporting categories descriptions.
- **Data for improvement:** Review the skills you measure in relation to each reporting category. Where you have data for your students (as individuals or as groups), think about strengths and opportunities for improvement represented by each reporting category. Which knowledge areas and skills are likely most in need of intervention and/or extension?
- **Skills language:** You can introduce skills language as you teach, so all students can grow their academic vocabulary in relation to your content. For consistency, consider working with other teachers at your school who teach the same content as you to develop a glossary of academic language. Use the language in reporting categories, along with the language in your curriculum and state standards to create this glossary.

Crosswalk: Arizona Standards to the ACT

- **Content coverage:** Review your course syllabi to determine if all the relevant state standards and relevant ACT assessment reporting categories are represented in the plan for instruction. Also consider the emphases of content in relation to the emphases of content in the related test blueprints.
- **Data for improvement:** Review the skills where there is overlap in your state standards and relevant ACT assessment reporting categories. Note where you have data on student performances linked to these skills and where you do not. Shape formative assessment to gather missing data. This will help you plan effectively to meet student needs linked to these critical content knowledge and skills.
- **Professional development planning:** As you review the intersections of concepts between your state standards and relevant ACT assessment reporting categories, reflect on professional learning goals. Consider setting goals to strengthen knowledge of research-based strategies to teach these intersection skills.

V. English Language Arts (ELA)

ACT Aspire English Content Description

- **Item tally and time:** The ACT Aspire English test has 62 items (50 scored items and 12 non-scored field-test items) and a 45-minute time limit.
- **Concept:** The test puts the student in the position of a writer who makes decisions to revise and edit a text.
- **Knowledge and skills tested:** The test measures knowledge areas and related skills reflected in the reporting categories for this test:
 - ***Production of Writing:*** Students apply their understanding of the rhetorical purpose and focus of a piece of writing to develop a topic effectively. They use various strategies to achieve logical organization, topical unity, and cohesion.
 - ***Knowledge of Language:*** Students demonstrate effective language use by ensuring precision and concision in word choice and maintaining consistency in style and tone.
 - ***Conventions of Standard English:*** Students apply their understanding of the conventions of standard English grammar, usage, and mechanics to revise and edit text.
- **Format and item types:** The test consists of multiple types of texts (essays, paragraphs, and sentences), each with multiple-choice or technology-enhanced questions.
 - Different text types are used to provide a variety of rhetorical situations.
 - Students must use the rich context of the text to make editorial choices, demonstrating their understanding of writing strategies and conventions.
 - Texts are chosen not only for their appropriateness in assessing writing and language skills but also to reflect students' interests and experiences.
- **Knowledge and skills not tested:** Spelling and the rote recall of grammar rules are not tested.

ACT Aspire English Test Blueprint

Four scores are reported for the ACT Aspire English test: a total test score based on all 50 scored items, and the three reporting category scores. The reporting categories constitute a specific number of items and percentage of the test, as shown in the table below.

Reporting Category	Number of Items	Percentage of Test
Production of Writing	13–14	26–28%
Knowledge of Language	6–8	12–16%
Conventions of Standard English	29–31	58–62%

The ACT English Content Description

- **Item tally and time:** The ACT English test has 50 items (40 scored items and 10 non-scored field-test items) and a 35-minute time limit.
- **Concept:** The test puts the student in the position of a writer who makes decisions to revise and edit a text.
- **Knowledge and skills tested:** The test measures knowledge areas and related skills reflected in the reporting categories for this test (further described in a table below):
 - ***Production of Writing:*** Students apply their understanding of the rhetorical purpose and focus of a piece of writing to develop a topic effectively. They use various strategies to achieve logical organization, topical unity, and cohesion.
 - ***Knowledge of Language:*** Students demonstrate effective language use by ensuring precision and concision in word choice and maintaining consistency in style and tone.
 - ***Conventions of Standard English:*** Students apply their understanding of the conventions of standard English grammar, usage, and mechanics to revise and edit text.
- **Format and item types:** The test consists of multiple passages, or essays, each accompanied by a sequence of multiple-choice test items.

- Different passage types—informational, narrative, and argumentative—are used to provide a variety of rhetorical situations.
 - Students must use the rich context of the passage to make editorial choices, demonstrating their understanding of writing strategies and conventions.
 - Passages are chosen not only for their appropriateness in assessing writing and language skills but also to reflect students’ interests and experiences.
- **Knowledge and skills not tested:** Spelling and the rote recall of grammar rules are not tested.

The ACT English Test Blueprint

Four scores are reported for the ACT English test: a total test score based on all 40 scored items, and the three reporting category scores. The reporting categories constitute a specific number of items and percentage of the test, as shown in the table below.

Reporting Category	Number of Items	Percentage of Test
Production of Writing	15-17	38-43%
Knowledge of Language	7-9	18-23%
Conventions of Standard English	15-17	38-43%

ACT Aspire and the ACT English Reporting Category Descriptions

Reporting Category	Skill Area	Description/Examples
Production of Writing	Topic Development: Purpose and Focus: Involves the ability to make content and stylistic choices that provide support for a text’s rhetorical purpose.	Determine if a text’s purpose is supported by organizational structure and content. Revise text to enhance the focus and cohesion.

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

ACT Aspire Reading Content Description

- **Item tally and time:** The ACT Aspire reading test has 32 items (24 scored items and 8 non-scored field-test items) and a 65-minute time limit.
- **Concept:** The test measures a student's ability to read closely, reason about texts using evidence, and integrate information from multiple sources.
- **Knowledge and skills tested:** The test measures knowledge areas and related skills reflected in the reporting categories for this test:
 - ***Key Ideas and Details:*** Students read texts closely to determine central ideas and themes; summarize information and ideas accurately; and read closely to understand relationships and draw logical inferences and conclusions, including understanding sequential, comparative, and cause-effect relationships.
 - ***Craft and Structure:*** Students determine word and phrase meanings, analyze an author's word choice rhetorically, analyze text structure, understand authorial purpose and perspective, and analyze characters' points of view. They interpret authorial decisions rhetorically and differentiate between various perspectives and sources of information.
 - ***Integration of Knowledge and Ideas:*** Students understand authors' claims, differentiate between facts and opinions, and use evidence to make connections between different texts that are related by topic. Some items will require students to analyze how authors construct arguments, evaluating reasoning and evidence from various sources.
- **Format and item types:** The test consists of four passages, each accompanied by a sequence of multiple-choice, technology-enhanced, and constructed-response test items.
 - Total number of passages includes one passage for the 8 field-test items that do not contribute to score points.
 - Passages in the reading test include both literary narratives and informational texts from the natural sciences and social sciences.

- **Knowledge and skills not tested:** Rote recall of facts from outside the passage or rules of formal logic are not tested. Nor does the test include items about vocabulary that can be answered without referring to the passage context.

ACT Aspire Reading Test Blueprint

Five scores are reported for the ACT Aspire reading test: a total test score based on all 24 scored items, the three reporting category scores, and a Progress with Text Complexity indicator score . The reporting categories constitute a specific number of items and percentage of the test, as shown below.

Reporting Category	Number of Items	Percentage of Test
Key Ideas and Details	13–15	43–60%
Craft and Structure	6–8	20–37%
Integration of Knowledge and Ideas	2–3	17–20%

The ACT Reading Content Description

- **Item tally and time:** The ACT reading test has 36 items (27 scored items and 9 non-scored field-test items) and a 40-minute time limit.
- **Concept:** The test measures a student’s ability to read closely, reason about texts using evidence, and integrate information from multiple sources.
- **Knowledge and skills tested:** The test measures knowledge areas and related skills reflected in the reporting categories for this test:
 - **Key Ideas and Details:** Students read texts closely to determine central ideas and themes; summarize information and ideas accurately; and read closely to understand relationships and draw logical inferences and conclusions, including understanding sequential, comparative, and cause-effect relationships.
 - **Craft and Structure:** Students determine word and phrase meanings, analyze an author’s word choice rhetorically, analyze text structure, understand authorial purpose and perspective,

and analyze characters’ points of view. They interpret authorial decisions rhetorically and differentiate between various perspectives and sources of information.

- *Integration of Knowledge and Ideas:* Students understand authors’ claims, evaluate reasoning and evidence, and differentiate between facts and opinions. They use evidence to make connections between different texts that are related by topic or between a text and a related graphic.
- **Format and item types:** The test consists of passages, or pairs of passages, accompanied by a sequence of multiple-choice test items.
 - Passages in the reading test include both literary narratives and informational texts from the humanities, natural sciences, and social sciences. Some informational passages may include a graphic (e.g., table, chart, graph) related to the text.
- **Knowledge and skills not tested:** Rote recall of facts from outside the passage or rules of formal logic are not tested. Nor does the test include items about vocabulary that can be answered without referring to the passage context.

The ACT Reading Test Blueprint

Four scores are reported for the ACT reading test—a total test score based on all 27 scored items and the three reporting category scores. The reporting categories constitute a specific number of items and percentage of the test, as shown below.

Reporting Category	Number of Items	Percentage of Test
Key Ideas and Details	12–14	44–52%
Craft and Structure	7–9	26–33%
Integration of Knowledge and Ideas	5–7	19–26%

ACT Aspire and the ACT Reading Reporting Category Descriptions

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

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

ACT Aspire Writing Content Description

- **Time:** The ACT Aspire writing test has a 40-minute time limit.
- **Concept:** The test presents students with a single writing task that assesses their ability to compose an effective essay.
- **Knowledge and skills tested:** The test measures knowledge areas and related skills reflected in the reporting categories for this test:

- ***Ideas and Analysis:*** Students generate a response that critically engages with the task. Proficient writers present a complex analysis that addresses implications and complications of the subject. They demonstrate skillful movement between specific details and generalized ideas.
 - ***Development and Support:*** Students thoroughly explain ideas, with skillful use of supporting reasons and detailed examples. Their claims and specific support are well integrated.
 - ***Organization:*** Students exhibit skillful strategy in organizing their ideas. Proficient writers arrange their essay in a way that shows a logical progression of ideas. Their use of transitions between and within paragraphs strengthen the relationships among ideas.
 - ***Language Use and Conventions:*** Students use written language to clearly convey ideas. Proficient writers make use of the conventions of grammar, syntax, word usage, and mechanics. They are also aware of their audience and adjust the style and tone of their writing to communicate effectively.
- **Format and question types:** Students respond to a prompt designed to elicit evidence of core thinking and writing competencies. Each prompt describes a central tension that surrounds a topic or idea. Students are asked to explain the values and challenges that surround the given topic, and to support their analysis with reasons and examples.

ACT Aspire Writing Test Scoring Rubric

Student responses are scored with a four-domain analytic rubric. The domains of the analytic rubric used for scoring may be considered analogous to the reporting categories; the scores reported on the test are directly based on the rubric domains. The number of points possible in each domain is shown below.

Reporting Category (Rubric Domain)	Number of Points	Percentage of Test
Ideas and Analysis	1–6	25%
Development and Support	1–6	25%

Reporting Category (Rubric Domain)	Number of Points	Percentage of Test
Organization	1–6	25%
Language Use and Convention	1–6	25%

The ACT Writing Content Description

- **Time:** The ACT Writing test has a 40-minute time limit.
- **Concept:** The test presents students with a single writing task that assesses their ability to compose an effective argumentative essay.
- **Knowledge and skills tested:** The test measures knowledge areas and related skills reflected in the reporting categories for this test (further described in a table below):
 - ***Ideas and Analysis:*** Students demonstrate their ability to analyze an issue and craft an argument in support of their chosen perspective. Proficient writers demonstrate understanding of the issue, audience, and purpose. Analysis includes engagement with multiple perspectives, a focused thesis, a relevant context, and implications, complexities, and tensions.
 - ***Development and Support:*** Students explore ideas, offering rationales and examples to strengthen their argument. Proficient writers elaborate upon ideas to help the reader understand their thinking about the issue. Development and support include reasoning, the significance of the argument, and qualifications and complications.
 - ***Organization:*** Students organize ideas with clarity and purpose. Proficient writers guide the reader through their argument. Organization includes a controlling idea, logical order, and transitions.
 - ***Language Use and Conventions:*** Students use written language to facilitate and enhance the reader’s understanding of the ideas in the essay. Proficient writers make use of conventions while attending to audience, adjusting the style and tone of their writing according to their purpose. Effective communication relies on word choice, sentence structure, style and register, and conventions.

- **Format and question types:** Students respond to a prompt designed to elicit evidence of core thinking and writing competencies. This includes the ability to engage critically with a complex issue and multiple perspectives about it.
 - Each prompt begins by describing a specific tension within a contemporary, complex issue that is relevant and accessible to students.
 - The prompt also offers three different viewpoints on the issue.
 - Students are asked to establish a perspective on the given issue and relate their perspective to at least one other.
 - Students may adopt one of the perspectives given in the prompt as their own, or they may introduce one that is completely different from those given.
- **Knowledge and skills not tested:** Students' scores will not be affected by the point of view they take on the issue.

The ACT Writing Test Scoring Rubric

Student responses are scored with a four-domain analytic rubric. The domains of the analytic rubric used for scoring may be considered analogous to the reporting categories; the scores reported on the test are directly based on the rubric domains. The number of points possible in each domain is shown below. A table describing the reporting categories in detail follows this.

Reporting Category (Rubric Domain)	Number of Items	Percentage of Test
Ideas and Analysis	2–12	25%
Development and Support	2–12	25%
Organization	2–12	25%
Language Use and Convention	2–12	25%

ACT Aspire Writing Reporting Category Descriptions

Reporting Category (Rubric Domain)	Skill Area	Description/Examples
Ideas and Analysis	Purpose: Understanding the task and writing with purpose	• Present a complex analysis of a given topic. • Identify and engage with the underlying tension presented in the prompt.
Ideas and Analysis	Critical Elements and Differing Perspectives: Analyzing critical elements of an issue and differing perspectives on it	• Convey an understanding of the circumstances in which the tension or problem exists. • Consider implications, complications, and/or underlying values and assumptions.
Development and Support	Reasoning and Evidence: Building and strengthening the argument	• Demonstrate reasoning, using examples as necessary, that reinforces the main idea and moves the writer and reader toward a deeper understanding of the issue.
Organization	Connecting Ideas	• Group and sequence ideas logically. • Use transitions to clarify relationships among ideas.
Language Use and Conventions	Enhanced Meaning: Using language to enhance meaning	• Make word choices that strengthen the analysis. • Make effective stylistic choices (voice, tone, diction) that make the analysis compelling.
Language Use and Conventions	Conventions of Written English: Applying the conventions of standard written English	• Compose clear sentences with varied structures. • Produce writing relatively free of errors in grammar, usage, and mechanics.

The ACT Writing Reporting Category Descriptions

Reporting Category (Rubric Domain)	Skill Area	Description/Examples
Ideas and Analysis	Purpose: Understanding the task and writing with purpose	• Generate a clear thesis that identifies the writer's objective. • Engage with multiple perspectives on a complex issue.
Ideas and Analysis	Critical Elements and Differing Perspectives: Analyzing critical elements of an issue and differing perspectives on it	• Establish a context for analysis; convey an understanding of the circumstances in which the tension or problem exists. • Consider implications, complexities and tensions, and/or underlying values and assumptions.
Development and Support	Reasoning and Evidence: Building and strengthening the argument	• Establish why the argument is worth considering. • Demonstrate reasoning, using examples as necessary, that reinforces the thesis and moves the writer and reader towards a deeper understanding of the issue. • Recognize factors that complicate or weaken the writer's position and address potential critiques related to those complications or weaknesses.
Organization	Connecting Ideas	• Group and sequence ideas logically. • Use transitions to clarify relationships among ideas.

Reporting Category (Rubric Domain)	Skill Area	Description/Examples
Organization	Organizational Strategy: Employing an organizational strategy	• Unify the argument; connect ideas throughout the essay to the thesis. • Rely on a logical progression of ideas that explains the argument and its purpose.
Language Use and Conventions	Enhanced Meaning: Using language to enhance meaning	• Make word choices that strengthen the argument. • Make effective stylistic choices (voice, tone, diction) that make the argument compelling.
Language Use and Conventions	Conventions of Written English: Applying the conventions of standard written English	• Compose clear sentences with varied structures. • Produce writing relatively free of errors in grammar, usage, and mechanics.

CROSSWALK:

Arizona English Language Arts Standards to ACT Assessments

Table 1: Arizona English Language Arts Standards, 9–10th Grade (adopted 2016), Aligned to ACT Aspire

Note regarding Speaking and Listening standards: *Standards requiring inferences about students' abilities to collaborate, speak and listen, extend and refine a practice over time, or execute their own research are not covered by the ACT summative assessments. Evidence to support such standards is best gathered directly from activities that are not currently practical in large-scale summative test administration conditions.*

Note: Rows with gray shading indicate the beginning of a new standards category.

State Standards Categories and Numbers	Standard	ACT Aspire English Reporting Categories and Skill Areas	ACT Aspire Reading Reporting Categories and Skill Areas	ACT Aspire Writing Reporting Categories and Skill Areas
Reading Standards for Literature (RL): Key Ideas and Details 9-10.RL.1	Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.	Production of Writing: Topic Development—Purpose and Focus	Key Ideas and Details: Close Reading Integration of Knowledge and Ideas: Arguments	
Reading Standards for Literature (RL): Key Ideas and Details 9-10.RL.2	Determine a theme or central idea of a text and analyze in detail its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.		Key Ideas and Details: Central Ideas, Themes, Summaries	
Reading Standards for Literature (RL): Key Ideas and Details 9-10.RL.3	Analyze how complex characters (e.g., those with multiple or conflicting motivations) develop over the course of a text, interact with other characters, and advance the plot or develop the theme.		Key Ideas and Details: Relationships Central Ideas, Themes, Summaries Craft and Structure: Text Structure	
Reading Standards for Literature (RL): Craft and Structure 9-10.RL.4	Determine the meaning of words and phrases as they are used in the text, including figurative and connotative meanings; analyze the cumulative impact of specific word choices on meaning and tone.	Production of Writing: Topic Development—Purpose and Focus	Craft and Structure: Word Meanings and Word Choice Text Structure	
Reading Standards for Literature (RL): Craft and Structure 9-10.RL.5	Analyze how an author’s choices concerning how to structure a text, order events within it, and manipulate time create such effects as mystery, tension, or surprise.	Production of Writing: Organization, Unity, and Cohesion	Craft and Structure: Text Structure	

State Standards Categories and Numbers	Standard	ACT Aspire English Reporting Categories and Skill Areas	ACT Aspire Reading Reporting Categories and Skill Areas	ACT Aspire Writing Reporting Categories and Skill Areas
Reading Standards for Literature (RL): Craft and Structure 9-10.RL.6	Analyze how points of view and/or cultural experiences are reflected in works of literature, drawing from a variety of literary texts.		Key Ideas and Details: Relationships Integration of Knowledge and Ideas: Visual and Quantitative Information	
Reading Standards for Literature (RL): Integration of Knowledge and Ideas: 9-10.RL.7	Analyze the representation of a subject or a key scene in two different artistic mediums, including what is emphasized or absent in each treatment.			
Reading Standards for Literature (RL): Integration of Knowledge and Ideas: 9-10.RL.8	(Not applicable to literature)			
Reading Standards for Literature (RL): Integration of Knowledge and Ideas: 9-10.RL.9	Analyze how an author draws on and transforms source material in a specific work.		Integration of Knowledge and Ideas: Synthesis of Multiple Texts Craft and Structure: Text Structure	
Reading Standards for Literature (RL): Range of Reading and Level of Text Complexity 9-10.RL.10	By the end of the year, proficiently and independently read and comprehend literature, including stories, drama, and poetry, in a text complexity range determined by qualitative and quantitative measures appropriate to grade 9. By the end of the year, proficiently and independently read and comprehend literature, including stories, drama, and poetry, in a text complexity range determined by qualitative and quantitative measures appropriate to grade 10.		All reporting categories	
Reading Standards for Informational Text (RI): Key Ideas and Details 9-10.RI.1	Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.	Production of Writing: Topic Development—Purpose and Focus	Key Ideas and Details: Central Ideas, Themes, Summaries Integration of Knowledge and Ideas: Arguments	
Reading Standards for Informational Text (RI): Key Ideas and Details 9-10.RI.2	Determine a central idea of a text and analyze its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.		Key Ideas and Details: Central Ideas, Themes, Summaries	

State Standards Categories and Numbers	Standard	ACT Aspire English Reporting Categories and Skill Areas	ACT Aspire Reading Reporting Categories and Skill Areas	ACT Aspire Writing Reporting Categories and Skill Areas
Reading Standards for Informational Text (RI): Key Ideas and Details 9-10.RI.3	Analyze how the author constructs an analysis or series of ideas or events, including the order in which the points are made, how they are introduced and developed, and the connections that are drawn between them.		Key Ideas and Details: Relationships	
Reading Standards for Informational Text (RI): Craft and Structure 9-10.RI.4	Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings analyze the cumulative impact of specific word choices on meaning and tone.	Production of Writing: Topic Development—Purpose and Focus	Craft and Structure: Word Meanings and Word Choice Text Structure	
Reading Standards for Informational Text (RI): Craft and Structure 9-10.RI.5	Analyze in detail how an author’s ideas or claims are developed and refined by particular sentences, paragraphs, or larger portions of a text (e.g., a section or chapter).	Production of Writing: Topic Development—Purpose and Focus Organization, Unity, and Cohesion	Craft and Structure: Text Structure	
Reading Standards for Informational Text (RI): Craft and Structure 9-10.RI.6	Determine an author’s point of view or purpose in a text and analyze how an author uses rhetoric to advance that point of view or purpose.		Craft and Structure: Purpose and Point of View	
Reading Standards for Informational Text (RI): Craft and Structure 9-10.RI.7	Analyze various accounts of a subject told in different mediums (e.g., a person’s life story in both print and multimedia), determining which details are emphasized in each account.		Integration of Knowledge and Ideas: Synthesis of Multiple Texts	
Reading Standards for Informational Text (RI): Craft and Structure 9-10.RI.8	Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and the evidence is relevant and sufficient identify false statements and fallacious reasoning.		Integration of Knowledge and Ideas: Arguments	
Reading Standards for Informational Text (RI): Craft and Structure 9-10.RI.9	Analyze seminal/primary documents of historical and literary significance, including how they address related themes and concepts.			
Reading Standards for Informational Text (RI): Range of Reading and Level of Text Complexity 9-10.RI.10	By the end of the year, proficiently and independently read and comprehend informational texts and nonfiction in a text complexity range determined by qualitative and quantitative measures appropriate to grade 9. By the end of the year, proficiently and independently read and comprehend informational texts and nonfiction in a text complexity range determined by qualitative and quantitative measures appropriate to grade 10.		All reporting categories	
Writing Standards (W): Text Types and Purposes 9-10.W.1	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.			

State Standards Categories and Numbers	Standard	ACT Aspire English Reporting Categories and Skill Areas	ACT Aspire Reading Reporting Categories and Skill Areas	ACT Aspire Writing Reporting Categories and Skill Areas
Writing Standards (W): Text Types and Purposes 9-10.W.1.a	Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among claim(s), counterclaims, reasons, and evidence.			
Writing Standards (W): Text Types and Purposes 9-10.W.1.c	Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.			
Writing Standards (W): Text Types and Purposes 9-10.W.1.d	Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.			
Writing Standards (W): Text Types and Purposes 9-10.W.1.e	Provide a concluding statement or section that follows from and supports the argument presented.			
Writing Standards (W): Text Types and Purposes 9-10.W.2	Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.			All reporting categories
Writing Standards (W): Text Types and Purposes 9-10.W.2.a	Introduce a topic; organize complex ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.			All reporting categories
Writing Standards (W): Text Types and Purposes 9-10.W.2.b	Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.			All reporting categories
Writing Standards (W): Text Types and Purposes 9-10.W.2.c	Use appropriate and varied transitions to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.			All reporting categories
Writing Standards (W): Text Types and Purposes 9-10.W.2.d	Use precise language and domain-specific vocabulary to manage the complexity of the topic.			All reporting categories
Writing Standards (W): Text Types and Purposes 9-10.W.2.e	Establish and maintain a formal style and an appropriate tone while attending to the norms and conventions of the discipline in which they are writing.			All reporting categories

State Standards Categories and Numbers	Standard	ACT Aspire English Reporting Categories and Skill Areas	ACT Aspire Reading Reporting Categories and Skill Areas	ACT Aspire Writing Reporting Categories and Skill Areas
Writing Standards (W): Text Types and Purposes 9-10.W.2.f	Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).			All reporting categories
Writing Standards (W): Text Types and Purposes 9-10.W.3	Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.			
Writing Standards (W): Text Types and Purposes 9-10.W.3.a	Engage and orient the reader by setting out a problem, situation, or observation, establishing one or multiple point(s) of view, and introducing a narrator and/or characters; create a smooth progression of experiences or events.			
Writing Standards (W): Text Types and Purposes 9-10.W.3.b	Use narrative techniques, such as dialogue, pacing, description, reflection, and multiple plot lines, to develop experiences, events, and/or characters.			
Writing Standards (W): Text Types and Purposes 9-10.W.3.c	Use a variety of techniques to sequence events so that they build on one another to create a coherent whole.			
Writing Standards (W): Text Types and Purposes 9-10.W.3.d	Use precise words and phrases, relevant descriptive details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters.			
Writing Standards (W): Text Types and Purposes 9-10.W.3.e	Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative.			
Writing Standards (W): Production and Distribution of Writing 9-10.W.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)	Production of Writing: Topic Development—Purpose and Focus Organization, Unity, and Cohesion Knowledge of Writing: Style Expressing Ideas Clearly		All reporting categories
Writing Standards (W): Production and Distribution of Writing 9-10.W.5	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grades 9–10.)	All reporting categories		All reporting categories

State Standards Categories and Numbers	Standard	ACT Aspire English Reporting Categories and Skill Areas	ACT Aspire Reading Reporting Categories and Skill Areas	ACT Aspire Writing Reporting Categories and Skill Areas
Writing Standards (W): Production and Distribution of Writing 9-10.W.6	Use technology, including the internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.			
Writing Standards (W): Research to Build and Present Knowledge 9-10.W.7	Conduct short as well as more sustained research projects to answer a question (including a self- generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.			
Writing Standards (W): Research to Build and Present Knowledge 9-10.W.8	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.			
Writing Standards (W): Research to Build and Present Knowledge 9-10.W.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.			
Writing Standards (W): Research to Build and Present Knowledge 9-10.W.9.a	Apply grades 9-10 Reading standards to literature.			
Writing Standards (W): Research to Build and Present Knowledge 9-10.W.9.b	Apply grades 9-10 Reading standards to informational text and nonfiction			
Writing Standards (W): Range of Writing 9-10.W.10	Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.			All reporting categories
Speaking and Listening Standards (SL): Comprehension and Collaboration 9-10.SL.1	Initiate and participate effectively in a range of collaborative discussions (one-on- one, in groups, and teacher-led) with diverse partners on grades 9– 10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.			
Speaking and Listening Standards (SL): Comprehension and Collaboration 9-10.SL.1.a	Come to discussions prepared having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well- reasoned exchange of ideas.			

State Standards Categories and Numbers	Standard	ACT Aspire English Reporting Categories and Skill Areas	ACT Aspire Reading Reporting Categories and Skill Areas	ACT Aspire Writing Reporting Categories and Skill Areas
Speaking and Listening Standards (SL): Comprehension and Collaboration 9-10.SL.1.b	Work with peers to set rules for collegial discussions and decision-making (e.g., informal consensus, taking votes on key issues, and presentation of alternate views), clear goals and deadlines, and individual roles as needed.			
Speaking and Listening Standards (SL): Comprehension and Collaboration 9-10.SL.1.c	Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions.			
Speaking and Listening Standards (SL): Comprehension and Collaboration 9-10.SL.1.d	Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and, when warranted, qualify or justify their own views and understanding and make new connections based on the evidence and reasoning presented.			
Speaking and Listening Standards (SL): Comprehension and Collaboration 9-10.SL.2	Integrate multiple sources of information presented in diverse media and formats, evaluating the credibility and accuracy of each source.			
Speaking and Listening Standards (SL): Comprehension and Collaboration 9-10.SL.3	Evaluate a speaker's point of view, reasoning, use of evidence, and use of rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence.			
Speaking and Listening Standards (SL): Presentation of Knowledge 9-10.SL.4	Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task; use appropriate eye contact, adequate volume, and clear pronunciation.			(Indirect association) All reporting categories
Speaking and Listening Standards (SL): Presentation of Knowledge 9-10.SL.5	Make strategic use of digital media in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.			
Speaking and Listening Standards (SL): Presentation of Knowledge 9-10.SL.6	Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grades 9–10 Language standards 1 and 3 for specific expectations.)			(Indirect association) Language Use and Conventions: Conventions of Written English

State Standards Categories and Numbers	Standard	ACT Aspire English Reporting Categories and Skill Areas	ACT Aspire Reading Reporting Categories and Skill Areas	ACT Aspire Writing Reporting Categories and Skill Areas
Language Standards (L): Conventions of Standard English 9-10.L.1	Demonstrate command of the conventions of Standard English grammar and usage when writing or speaking.	Conventions of Standard English: Sentence Structure and Formation Usage Conventions Knowledge of Language: Style		Language Use and Conventions: Conventions of Written English
Language Standards (L): Conventions of Standard English 9-10.L.1.a	Use parallel structure.	Conventions of Standard English: Sentence Structure and Formation Usage Conventions Knowledge of Language: Style		Language Use and Conventions: Conventions of Written English
Language Standards (L): Conventions of Standard English 9-10.L.1.b	Use various types of phrases (noun, verb, adjectival, adverbial, participial, prepositional, and absolute) and clauses (independent, dependent; noun, relative, adverbial) to convey specific meanings and add variety and interest to writing or presentations.	Conventions of Standard English: Sentence Structure and Formation Usage Conventions Knowledge of Language: Style		Language Use and Conventions: Conventions of Written English
Language Standards (L): Conventions of Standard English 9-10.L.2	Demonstrate command of the conventions of Standard English capitalization, punctuation, and spelling when writing.	Conventions of Standard English: Sentence Structure and Formation Usage Conventions Knowledge of Language: Style		Language Use and Conventions: Conventions of Written English
Language Standards (L): Conventions of Standard English 9-10.L.2.a	Use a semicolon (and perhaps a conjunctive adverb) to link two or more closely related independent clauses.	Conventions of Standard English: Sentence Structure and Formation Usage Conventions Knowledge of Language: Style		Language Use and Conventions: Conventions of Written English
Language Standards (L): Conventions of Standard English 9-10.L.2.b	Use a colon to introduce a list or quotation.	Conventions of Standard English: Sentence Structure and Formation Usage Conventions Knowledge of Language: Style		Language Use and Conventions: Conventions of Written English
Language Standards (L): Conventions of Standard English 9-10.L.2.c	Use correct spelling.	Conventions of Standard English: Sentence Structure and Formation Usage Conventions Knowledge of Language: Style		Language Use and Conventions: Conventions of Written English

State Standards Categories and Numbers	Standard	ACT Aspire English Reporting Categories and Skill Areas	ACT Aspire Reading Reporting Categories and Skill Areas	ACT Aspire Writing Reporting Categories and Skill Areas
Language Standards (L): Knowledge of Language 9-10.L.3	Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.	Knowledge of Language: Expressing Ideas Clearly Style		Ideas and Analysis: Enhanced Meaning
Language Standards (L): Knowledge of Language 9-10.L.3.a	Write and edit work so that it conforms to the guidelines in a style manual.	Knowledge of Language: Expressing Ideas Clearly Style		Ideas and Analysis: Enhanced Meaning
Language Standards (L): Vocabulary Acquisition and Use 9-10.L.4	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 9–10 reading and content, choosing flexibly from a range of strategies.	Production of Writing: Topic Development—Purpose and Focus Knowledge of Language: Expressing Ideas Clearly Conventions of Standard English: Sentence Structure and Formation Usage Conventions	Craft and Structure: Text Structure Word Meanings and Word Choice	(Indirect association) Ideas and Analysis: Enhanced Meaning
Language Standards (L): Vocabulary Acquisition and Use 9-10.L.4.a	Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., analyze, analysis, analytical; advocate, advocacy).	Production of Writing: Topic Development—Purpose and Focus Knowledge of Language: Expressing Ideas Clearly Conventions of Standard English: Sentence Structure and Formation Usage Conventions	Craft and Structure: Text Structure Word Meanings and Word Choice	(Indirect association) Ideas and Analysis: Enhanced Meaning
Language Standards (L): Vocabulary Acquisition and Use 9-10.L.4.b	Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word’s position or function in a sentence) as a clue to the meaning of a word or phrase.	Production of Writing: Topic Development—Purpose and Focus Knowledge of Language: Expressing Ideas Clearly Conventions of Standard English: Sentence Structure and Formation Usage Conventions	Craft and Structure: Text Structure Word Meanings and Word Choice	(Indirect association) Ideas and Analysis: Enhanced Meaning

State Standards Categories and Numbers	Standard	ACT Aspire English Reporting Categories and Skill Areas	ACT Aspire Reading Reporting Categories and Skill Areas	ACT Aspire Writing Reporting Categories and Skill Areas
Language Standards (L): Vocabulary Acquisition and Use 9-10.L.4.c	Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, or its etymology.	Production of Writing: Topic Development—Purpose and Focus Knowledge of Language: Expressing Ideas Clearly Conventions of Standard English: Sentence Structure and Formation Usage Conventions	Craft and Structure: Text Structure Word Meanings and Word Choice	
Language Standards (L): Vocabulary Acquisition and Use 9-10.L.4.d	Verify the preliminary determination of the meaning of a word or phrase.	Production of Writing: Topic Development—Purpose and Focus Knowledge of Language: Expressing Ideas Clearly Conventions of Standard English: Sentence Structure and Formation Usage Conventions	Craft and Structure: Text Structure Word Meanings and Word Choice	(Indirect association) Ideas and Analysis: Enhanced Meaning
Language Standards (L): Vocabulary Acquisition and Use 9-10.L.5	Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.	Knowledge of Language: Expressing Ideas Clearly	Craft and Structure: Word Meanings and Word Choice	Ideas and Analysis: Enhanced Meaning
Language Standards (L): Vocabulary Acquisition and Use 9-10.L.5.a	Interpret figures of speech (e.g., euphemism, oxymoron) in context and analyze their role in the text.	Knowledge of Language: Expressing Ideas Clearly	Craft and Structure: Word Meanings and Word Choice	Ideas and Analysis: Enhanced Meaning
Language Standards (L): Vocabulary Acquisition and Use 9-10.L.5b	Analyze nuances in the meaning of words with similar denotations.	Knowledge of Language: Expressing Ideas Clearly	Craft and Structure: Word Meanings and Word Choice	Ideas and Analysis: Enhanced Meaning
Language Standards (L): Vocabulary Acquisition and Use 9-10.L.6	Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.	Knowledge of Language: Expressing Ideas Clearly Production of Writing: Topic Development—Purpose and Focus	Craft and Structure: Word Meanings and Word Choice	Ideas and Analysis: Enhanced Meaning

Table 2: Arizona English Language Arts Standards, 11–12th Grade (adopted 2016), Aligned to the ACT

Note regarding Speaking and Listening standards: *Standards requiring inferences about students’ abilities to collaborate, speak and listen, extend and refine a practice over time, or execute their own research are not covered by the ACT summative assessments. Evidence to support such standards is best gathered directly from activities that are not currently practical in large-scale summative test administration conditions.*

Note: Rows with gray shading indicate the beginning of a new standards category.

State Standards Categories and Numbers	Standard	The ACT English Reporting Categories and Skill Areas	The ACT Reading Reporting Categories and Skill Areas	The ACT Writing Reporting Categories and Skill Areas
Reading Standards for Literature (RL): Key Ideas and Details 11-12.RL.1	Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.		Key Ideas and Details: Close Reading	
Reading Standards for Literature (RL): Key Ideas and Details 11-12.RL.2	Determine two or more themes or central ideas of a text and analyze their development over the course of the text, including how they interact and build on one another to produce a complex account; provide an objective summary of the text.		Key Ideas and Details: Central Ideas, Themes, Summaries Craft and Structure: Text Structure	
Reading Standards for Literature (RL): Key Ideas and Details 11-12.RL.3	Analyze the impact of the author's choices regarding how to develop and connect elements of a story or drama.		Key Ideas and Details: Relationships Craft and Structure: Text Structure	
Reading Standards for Literature (RL): Key Ideas and Details 11-12.RL.4	Determine the meaning(s) of words and phrases as they are used in a text, including figurative and connotative meanings, while analyzing the impact of specific choices on meaning and tone.		Craft and Structure: Word Meanings and Word Choice Text Structure	
Reading Standards for Literature (RL): Key Ideas and Details 11-12.RL.5	Analyze how an author's choices concerning how to structure specific parts of a text contribute to its overall structure and meaning, as well as its aesthetic impact.		Craft and Structure: Text Structure	
Reading Standards for Literature (RL): Key Ideas and Details 11-12.RL.6	Using a variety of genres, analyze how the narrative point of view impacts the implicit and explicit meanings in a text.		Craft and Structure: Purpose and Point of View Key Ideas and Details: Close Reading	
Reading Standards for Literature (RL): Integration of Knowledge and Ideas 11-12.RL.7	Analyze multiple interpretations of a story, drama, or poem (e.g., recorded or live production of a play or recorded novel or poetry), evaluating how each version interprets the source text.			
Reading Standards for Literature (RL): Integration of Knowledge and Ideas 11-12.RL.8	(Not applicable to literature)			

State Standards Categories and Numbers	Standard	The ACT English Reporting Categories and Skill Areas	The ACT Reading Reporting Categories and Skill Areas	The ACT Writing Reporting Categories and Skill Areas
Reading Standards for Literature (RL): Integration of Knowledge and Ideas 11-12.RL.9	Drawing on a wide range of time periods, analyze how two or more texts treat similar themes or topics.		Integration of Knowledge and Ideas: Synthesis of Multiple Texts	
Reading Standards for Literature (RL): Integration of Knowledge and Ideas 11-12.RL.10	By the end of the year, proficiently and independently read and comprehend literature, including stories, dramas, and poetry, in a text complexity range determined by qualitative and quantitative measures appropriate to grade 11. By the end of the year, proficiently and independently read and comprehend literature, including stories, dramas, and poetry, in a text complexity range determined by qualitative and quantitative measures appropriate to grade 12.		Key Ideas and Details: Close Reading Relationships Central Ideas, Themes, Summaries Craft and Structure: Word Meanings and Word Choice Text Structure Purpose and Point of View Integration of Knowledge and Ideas: Synthesis of Multiple Texts	
Reading Standards for Informational Text (RI): Key Ideas and Details 11-12.RI.1	Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.		Key Ideas and Details: Close Reading	
Reading Standards for Informational Text (RI): Key Ideas and Details 11-12.RI.2	Determine and analyze the development and interaction of two or more central ideas over the course of a text to provide a complex analysis or objective summary.		Key Ideas and Details: Central Ideas, Themes, Summaries Craft and Structure: Text Structure	
Reading Standards for Informational Text (RI): Key Ideas and Details 11-12.RI.3	Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or events interact and develop over the course of the text.		Key Ideas and Details: Relationships Craft and Structure: Text Structure	
Reading Standards for Informational Text (RI): Craft and Structure 11-12.RI.4	Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze how an author uses and refines the meaning of a key term or terms over the course of a text.		Craft and Structure: Word Meanings and Word Choice Text Structure	
Reading Standards for Informational Text (RI): Craft and Structure 11-12.RI.5	Analyze and evaluate the effectiveness of the author's choice of structural elements and text features.		Craft and Structure: Text Structure	

State Standards Categories and Numbers	Standard	The ACT English Reporting Categories and Skill Areas	The ACT Reading Reporting Categories and Skill Areas	The ACT Writing Reporting Categories and Skill Areas
Reading Standards for Informational Text (RI): Craft and Structure 11-12.RI.6	Determine an author's point of view or purpose in a text in which the rhetoric is particularly effective, analyzing how style and content contribute to the effectiveness of the text.		Craft and Structure: Purpose and Point of View Word Meanings and Word Choice Text Structure Integration of Knowledge and Ideas: Arguments	
Reading Standards for Informational Text (RI): Craft and Structure 11-12.RI.7	Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in print in order to address a question or solve a problem.		Integration of Knowledge and Ideas: Visual and Quantitative Information	
Reading Standards for Informational Text (RI): Craft and Structure 11-12.RI.8	Delineate and evaluate the rhetorical effectiveness of the authors' reasoning, premises, purpose, and argument in seminal U.S. and world texts.		Integration of Knowledge and Ideas: Arguments Craft and Structure: Purpose and Point of View	
Reading Standards for Informational Text (RI): Craft and Structure 11-12.RI.9	Analyze foundational U.S. and world documents of historical and literary significance for their themes, purposes, and rhetorical features.			
Reading Standards for Informational Text (RI): Range of Reading and Level of Text Complexity 11-12.RI.10	By the end of the year, proficiently and independently read and comprehend informational text and nonfiction in a text complexity range determined by qualitative and quantitative measures appropriate to grade 11. By the end of the year, proficiently and independently read and comprehend informational text and nonfiction in a text complexity range determined by qualitative and quantitative measures appropriate to grade 12.		All reporting categories	
Writing Standards (W): Text Types and Purposes 11-12.W.1	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.	Production of Writing: Topic Development—Purpose and Focus Organization, Unity, and Cohesion Knowledge of Language: Expressing Ideas Clearly Style		All reporting categories

State Standards Categories and Numbers	Standard	The ACT English Reporting Categories and Skill Areas	The ACT Reading Reporting Categories and Skill Areas	The ACT Writing Reporting Categories and Skill Areas
Writing Standards (W): Text Types and Purposes 11-12.W.1.a	Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences claim(s), counterclaims, reasons, and evidence.	Production of Writing: Topic Development—Purpose and Focus Organization, Unity, and Cohesion		Ideas and Analysis: Purpose Critical Elements and Differing Perspectives Organization: Connecting Ideas Organizational Strategy
Writing Standards (W): Text Types and Purposes 11-12.W.1.b	Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant evidence for each while pointing out the strengths and limitations of both in a manner that anticipates the audience’s knowledge level, concerns, values, and possible biases.	Production of Writing: Topic Development—Purpose and Focus		Ideas and Analysis: Purpose Critical Elements and Differing Perspectives Development and Support: Reasoning and Evidence
Writing Standards (W): Text Types and Purposes 11-12.W.1.c	Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.	Production of Writing: Topic Development—Purpose and Focus Organization, Unity, and Cohesion Knowledge of Language: Expressing Ideas Clearly		Organization: Connecting Ideas Organizational Strategy Language Use and Conventions: Conventions
Writing Standards (W): Text Types and Purposes 11-12.W.1.d	Establish and maintain a style and tone appropriate to the norms and conventions of the discipline in which they are writing.	Knowledge of Language: Expressing Ideas Clearly Style		Language Use and Conventions: Enhanced Meaning Conventions of Written English
Writing Standards (W): Text Types and Purposes 11-12.W.1.e	Provide a concluding statement or section that follows from and supports the argument presented.	Production of Writing: Organization, Unity, and Cohesion		All reporting categories
Writing Standards (W): Text Types and Purposes 11-12.W.2.	Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.	Production of Writing: Topic Development—Purpose and Focus Organization, Unity, and Cohesion Knowledge of Language: Expressing Ideas Clearly Style		All reporting categories
Writing Standards (W): Text Types and Purposes 11-12.W.2.a	Introduce a topic; organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting, graphics, and multimedia when useful for comprehension.	Production of Writing: Topic Development—Purpose and Focus Organization, Unity, and Cohesion		Ideas and Analysis: Purpose Organization: Connecting Ideas Organizational Strategy

State Standards Categories and Numbers	Standard	The ACT English Reporting Categories and Skill Areas	The ACT Reading Reporting Categories and Skill Areas	The ACT Writing Reporting Categories and Skill Areas
Writing Standards (W): Text Types and Purposes 11-12.W.2.b	Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.	Production of Writing: Topic Development—Purpose and Focus		Development and Support: Reasoning and Evidence
Writing Standards (W): Text Types and Purposes 11-12.W.2.c	Use appropriate and varied transitions and syntax to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.	Production of Writing: Topic Development—Purpose and Focus Organization, Unity, and Cohesion Knowledge of Language: Expressing Ideas Clearly		Organization: Connecting Ideas Organizational Strategy Language Use and Conventions: Conventions of Written English
Writing Standards (W): Text Types and Purposes 11-12.W.2.d	Use precise language, domain-specific vocabulary, and rhetorical techniques to manage the complexity of the topic.	Production of Writing: Topic Development—Purpose and Focus Knowledge of Language: Expressing Ideas Clearly Style		Language Use and Conventions: Enhanced Meaning
Writing Standards (W): Text Types and Purposes 11-12.W.2.e	Establish and maintain a style and tone appropriate to the norms and conventions of the discipline in which they are writing.	Knowledge of Language: Expressing Ideas Clearly Style		Language Use and Conventions: Enhanced Meaning Conventions of Written English
Writing Standards (W): Text Types and Purposes 11-12.W.2.f	Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).	Production of Writing: Organization, Unity, and Cohesion		All reporting categories
Writing Standards (W): Text Types and Purposes 11-12.W.3	Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.	Production of Writing: Topic Development—Purpose and Focus Organization, Unity, and Cohesion Knowledge of Language: Expressing Ideas Clearly Style		(Indirect association): All reporting categories
Writing Standards (W): Text Types and Purposes 11-12.W.3.a	Engage and orient the reader by setting out a problem, situation, or observation and its significance, establishing one or multiple point(s) of view, and introducing a narrator and/or characters; create a smooth progression of experiences or events.	Production of Writing: Topic Development—Purpose and Focus Organization, Unity, and Cohesion		
Writing Standards (W): Text Types and Purposes 11-12.W.3.b	Use narrative techniques to develop experiences, events, and/or characters.	Production of Writing: Topic Development—Purpose and Focus		

State Standards Categories and Numbers	Standard	The ACT English Reporting Categories and Skill Areas	The ACT Reading Reporting Categories and Skill Areas	The ACT Writing Reporting Categories and Skill Areas
Writing Standards (W): Text Types and Purposes 11-12.W.3.c	Use a variety of techniques to sequence events so that they build on one another to create a coherent whole and particular tone and outcome.	Production of Writing: Topic Development—Purpose and Focus Organization, Unity, and Cohesion Knowledge of Language: Expressing Ideas Clearly Style		
Writing Standards (W): Text Types and Purposes 11-12.W.3.d	Use precise words and phrases, relevant descriptive details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters.	Production of Writing: Topic Development—Purpose and Focus Knowledge of Language: Expressing Ideas Clearly Style		
Writing Standards (W): Text Types and Purposes 11-12.W.3.e	Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative.	Production of Writing: Organization, Unity, and Cohesion		
Writing Standards (W): Production and Distribution of Writing 11-12.W.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)	Production of Writing: Topic Development—Purpose and Focus Organization, Unity, and Cohesion Knowledge of Language: Expressing Ideas Clearly Style		All reporting categories
Writing Standards (W): Production and Distribution of Writing 11-12.W.5	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grades 11–12.)	All reporting categories		All reporting categories
Writing Standards (W): Production and Distribution of Writing 11-12.W.6	Use technology, including the internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.			
Writing Standards (W): Research to Build and Present Knowledge 11-12.W.7	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.			

State Standards Categories and Numbers	Standard	The ACT English Reporting Categories and Skill Areas	The ACT Reading Reporting Categories and Skill Areas	The ACT Writing Reporting Categories and Skill Areas
Writing Standards (W): Research to Build and Present Knowledge 11-12.W.8	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.			
Writing Standards (W): Research to Build and Present Knowledge 11-12.W.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.		All reporting categories	
Writing Standards (W): Research to Build and Present Knowledge 11-12.W.9.a	.Apply grades 11-12 Reading standards to literature.		Key Ideas and Details: Close Reading Relationships Central Ideas, Themes, Summaries Craft and Structure: Word Meanings and Word Choice Text Structure Purpose and Point of View Integration of Knowledge and Ideas: Synthesis of Multiple Text	
Writing Standards (W): Research to Build and Present Knowledge 11-12.W.9.b	Apply grades 11-12 Reading standards to informational text and nonfiction.		All reporting categories	
Writing Standards (W): Range of Writing 11-12.W.10	Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.	All reporting categories		All reporting categories
Speaking and Listening Standards (SL): Comprehension and Collaboration 11-12.SL.1	Initiate and participate effectively in a range of collaborative discussions (one-on- one, in groups, and teacher-led) with diverse partners on grades 11-12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.			
Speaking and Listening Standards (SL): Comprehension and Collaboration 11-12.SL.1.a	Come to discussions prepared having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.			

State Standards Categories and Numbers	Standard	The ACT English Reporting Categories and Skill Areas	The ACT Reading Reporting Categories and Skill Areas	The ACT Writing Reporting Categories and Skill Areas
Speaking and Listening Standards (SL): Comprehension and Collaboration 11-12.SL.1.b	Work with peers to promote civil, democratic discussions and decision-making, set clear goals and deadlines, and establish individual roles as needed.			
Speaking and Listening Standards (SL): Comprehension and Collaboration 11-12.SL.1.c	Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify, or challenge ideas and conclusions; and promote divergent and creative perspectives.			
Speaking and Listening Standards (SL): Comprehension and Collaboration 11-12.SL.1.d	Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task.			
Speaking and Listening Standards (SL): Comprehension and Collaboration 11-12.SL.2	Integrate multiple sources of information presented in diverse media and formats in order to make informed decisions and propose solutions, while evaluating the credibility and accuracy of each source and noting any discrepancies.			
Speaking and Listening Standards (SL): Comprehension and Collaboration 11-12.SL.3	Evaluate a speaker's point of view, reasoning, use of evidence, and use of rhetoric, assessing the stance, premises, links among ideas, word choice, points of emphasis, and tone used.			
Speaking and Listening Standards (SL): Presentation of Knowledge and Ideas 11-12.SL.4	Present information, findings, and supporting evidence in an organized, developed style appropriate to purpose, audience, and task, allowing listeners to follow the speaker's line of reasoning, message, and any alternative perspectives.			
Speaking and Listening Standards (SL): Presentation of Knowledge and Ideas 11-12.SL.5	Make strategic use of digital media in presentations to enhance understanding of findings, reasoning, and evidence to keep the audience engaged.			
Speaking and Listening Standards (SL): Presentation of Knowledge and Ideas 11-12.SL.6	Adapt speech to a variety of contexts and tasks, demonstrating a command of formal English when indicated or appropriate. (See grades 11–12 Language standards 1 and 3 for specific expectations.)			
Language Standards (L): Conventions of Standard English 11-12.L.1	Demonstrate command of the conventions of Standard English grammar and usage when writing or speaking.	Conventions of Standard English: Sentence Structure and Formation Usage Conventions		Language Use and Conventions: Conventions of Written English

State Standards Categories and Numbers	Standard	The ACT English Reporting Categories and Skill Areas	The ACT Reading Reporting Categories and Skill Areas	The ACT Writing Reporting Categories and Skill Areas
Language Standards (L): Conventions of Standard English 11-12.L.1.a	Apply the understanding that usage is a matter of convention, can change over time, and is sometimes contested.	Conventions of Standard English: Usage Conventions		Language Use and Conventions: Conventions of Written English
Language Standards (L): Conventions of Standard English 11-12.L.1.b	Resolve issues of complex or contested usage, consulting references as needed.	Conventions of Standard English: Usage Conventions		Language Use and Conventions: Conventions of Written English
Language Standards (L): Conventions of Standard English 11-12.L.2	Demonstrate command of the conventions of Standard English capitalization, punctuation, and spelling when writing.	Conventions of Standard English: Punctuation Conventions		Language Use and Conventions: Conventions of Written English
Language Standards (L): Conventions of Standard English 11-12.L.2.a	Use hyphenation conventions.			Language Use and Conventions: Conventions of Written English
Language Standards (L): Conventions of Standard English 11-12.L.2.b	Use correct spelling.			Language Use and Conventions: Conventions of Written English
Language Standards (L): Knowledge of Language 11-12.L.3	Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.	Knowledge of Language: Expressing Ideas Clearly Style Production of Writing: Topic Development—Purpose and Focus Conventions of Standard English: Sentence Structure and Formation	Craft and Structure: Word Meanings and Word Choice Text Structure	Language Use and Conventions: Enhanced Meaning Conventions of Written English
Language Standards (L): Knowledge of Language 11-12.L.3.a	Vary syntax for effect, consulting references for guidance as needed; apply an understanding of syntax to the study of complex texts when reading.	Knowledge of Language: Style Conventions of Standard English: Sentence Structure and Formation	Craft and Structure: Word Meanings and Word Choice Text Structure	Language Use and Conventions: Enhanced Meaning Conventions of Written English
Language Standards (L): Vocabulary Acquisition and Use 11-12.L.4	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 11–12 reading and content, choosing flexibly from a range of strategies.	Production of Writing: Topic Development—Purpose and Focus Knowledge of Language: Expressing Ideas Clearly Conventions of Standard Usage: Usage Conventions	Craft and Structure: Word Meanings and Word Choice	Language Use and Conventions: Conventions of Written English

State Standards Categories and Numbers	Standard	The ACT English Reporting Categories and Skill Areas	The ACT Reading Reporting Categories and Skill Areas	The ACT Writing Reporting Categories and Skill Areas
Language Standards (L): Vocabulary Acquisition and Use 11-12.L.4.a	Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., conceive, conception, conceivable).			
Language Standards (L): Vocabulary Acquisition and Use 11-12.L.4.b	Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.	Production of Writing: Topic Development—Purpose and Focus Knowledge of Language: Expressing Ideas Clearly Conventions of Standard English: Usage Conventions	Craft and Structure: Word Meanings and Word Choice	Language Use and Conventions: Conventions of Written English
Language Standards (L): Vocabulary Acquisition and Use 11-12.L.4.c	Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, its etymology, or its standard usage.			
Language Standards (L): Vocabulary Acquisition and Use 11-12.L.4.d	Verify the preliminary determination of the meaning of a word or phrase.	Knowledge of Language: Expressing Ideas Clearly Conventions of Standard English: Usage Conventions	Craft and Structure: Word Meanings and Word Choice	
Language Standards (L): Vocabulary Acquisition and Use 11-12.L.5	Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.	Production of Writing: Topic Development—Purpose and Focus Knowledge of Language: Expressing Ideas Clearly Conventions of Standard English: Usage Conventions	Craft and Structure: Word Meanings and Word Choice Text Structure	
Language Standards (L): Vocabulary Acquisition and Use 11-12.L.5.a	Interpret figures of speech (e.g., hyperbole, paradox) in context and analyze their role in the text.	Production of Writing: Topic Development—Purpose and Focus	Craft and Structure: Word Meanings and Word Choice Text Structure	
Language Standards (L): Vocabulary Acquisition and Use 11-12.L.5.b	Analyze nuances in the meaning of words with similar denotations.	Production of Writing: Topic Development—Purpose and Focus Knowledge of Language: Expressing Ideas Clearly Conventions of Standard English: Usage Conventions	Craft and Structure: Word Meanings and Word Choice	

State Standards Categories and Numbers	Standard	The ACT English Reporting Categories and Skill Areas	The ACT Reading Reporting Categories and Skill Areas	The ACT Writing Reporting Categories and Skill Areas
Language Standards (L): Vocabulary Acquisition and Use 11-12.L.6	Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.	Production of Writing: Topic Development—Purpose and Focus Knowledge of Language: Expressing Ideas Clearly Style Conventions of Standard English: Usage Conventions	Craft and Structure: Word Meanings and Word Choice Text Structure	Language Use and Conventions: Enhanced Meaning Conventions of Written English

VI. Mathematics

ACT Aspire Content Description

- **Item tally and time:** The ACT Aspire mathematics test has 48 items (42 scored items and 6 non-scored field-test items) and a 75-minute time limit.
- **Concept:** The test measures the whole of a student's mathematical development of topics typically taught through the early years of high school in US schools. It focuses on the prerequisite knowledge and skills important for success in college mathematics courses and career training programs.
- **Format:** Most test questions are self-contained. Some may belong to a set of several questions (for example, each about the same graph or chart). The items measure the following reporting categories:
 - Grade-Level Progress
 - Integrating Essential Skills
 - Justification and Explanation
 - Modeling
- **Knowledge and skills tested:** The test measures knowledge areas and related skills reflected in the reporting categories for this test (further described in a table below):
 - ***Grade-Level Progress:*** Students apply the more recent mathematics they are learning. This reporting category is divided into the following five subcategories:
 - ***Number and Quantity:*** Students demonstrate knowledge of the real number system, including rational and irrational numbers. They reason quantitatively and use units to solve problems.
 - ***Algebra:*** Students solve, graph, and model multiple types of expressions. They employ many different kinds of equations, including but not limited to linear, polynomial, radical, and exponential relationships. They find solutions to systems of equations and apply their knowledge to applications.

- *Functions:* Students apply their knowledge of function definition, notation, representation, and application. Questions may include but are not limited to linear, radical, and polynomial functions. Students manipulate and translate functions, as well as find and apply important features of graphs.
 - *Geometry:* Students define and apply knowledge of shapes and solids, such as congruence and similarity relationships or surface area and volume measurements. They understand composition of objects and solve for missing values in triangles, circles, and other figures, including using trigonometric ratios and equations of circles.
 - *Statistics and Probability:* Students describe center and spread of distributions, apply and analyze data collection methods, understand and model relationships in bivariate data, and calculate probabilities, including the related sample spaces.
- *Integrating Essential Skills:* Students put together understandings and skills to solve problems of moderate to high complexity. Topics include:
 - Rate and percentage
 - Proportional reasoning
 - Area, surface area, and volume
 - Quantities and units
 - Expressing numbers in diverse ways
 - Using expressions to represent quantities and equations to capture relationships
 - Rational exponents
 - Basics of functions
 - Function notation
 - *Justification and Explanation:* Students use mathematical arguments in a constructed-response format. Students justify their reasoning by using definitions and theorems, tying in calculations and diagrams, considering cases, understanding general versus specific statements, applying counterexamples, and putting statements together into coherent arguments.

- **Modeling:** Students use mathematics to represent, through a model, an analysis of an actual, empirical situation. The Modeling reporting category represents all items that involve producing, interpreting, understanding, evaluating, and improving models. Each modeling item is also counted in the other appropriate reporting categories above. Thus, the Modeling reporting category is an overall measure of how well a student uses modeling skills across mathematical topics.
- **Question type:** The test contains the following types of questions:
 - Multiple-choice (MC)
 - Technology-enhanced (TE)
 - Constructed-response (CR)
- **Knowledge and skills not tested:** Knowledge of basic formulas and computational skills are assumed as background for the problems, but recall of complex formulas and extensive computation are not required.

ACT Aspire Mathematics Test Blueprint

Ten scores are reported for the ACT Aspire mathematics test: a total test score based on all 42 scored items, and nine reporting category scores, which include the subcategories for Grade-Level Progress. The reporting categories constitute a specific number of items and percentage of the test, as shown below.

Reporting Category	Number of Items	Percentage of Test (raw-score points)
Grade-Level Progress	28	61% (31)
Grade-Level Progress: Number and Quantity	2–3	4–6% (2–3)
Grade-Level Progress: Algebra	6–7	12–14% (6–7)
Grade-Level Progress: Functions	5–6	10–12% (5–6)
Grade-Level Progress: Geometry	6–7	12–14% (6–7)

Grade-Level Progress: Statistics and Probability	3–4	6–8% (3–4)
Integrating Essential Skills	14	39% (20)
Justification and Explanation	3	24% (12)
Modeling	≥ 11	≥ 22% (>11)

Note: Items for Justification and Explanation and for Modeling are included in the item counts in Grade-Level Progress and Integrating Essential Skills. The Grade-Level Progress category contains one Justification and Explanation item worth 4 raw-score points. The Integrating Essential Skills category contains two Justification and Explanation items worth 8 raw-score points.

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

The ACT Mathematics Content Description

- **Item tally and time:** The ACT mathematics test has 45 items (41 scored items and 4 non-scored field-test items) and a 50-minute time limit.
- **Concept:** The test measures the whole of a student’s mathematical development of topics typically taught up to the beginning of Grade 12 in US schools. It focuses on the prerequisite knowledge and skills important for success in college mathematics courses and career training programs.
- **Knowledge and skills tested:** The test measures knowledge areas and related skills reflected in the reporting categories for this test (further described in a chart below):
 - **Preparing for Higher Mathematics:** Students apply the more recent mathematics they are learning. This reporting category is divided into the following five subcategories:
 - **Number and Quantity:** Students demonstrate knowledge of real and complex number systems. They understand and reason with numerical quantities in many forms, including integer and rational exponents, and vectors and matrices.

- *Algebra*: Students solve, graph, and model multiple types of expressions. They employ many kinds of equations, including but not limited to linear, polynomial, radical, and exponential relationships. They find solutions to systems of equations, even when represented by simple matrices, and apply their knowledge to applications.
- *Functions*: Students apply their knowledge of function definition, notation, representation, and application. Items may include but are not limited to linear, radical, piecewise, polynomial, and logarithmic functions. Students manipulate and translate functions, as well as find and apply important features of graphs.
- *Geometry*: Students define and apply knowledge of shapes and solids, such as congruence and similarity relationships or surface area and volume measurements. They understand composition of objects and solve for missing values in triangles, circles, and other figures, including using trigonometric ratios and equations of conic sections.
- *Statistics and Probability*: Students describe center and spread of distributions, apply and analyze data collection methods, understand and model relationships in bivariate data, and calculate probabilities.
- *Integrating Essential Skills*: Students put together understandings and skills to solve problems of moderate to high complexity. Topics include
 - Rate and percentage
 - Proportional reasoning
 - Area, surface area, and volume
 - Quantities and units
 - Expressing numbers in diverse ways
 - Using expressions to represent quantities and equations to capture relationships
 - Rational exponents
 - Basics of functions
 - Function notation
 - Data analysis

- **Modeling:** Students use mathematics to represent, through a model, an analysis of an actual, empirical situation. The Modeling reporting category represents all items that involve producing, interpreting, understanding, evaluating, and improving models. Each modeling item is also counted in the other appropriate reporting categories above. Thus, the Modeling reporting category is an overall measure of how well a student uses modeling skills across mathematical topics.
- **Format and item type:** All test items are multiple-choice and are self-contained. Some may belong to a set of several items (for example, each about the same graph or chart). The items measure the following reporting categories:
 - Preparing for Higher Mathematics
 - Integrating Essential Skills
 - Modeling
- **Knowledge and skills not tested:** Knowledge of basic formulas and computational skills are assumed as background for the problems, but recall of complex formulas and extensive computation are not required. A calculator is encouraged but not required.

The ACT Mathematics Test Blueprint

Nine scores are reported for the ACT mathematics test—a total test score based on all 41 scored items, and eight reporting category scores, which include the subcategories for Preparing for Higher Mathematics. The reporting categories constitute a specific number of items and percentage of the test, as shown in the table below.

Reporting Category	Number of Items	Percentage of Test
Preparing for Higher Mathematics	33	80%
Preparing for Higher Mathematics: Number and Quantity	4–5	10–12%
Preparing for Higher Mathematics: Algebra	7–8	17–20%

Reporting Category	Number of Items	Percentage of Test
Preparing for Higher Mathematics: Functions	7–8	17–20%
Preparing for Higher Mathematics: Geometry	7–8	17–20%
Preparing for Higher Mathematics: Statistics and Probability	5–6	12–15%
Integrating Essential Skills	8	20%
Modeling	≥ 8	$\geq 20\%$

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

ACT Aspire Reporting Category Descriptions

Reporting Category	Skill Area	Description/Examples
Grade-Level Progress: Number and Quantity	Rational and Irrational Numbers	Use and apply the properties of rational and irrational numbers.
Grade-Level Progress: Number and Quantity	Properties of Rational Exponents	Use and apply the properties of rational exponents.
Grade-Level Progress: Number and Quantity	Quantities and Units	Reason quantitatively and use units to solve problems.
Grade-Level Progress: Algebra	Linear Expressions, Equations, and Inequalities	Model situations, solve problems, and perform operations involving linear expressions, equations, and inequalities.
Grade-Level Progress: Algebra	Quadratic Expressions, Equations, and Inequalities	Model situations, solve problems, and perform operations involving quadratic expressions, equations, and inequalities.
Grade-Level Progress: Algebra	Rational and Radical Expressions and Equations	Model situations, solve problems, and perform operations involving simple rational and radical expressions and equations.

Reporting Category	Skill Area	Description/Examples
Grade-Level Progress: Algebra	Polynomial Expressions and Equations	Model situations, solve problems, and perform operations involving polynomial expressions and equations.
Grade-Level Progress: Algebra	Systems of Equations and Inequalities	Write, solve, and graph situations with systems of equations and inequalities.
Grade-Level Progress: Functions	Properties of Functions	Create functions and describe their properties. Convert between different representations of functions.
Grade-Level Progress: Functions	Function Composition and Inverse Functions	Compose functions, find inverse functions, and find domain and range of composition.
Grade-Level Progress: Functions	Sequences and Series	Model situations, perform operations, and solve problems involving sequences and series.
Grade-Level Progress: Functions	Exponential and Logarithmic Functions	Model situations, perform operations, and solve problems involving exponential functions.
Grade-Level Progress: Geometry	Transformations	Model situations, perform operations, and solve problems involving transformations and their properties in a plane.
Grade-Level Progress: Geometry	Proof, Reasoning, and Constructions	Construct geometric figures and use logical arguments to prove theorems.
Grade-Level Progress: Geometry	Similarity, Right Triangles, and Trigonometry	Define trigonometric ratios in terms of right triangles.
Grade-Level Progress: Geometry	Coordinate Geometry	Model situations, perform operations, and solve problems in the coordinate plane.

Reporting Category	Skill Area	Description/Examples
Grade-Level Progress: Geometry	Conic Sections	Model situations, perform operations, and solve problems involving circles,
Grade-Level Progress: Geometry	Properties of Circles	Model situations, perform operations, and solve problems involving properties of circles.
Grade-Level Progress: Geometry	Geometric Measurement and Modeling	Apply geometric concepts in modeling situations.
Grade-Level Progress: Statistics and Probability	Interpret Data on a Single Count	Summarize, represent, and interpret data on a single count or measurement variable.
Grade-Level Progress: Statistics and Probability	Interpret Data on Two Counts	Summarize, represent, and interpret data on a double count or on quantitative variables.
Grade-Level Progress: Statistics and Probability	Making Inferences from Experiments and Surveys	Interpret and evaluate random processes underlying statistical experiments.
Grade-Level Progress: Statistics and Probability	Rules of Probability	Use rules of probability such as the Addition rule to compute probabilities.
Integrating Essential Skills	Properties of Real Numbers	Interpret and apply the properties of real numbers to aid problem solving.
Integrating Essential Skills	Computation and Problem-Solving with Real Numbers	Use all types of real numbers to compute and answer questions.
Integrating Essential Skills	Ratio, Proportion, and Percent	Use ratios, proportions, and percentages in problem-solving situations.
Integrating Essential Skills	Writing Algebraic Expressions	Write algebraic expressions to represent situations including linear and polynomial expressions.

Reporting Category	Skill Area	Description/Examples
Integrating Essential Skills	Writing and Solving Simple Equations and Inequalities	Write equations in one or two variables with linear relationships and use these equations to answer questions.
Integrating Essential Skills	Perimeter, Circumference, and Area	Calculate perimeter, circumference, and area for polygons and circles.
Integrating Essential Skills	Surface Area and Volume	Calculate surface area and volume of solids including prisms, cylinders, cones, and spheres.
Integrating Essential Skills	Measurement Units and Unit Conversion	Model situations, perform operations, and solve problems involving measurement units.
Integrating Essential Skills	Properties of Lines, Angles, and Shapes	Use the properties of lines, angles, two-dimensional shapes, and three-dimensional shapes to describe situations and to solve problems.
Integrating Essential Skills	Pythagorean Theorem	Use the Pythagorean theorem to solve problems and to find distances.
Integrating Essential Skills	Scatterplots and Association	Construct and interpret scatterplots and use linear models.
Integrating Essential Skills	Data Summary and Displays	Describe measures of center, spread, and shape for a data set. Display data in displays such as line plots, dot plots, histograms, and box plots.
Integrating Essential Skills	Basic Probability	Compute probabilities for simple events and for compound events where the sample space can be listed.

Reporting Category	Skill Area	Description/Examples
Justification and Explanation	Number and Quantity, Algebra, Functions, Geometry, Statistics and Probability, and Integrating Essential Skills	Justify reasoning by using definitions and theorems, tying in calculations and diagrams, considering cases, understanding general versus specific statements, applying counterexamples, and putting statements together into coherent arguments.
Modeling	Producing	Produce a model for a given real-world or mathematical context.
Modeling	Interpreting	Take information from a model and interpret the information in terms of the situation.
Modeling	Understanding	Show understanding by determining conditions under which a model works or does not work.
Modeling	Evaluating	Choose the best model for a situation or decide if a model is good enough for a given situation.
Modeling	Improving	Change a model or change assumptions of a model by iterating.

The ACT Reporting Category Descriptions

Reporting Category	Skill Area	Description/Examples
Preparing for Higher Mathematics: Number and Quantity	Rational and Irrational Numbers	Use and apply the properties of rational and irrational numbers.

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

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

Reporting Category	Skill Area	Description/Examples
Preparing for Higher Mathematics: Geometry	Similarity, Right Triangles, and Trigonometry	Use properties of similarity and congruence to solve problems. Define trigonometric ratios in terms of right triangles, and apply these ratios to general triangles.
Preparing for Higher Mathematics: Geometry	Coordinate Geometry	Model situations and solve problems with geometric figures in the coordinate plane.
Preparing for Higher Mathematics: Geometry	Conic Sections	Model situations and solve problems involving conic sections.
Preparing for Higher Mathematics: Geometry	Properties of Circles	Solve problems using properties and features of circles, including inscribed angles, central angles, radii, chords, secants, and tangents.
Preparing for Higher Mathematics: Geometry	Geometric Measurement and Modeling	Apply geometric concepts in modeling situations.
Preparing for Higher Mathematics: Statistics and Probability	Univariate Data Analysis	Solve problems involving the comparison and interpretation of the center, shape, and spread of univariate datasets, including normally distributed datasets.
Preparing for Higher Mathematics: Statistics and Probability	Bivariate Data Analysis	Summarize, represent, and interpret datasets with two categorical or two quantitative variables. Determine whether an association exists between two variables.

Reporting Category	Skill Area	Description/Examples
Preparing for Higher Mathematics: Statistics and Probability	Introduction to Formal Inferential Statistics	Use sample data and margin of error to estimate population parameters. Use simulation or other methods to reject or fail to reject claims about population parameters.
Preparing for Higher Mathematics: Statistics and Probability	Rules of Probability	Use rules of probability to compute probabilities and expected values.
Preparing for Higher Mathematics: Statistics and Probability	Counting, Permutations, and Combinations	Use counting principles, combinations, and permutations to compute probabilities of compound events and solve problems.
Integrating Essential Skills	Properties of Real Numbers	Use and apply the properties of real numbers.
Integrating Essential Skills	Computation and Problem Solving with Real Numbers	Evaluate expressions and solve problems involving real numbers.
Integrating Essential Skills	Ratio, Proportion, and Percent	Use ratios, proportions, and percents in problem-solving situations.
Integrating Essential Skills	Writing Algebraic Expressions	Model situations and perform operations with linear and polynomial expressions.
Integrating Essential Skills	Writing and Solving Simple Equations and Inequalities	Write one- and two-variable linear equations, and use these equations to answer questions.
Integrating Essential Skills	Measurement Units and Unit Conversion	Model situations, solve problems, and perform operations involving measurement units and scale models.

Reporting Category	Skill Area	Description/Examples
Integrating Essential Skills	Properties of Lines, Angles, and Shapes	Use the properties of lines, angles, two-dimensional shapes, and three-dimensional shapes to describe situations and solve problems.
Integrating Essential Skills	Perimeter, Circumference, and Area	Calculate the perimeter, circumference, and area of polygons and circles.
Integrating Essential Skills	Surface Area and Volume	Calculate surface area and volume of solids including prisms, cylinders, cones, and spheres.
Integrating Essential Skills	The Coordinate Plane	Solve problems involving the graphing of points and polygons in the coordinate plane.
Integrating Essential Skills	Pythagorean Theorem	Use the Pythagorean theorem to solve problems and to find distances.
Integrating Essential Skills	Scatterplots	Analyze scatterplots and, where appropriate, draw informal lines of best fit and represent them symbolically.
Integrating Essential Skills	Data Summaries and Displays	Describe the distribution of a quantitative dataset by its shape and measures of center and spread. Present data in displays such as line plots, histograms, box plots, and bar charts.
Integrating Essential Skills	Informal Inferential Statistics	Estimate a population parameter with sample data.
Integrating Essential Skills	Basic Probability	Compute probabilities for simple events and for compound events where the sample space can be listed.

Reporting Category	Skill Area	Description/Examples
Modeling	Producing	Produce a model for a given real-world or mathematical context.
Modeling	Interpreting	Take information from a model and interpret the information in terms of the situation.
Modeling	Understanding	Show understanding by determining conditions under which a model works or does not work.
Modeling	Evaluating	Choose the best model for a situation or decide if a model is good enough for a given situation.
Modeling	Improving	Change a model or change assumptions of a model by iterating.

CROSSWALK:
Arizona Mathematics Standards Aligned to ACT Assessments

Table 3: Arizona Mathematics Standards—Algebra 1 (adopted 2016), Aligned to ACT Aspire

Note: Rows with gray shading indicate the beginning of a new standards category or subcategory.

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Algebra I	ACT Aspire Mathematics Reporting Categories and Skill Areas
Number and Quantity (N): The Real Number System (R-N) A1.N-RN.B	Use properties of rational and irrational numbers.	
Number and Quantity (N): The Real Number System (R-N) A1.N-RN.B.3	Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.	Number and Quantity: Rational and Irrational Numbers Integrating Essential Skills: Properties of Real Numbers
Number and Quantity (N): Quantities (N-Q) A1.N-Q.A	Reason quantitatively and use units to solve problems.	
Number and Quantity (N): Quantities (N-Q) A1.N-Q.A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays, include utilizing real-world context.	Number and Quantity: Quantities and Units Integrating Essential Skills: Measurement Units and Unit Conversion Data Summary and Displays Computation and Problem-Solving with Real Numbers
Number and Quantity (N): Quantities (N-Q) A1.N-Q.A.2	Define appropriate quantities for the purpose of descriptive modeling. Include problem-solving opportunities utilizing real-world context.	Number and Quantity: Quantities and Units Integrating Essential Skills: Computation and Problem-Solving with Real Numbers
Number and Quantity (N): Quantities (N-Q) A1.N-Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities utilizing real-world context.	Number and Quantity: Quantities and Units Integrating Essential Skills: Computation and Problem-Solving with Real Numbers
Algebra (A): Seeing Structures in Expressions (A-SSE) A1.A-SSE.A	Interpret the structure of expressions.	

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Algebra I	ACT Aspire Mathematics Reporting Categories and Skill Areas
Algebra (A): Seeing Structures in Expressions (A-SSE) A1.A-SSE.A.1	Interpret expressions that represent a quantity in terms of its context.	Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities Polynomial Expressions and Equations Systems of Equations and Inequalities Modeling: Interpreting
Algebra (A): Seeing Structures in Expressions (A-SSE) A1.A-SSE.A.1.a	Interpret parts of an expression, such as terms, factors, and coefficients.	Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities Polynomial Expressions and Equations Systems of Equations and Inequalities Modeling: Interpreting
Algebra (A): Seeing Structures in Expressions (A-SSE) A1.A-SSE.A.1.b	Interpret expressions by viewing one or more of their parts as a single entity.	Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities Polynomial Expressions and Equations Systems of Equations and Inequalities Modeling: Interpreting
Algebra (A): Seeing Structures in Expressions (A-SSE) A1.A-SSE.A.2	Use structure to identify ways to rewrite numerical and polynomial expressions. Focus on polynomial multiplication and factoring patterns.	Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities Polynomial Expressions and Equations Systems of Equations and Inequalities Modeling: Interpreting
Algebra (A): Seeing Structures in Expressions (A-SSE) A1.A-SSE.B	Write expressions in equivalent forms to solve problems.	
Algebra (A): Seeing Structures in Expressions (A-SSE) A1.A-SSE.B.3	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.	Algebra: Polynomial Expressions and Equations Quadratic Expressions, Equations, and Inequalities Modeling: Interpreting

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Algebra I	ACT Aspire Mathematics Reporting Categories and Skill Areas
Algebra (A): Seeing Structures in Expressions (A-SSE) A1.A-SSE.B.3.a	Factor a quadratic expression to reveal the zeros of the function it defines.	Algebra: Polynomial Expressions and Equations Quadratic Expressions, Equations, and Inequalities Modeling: Interpreting
Algebra (A): Seeing Structures in Expressions (A-SSE) A1.A-SSE.B.3.b	Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.	Algebra: Polynomial Expressions and Equations Quadratic Expressions, Equations, and Inequalities Modeling: Interpreting
Algebra (A): Arithmetic with Polynomials and Rational Expressions (A-APR) A1.A-APR.A	Perform arithmetic operations on polynomials.	
Algebra (A): Arithmetic with Polynomials and Rational Expressions (A-APR) A1.A-APR.A.1	Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.	Algebra: Polynomial Expressions and Equations Quadratic Expressions, Equations, and Inequalities
Algebra (A): Arithmetic with Polynomials and Rational Expressions (A-APR) A1.A-APR.B	Understand the relationship between zeros and factors of polynomials.	
Algebra (A): Arithmetic with Polynomials and Rational Expressions (A-APR) A1.A-APR.B.3	Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial. Focus on quadratic and cubic polynomials in which linear and quadratic factors are available.	Algebra: Polynomial Expressions and Equations Quadratic Expressions, Equations, and Inequalities Functions: Properties of Functions
Algebra (A): Creating Equations (A-CED) A1.A-CED.A	Create equations that describe numbers or relationships.	
Algebra (A): Creating Equations (A-CED) A1.A-CED.A.1	Create equations and inequalities in one variable and use them to solve problems. Include problem-solving opportunities utilizing real-world context. Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).	Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities Number and Quantity: Properties of Exponents Modeling: Producing Integrating Essential Skills: Computation and Problem-Solving with Real Numbers

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Algebra I	ACT Aspire Mathematics Reporting Categories and Skill Areas
Algebra (A): Creating Equations (A-CED) A1.A-CED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities Polynomial Expressions and Equations Functions: Exponential and Logarithmic Functions Number and Quantity: Quantities and Units
Algebra (A): Creating Equations (A-CED) A1.A-CED.A.3	Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context.	Algebra: Quadratic Expressions, Equations, and Inequalities Linear Expressions, Equations, and Inequalities Systems of Equations and Inequalities
Algebra (A): Creating Equations (A-CED) A1.A-CED.A.4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm’s law $V = IR$ to highlight resistance R .	Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities Rational and Radical Expressions and Equations Polynomial Expressions and Equations
Algebra (A): Reasoning with Equations and Inequalities (A-REI) A1.A-REI.A	Understand solving equations as a process of reasoning and explain the reasoning.	
Algebra (A): Reasoning with Equations and Inequalities (A-REI) A1.A-REI.A.1	Explain each step in solving linear and quadratic equations as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities
Algebra (A): Reasoning with Equations and Inequalities (A-REI) A1.REI.B	Solve equations and inequalities in one variable.	
Algebra (A): Reasoning with Equations and Inequalities (A-REI) A1.A-REI.B.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	Algebra: Linear Expressions, Equations, and Inequalities Integrating Essential Skills: Writing and Solving Simple Equations and Inequalities
Algebra (A): Reasoning with Equations and Inequalities (A-REI) A1.A-REI.B.4	Solve quadratic equations in one variable.	Algebra: Quadratic Expressions, Equations, and Inequalities
Algebra (A): Reasoning with Equations and Inequalities (A-REI) A1.A-REI.B.4.a	Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x-k)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.	Algebra: Quadratic Expressions, Equations, and Inequalities

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Algebra I	ACT Aspire Mathematics Reporting Categories and Skill Areas
Algebra (A): Reasoning with Equations and Inequalities (A-REI) A1.A-REI.B.4.b	Solve quadratic equations by inspection (e.g., $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Focus on solutions for quadratic equations that have real roots. Include cases that recognize when a quadratic equation has no real solutions.	Algebra: Quadratic Expressions, Equations, and Inequalities
Algebra (A): Reasoning with Equations and Inequalities (A-REI) A1.A-REI.C	Solve systems of equations.	
Algebra (A): Reasoning with Equations and Inequalities (A-REI) A1.A-REI.C.5	Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.	Algebra: Systems of Equations and Inequalities Integrating Essential Skills: Writing and Solving Simple Equations and Inequalities
Algebra (A): Reasoning with Equations and Inequalities (A-REI) A1.A-REI.C.6	Solve systems of linear equations exactly and approximately, focusing on pairs of linear equations in two variables. Include problem solving opportunities utilizing real-world context.	Algebra: Systems of Equations and Inequalities Integrating Essential Skills: Writing and Solving Simple Equations and Inequalities Modeling: Producing Interpreting
Algebra (A): Reasoning with Equations and Inequalities (A-REI) A1.A-REI.D	Represent and solve equations and inequalities graphically.	
Algebra (A): Reasoning with Equations and Inequalities (A-REI) A1.A-REI.D.10	Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve, which could be a line.	Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities Functions: Properties of Functions Geometry: Coordinate Geometry
Algebra (A): Reasoning with Equations and Inequalities (A-REI) A1.A-REI.D.11	Explain why the x-coordinates of the points where the graphs of the equations $y=f(x)$ and $y=g(x)$ intersect are the solutions of the equation $f(x)=g(x)$; find the solutions approximately (e.g., using technology to graph the functions, make tables of values, or find successive approximations). Focus on cases where $f(x)$ and/or $g(x)$ are linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).	Algebra: Systems of Equations and Inequalities Linear Expressions, Equations, and Inequalities Rational and Radical Expressions and Equations Polynomial Expressions and Equations Quadratic Expressions, Equations, and Inequalities Functions: Properties of Functions

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Algebra I	ACT Aspire Mathematics Reporting Categories and Skill Areas
Algebra (A): Reasoning with Equations and Inequalities (A-REI) A1.A-REI.D.12	Graph the solutions to a linear inequality in two variables as a half-plane, excluding the boundary in the case of a strict inequality, and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.	Algebra: Systems of Equations and Inequalities Linear Expressions, Equations, and Inequalities
Functions (F): Interpreting Functions (F-IF) A1.F-IF.A	Understand the concept of a function and use function notation.	
Functions (F): Interpreting Functions (F-IF) A1.F-IF.A.1	Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x . The graph of f is the graph of the equation $y = f(x)$.	Functions: Properties of Functions
Functions (F): Interpreting Functions (F-IF) A1.F-IF.A.2	Evaluate a function for inputs in the domain, and interpret statements that use function notation in terms of a context.	Functions: Properties of Functions Function Composition and Inverse Functions
Functions (F): Interpreting Functions (F-IF) A1.F-IF.A.3	Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.	Functions: Properties of Functions Sequences and Series
Functions (F): Interpreting Functions (F-IF) A1.F-IF.B	Interpret functions that arise in applications in terms of the context	
Functions (F): Interpreting Functions (F-IF) A1.F-IF.B.4	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Include problem-solving opportunities utilizing real-world context. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums. Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).	Functions: Properties of Functions Geometry: Coordinate Geometry Algebra: Linear Expressions, Equations, and Inequalities Rational and Radical Expressions and Equations Polynomial Expressions and Equations Quadratic Expressions, Equations, and Inequalities
Functions (F): Interpreting Functions (F-IF) A1.F-IF.B.5	Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.	Functions: Properties of Functions

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Algebra I	ACT Aspire Mathematics Reporting Categories and Skill Areas
Functions (F): Interpreting Functions (F-IF) A1.F-IF.B.6	Calculate and interpret the average rate of change of a continuous function (presented symbolically or as a table) on a closed interval. Estimate the rate of change from a graph. Include problem-solving opportunities utilizing real-world context. Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).	Functions: Properties of Functions Geometry: Coordinate Geometry Integrating Essential Skills: Computation and Problem-Solving with Real Numbers Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities
Functions (F): Interpreting Functions (F-IF) A1.F-IF.C	Analyze functions using different representations.	
Functions (F): Interpreting Functions (F-IF) A1.F-IF.C.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).	Functions: Properties of Functions Geometry: Coordinate Geometry Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities
Functions (F): Interpreting Functions (F-IF) A1.F-IF.C.8	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.	Functions: Properties of Functions Algebra: Quadratic Expressions, Equations, and Inequalities
Functions (F): Interpreting Functions (F-IF) A1.F-IF.C.8.a	Use the process of factoring and completing the square of a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.	Functions: Properties of Functions Algebra: Quadratic Expressions, Equations, and Inequalities
Functions (F): Interpreting Functions (F-IF) A1.F-IF.C.9	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).	Functions: Properties of Functions Exponential and Logarithmic Functions Algebra: Linear Expressions, Equations, and Inequalities Polynomial Expressions and Equations Quadratic Expressions, Equations, and Inequalities
Functions (F): Building Functions (F-BF) A1.F-BF.A	Build a function that models a relationship between two quantities.	

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Algebra I	ACT Aspire Mathematics Reporting Categories and Skill Areas
Functions (F): Building Functions (F-BF) A1.F-BF.A.1	Write a function that describes a relationship between two quantities. Determine an explicit expression, a recursive process, or steps for calculation from real-world context. Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).	Functions: Properties of Functions Exponential and Logarithmic Functions Sequences and Series Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities Polynomial Expressions and Equations
Functions (F): Building Functions (F-BF) A1.F-BF.B	Build new functions from existing functions.	
Functions (F): Building Functions (F-BF) A1.F-BF.B.3	Identify the effect on the graph of replacing $f(x)$ by $f(x)+k$, $k f(x)$, and $f(x+k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph. Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).	Functions: Properties of Functions Exponential and Logarithmic Functions Function Composition and Inverse Functions Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities Polynomial Expressions and Equations Rational and Radical Expressions and Equations Geometry: Coordinate Geometry
Functions (F): Linear, Quadratic, and Exponential Models (F-LE) A1.F-LE.A	Construct and compare linear, quadratic, and exponential models and solve problems.	
Functions (F): Linear, Quadratic, and Exponential Models (F-LE) A1.F-LE.A.1	Distinguish between situations that can be modeled with linear functions and with exponential functions.	Functions: Properties of Functions Exponential and Logarithmic Functions Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities Modeling: Producing Interpreting

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Algebra I	ACT Aspire Mathematics Reporting Categories and Skill Areas
Functions (F): Linear, Quadratic, and Exponential Models (F-LE) A1.F-LE.A.1.a	Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.	Functions: Properties of Functions Exponential and Logarithmic Functions Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities Modeling: Producing Interpreting
Functions (F): Linear, Quadratic, and Exponential Models (F-LE) A1.F-LE.A.1.b	Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.	Functions: Properties of Functions Exponential and Logarithmic Functions Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities Modeling: Producing Interpreting
Functions (F): Linear, Quadratic, and Exponential Models (F-LE) A1.F-LE.A.1.c	Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.	Functions: Properties of Functions Exponential and Logarithmic Functions Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities Modeling: Producing Interpreting
Functions (F): Linear, Quadratic, and Exponential Models (F-LE) A1.F-LE.A.2	Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or input/output pairs.	Functions: Properties of Functions Exponential and Logarithmic Functions Sequences and Series Algebra: Linear Expressions, Equations, and Inequalities Modeling: Producing Interpreting

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Algebra I	ACT Aspire Mathematics Reporting Categories and Skill Areas
Functions (F): Linear, Quadratic, and Exponential Models (F-LE) A1.F-LE.A.3	Observe, using graphs and tables, that a quantity increasing exponentially eventually exceeds a quantity increasing linearly or quadratically.	Functions: Properties of Functions Exponential and Logarithmic Functions Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities
Functions (F): Linear, Quadratic, and Exponential Models (F-LE) A1.F-LE.B	Interpret expressions for functions in terms of the situation they model.	
Functions (F): Linear, Quadratic, and Exponential Models (F-LE) A1.F-LE.B.5	Interpret the parameters in a linear or exponential function with integer exponents utilizing real world context.	Functions: Properties of Functions Exponential and Logarithmic Functions Algebra: Linear Expressions, Equations, and Inequalities Modeling: Interpreting
Statistics and Probability (S): Summarize, represent, and interpret data on a single count or measurement variable. (S-ID) A1.S-ID.A	Summarize, represent, and interpret data on a single count or measurement variable.	
Statistics and Probability (S): Summarize, represent, and interpret data on a single count or measurement variable. (S-ID) A1.S-ID.A.1	Represent real-value data with plots for the purpose of comparing two or more data sets.	Statistics and Probability: Interpret Data on a Single Count Integrating Essential Skills: Scatterplots and Association Data Summary and Displays
Statistics and Probability (S): Summarize, represent, and interpret data on a single count or measurement variable. (S-ID) A1.S-ID.A.2	Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.	Statistics and Probability: Interpret Data on a Single Count Making Inferences from Experiments and Surveys Integrating Essential Skills: Data Summary and Displays
Statistics and Probability (S): Summarize, represent, and interpret data on a single count or measurement variable. (S-ID) A1.S-ID.A.3	Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of outliers if present.	Statistics and Probability: Interpret Data on a Single Count Making Inferences from Experiments and Surveys Integrating Essential Skills: Data Summary and Displays
Statistics and Probability (S): Summarize, represent, and interpret data on a single count or measurement variable. (S-ID) A1.S-ID.B	Summarize, represent, and interpret data on two categorical and quantitative variables.	

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Algebra I	ACT Aspire Mathematics Reporting Categories and Skill Areas
Statistics and Probability (S): Summarize, represent, and interpret data on a single count or measurement variable. (S-ID) A1.S-ID.B.5	Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data, including joint, marginal, and conditional relative frequencies. Recognize possible associations and trends in the data.	Statistics and Probability: Interpret Data on Two Counts Making Inferences from Experiments and Surveys Integrating Essential Skills: Scatterplots and Association
Statistics and Probability (S): Summarize, represent, and interpret data on a single count or measurement variable. (S-ID) A1.S-ID.B.6	Represent data on two quantitative variables on a scatter plot, and describe how the quantities are related.	Statistics and Probability: Interpret Data on Two Counts Integrating Essential Skills: Scatterplots and Association Functions: Properties of Functions
Statistics and Probability (S): Summarize, represent, and interpret data on a single count or measurement variable. (S-ID) A1.S-ID.B.6.a	Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Focus on linear models.	Statistics and Probability: Interpret Data on Two Counts Integrating Essential Skills: Scatterplots and Association Functions: Properties of Functions
Statistics and Probability (S): Summarize, represent, and interpret data on a single count or measurement variable. (S-ID) A1.S-ID.B.6.b	Informally assess the fit of a function by plotting and analyzing residuals.	Statistics and Probability: Interpret Data on Two Counts Integrating Essential Skills: Scatterplots and Association Functions: Properties of Functions
Statistics and Probability (S): Summarize, represent, and interpret data on a single count or measurement variable. (S-ID) A1.S-ID.C	Interpret linear models.	
Statistics and Probability (S): Summarize, represent, and interpret data on a single count or measurement variable. (S-ID) A1.S-ID.C.7	Interpret the slope as a rate of change and the constant term of a linear model in the context of the data.	Statistics and Probability: Interpret Data on Two Counts Integrating Essential Skills: Scatterplots and Association Functions: Properties of Functions
Statistics and Probability (S): Summarize, represent, and interpret data on a single count or measurement variable. (S-ID) A1.S-ID.C.8	Compute and interpret the correlation coefficient of a linear relationship.	

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Algebra I	ACT Aspire Mathematics Reporting Categories and Skill Areas
Statistics and Probability (S): Summarize, represent, and interpret data on a single count or measurement variable. (S-ID) A1.S-ID.C.9	Distinguish between correlation and causation.	Statistics and Probability: Interpret Data on Two Counts Making Inferences from Experiments and Surveys Integrating Essential Skills: Scatterplots and Association
Statistics and Probability (S): Conditional Probability and the Rules of Probability (S-CP) A1.S-CP.A	Understand independence and conditional probability and use them to interpret data.	
Statistics and Probability (S): Conditional Probability and the Rules of Probability (S-CP) A1.S-CP.A.1	Describe events as subsets of a sample space using characteristics of the outcomes, or as unions, intersections, or complements of other events.	Statistics and Probability: Rules of Probability Integrating Essential Skills: Basic Probability
Statistics and Probability (S): Conditional Probability and the Rules of Probability (S-CP) A1.S-CP.A.2	Use the Multiplication Rule for independent events to understand that two events <i>A</i> and <i>B</i> are independent if the probability of <i>A</i> and <i>B</i> occurring together is the product of their probabilities, and use this characterization to determine if they are independent.	Statistics and Probability: Rules of Probability Integrating Essential Skills: Basic Probability
Standards for Mathematical Practice (MP): A1.MP.1	Make sense of problems and persevere in solving them. Mathematically proficient students explain to themselves the meaning of a problem, look for entry points to begin work on the problem, and plan and choose a solution pathway. While engaging in productive struggle to solve a problem, they continually ask themselves, “Does this make sense?” to monitor and evaluate their progress and change course if necessary. Once they have a solution, they look back at the problem to determine if the solution is reasonable and accurate. Mathematically proficient students check their solutions to problems using different methods, approaches, or representations. They also compare and understand different representations of problems and different solution pathways, both their own and those of others.	Modeling: Producing Interpreting Understanding Evaluating
Standards for Mathematical Practice (MP): A1.MP.2	Reason abstractly and quantitatively. Mathematically proficient students make sense of quantities and their relationships in problem situations. Students can contextualize and decontextualize problems involving quantitative relationships. They contextualize quantities, operations, and expressions by describing a corresponding situation. They decontextualize a situation by representing it symbolically. As they manipulate the symbols, they can pause as needed to access the meaning of the numbers, the units, and the operations that the symbols represent. Mathematically proficient students know and flexibly use different properties of operations, numbers, and geometric objects and when appropriate they interpret their solution in terms of the context.	Modeling: Producing Interpreting

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Algebra I	ACT Aspire Mathematics Reporting Categories and Skill Areas
Standards for Mathematical Practice (MP): A1.MP.3	Construct viable arguments and critique the reasoning of others. Mathematically proficient students construct mathematical arguments (explain the reasoning underlying a strategy, solution, or conjecture) using concrete, pictorial, or symbolic referents. Arguments may also rely on definitions, assumptions, previously established results, properties, or structures. Mathematically proficient students make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. Mathematically proficient students present their arguments in the form of representations, actions on those representations, and explanations in words (oral or written). Students critique others by affirming or questioning the reasoning of others. They can listen to or read the reasoning of others, decide whether it makes sense, ask questions to clarify or improve the reasoning, and validate or build on it. Mathematically proficient students can communicate their arguments, compare them to others, and reconsider their own arguments in response to the critiques of others.	Modeling: Producing Interpreting Understanding
Standards for Mathematical Practice (MP): A1.MP.4	Model with mathematics. Mathematically proficient students apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. When given a problem in a contextual situation, they identify the mathematical elements of a situation and create a mathematical model that represents those mathematical elements and the relationships among them. Mathematically proficient students use their model to analyze the relationships and draw conclusions. They interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.	Modeling: Producing Interpreting Understanding Evaluating Improving
Standards for Mathematical Practice (MP): A1.MP.5	Use appropriate tools strategically. Mathematically proficient students consider available tools when solving a mathematical problem. They choose tools that are relevant and useful to the problem at hand. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful; recognizing both the insight to be gained and their limitations. Students deepen their understanding of mathematical concepts when using tools to visualize, explore, compare, communicate, make and test predictions, and understand the thinking of others.	Modeling: Producing Understanding Evaluating

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Algebra I	ACT Aspire Mathematics Reporting Categories and Skill Areas
Standards for Mathematical Practice (MP): A1.MP.6	Attend to precision. Mathematically proficient students clearly communicate to others using appropriate mathematical terminology, and craft explanations that convey their reasoning. When making mathematical arguments about a solution, strategy, or conjecture, they describe mathematical relationships and connect their words clearly to their representations. Mathematically proficient students understand meanings of symbols used in mathematics, calculate accurately and efficiently, label quantities appropriately, and record their work clearly and concisely.	Modeling: Interpreting Understanding
Standards for Mathematical Practice (MP): A1.MP.7	Look for and make use of structure. Mathematically proficient students use structure and patterns to assist in making connections among mathematical ideas or concepts when making sense of mathematics. Students recognize and apply general mathematical rules to complex situations. They are able to compose and decompose mathematical ideas and notations into familiar relationships. Mathematically proficient students manage their own progress, stepping back for an overview and shifting perspective when needed.	Modeling: Producing Understanding Evaluating
Standards for Mathematical Practice (MP): A1.MP.8	Look for and express regularity in repeated reasoning. Mathematically proficient students look for and describe regularities as they solve multiple related problems. They formulate conjectures about what they notice and communicate observations with precision. While solving problems, students maintain oversight of the process and continually evaluate the reasonableness of their results. This informs and strengthens their understanding of the structure of mathematics which leads to fluency.	Modeling: Understanding Evaluating

Table 4: Arizona Mathematics Standards—Algebra 1 (adopted 2016), Aligned to the ACT

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Algebra I	The ACT Mathematics Reporting Categories and Skill Areas
Number and Quantity (N): The Real Number System (R-N) A1.N-RN.B	Use properties of rational and irrational numbers.	
Number and Quantity (N): The Real Number System (R-N) A1.N-RN.B.3	Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.	Number and Quantity: Rational and Irrational Numbers
Number and Quantity (N): Quantities (N-Q) A1.N-Q.A	Reason quantitatively and use units to solve problems.	

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Algebra I	The ACT Mathematics Reporting Categories and Skill Areas
Number and Quantity (N): Quantities (N-Q) A1.N-Q.A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays, include utilizing real-world context.	Number and Quantity: Quantities and Units Integrating Essential Skills: Computation and Problem Solving with Real Numbers Measurement Units and Unit Conversion
Number and Quantity (N): Quantities (N-Q) A1.N-Q.A.2	Define appropriate quantities for the purpose of descriptive modeling. Include problem-solving opportunities utilizing real-world context.	Number and Quantity: Quantities and Units Integrating Essential Skills: Computation and Problem Solving with Real Numbers
Number and Quantity (N): Quantities (N-Q) A1.N-Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities utilizing real-world context.	Number and Quantity: Quantities and Units Integrating Essential Skills: Computation and Problem Solving with Real Numbers
Algebra (A): Seeing Structures in Expressions (A-SSE) A1.A-SSE.A	Interpret the structure of expressions.	
Algebra (A): Seeing Structures in Expressions (A-SSE) A1.A-SSE.A.1	Interpret expressions that represent a quantity in terms of its context.	Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities Polynomial Expressions and Equations Representation of Expressions and Equations
Algebra (A): Seeing Structures in Expressions (A-SSE) A1.A-SSE.A.1.a	Interpret parts of an expression, such as terms, factors, and coefficients.	Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities Polynomial Expressions and Equations Representation of Expressions and Equations
Algebra (A): Seeing Structures in Expressions (A-SSE) A1.A-SSE.A.1.b	Interpret expressions by viewing one or more of their parts as a single entity.	Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities Polynomial Expressions and Equations Representation of Expressions and Equations
Algebra (A): Seeing Structures in Expressions (A-SSE) A1.A-SSE.A.2	Use structure to identify ways to rewrite numerical and polynomial expressions. Focus on polynomial multiplication and factoring patterns.	Algebra: Polynomial Expressions and Equations Quadratic Expressions, Equations, and Inequalities Representation of Expressions and Equations
Algebra (A): Seeing Structures in Expressions (A-SSE) A1.A-SSE.B	Write expressions in equivalent forms to solve problems.	

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Algebra I	The ACT Mathematics Reporting Categories and Skill Areas
Algebra (A): Seeing Structures in Expressions (A-SSE) A1.A-SSE.B.3	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.	Algebra: Quadratic Expressions, Equations, and Inequalities Linear Expressions, Equations, and Inequalities Representation of Expressions and Equations
Algebra (A): Seeing Structures in Expressions (A-SSE) A1.A-SSE.B.3.a	Factor a quadratic expression to reveal the zeros of the function it defines.	Algebra: Quadratic Expressions, Equations, and Inequalities Linear Expressions, Equations, and Inequalities Representation of Expressions and Equations
Algebra (A): Seeing Structures in Expressions (A-SSE) A1.A-SSE.B.3.b	Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.	Algebra: Quadratic Expressions, Equations, and Inequalities Linear Expressions, Equations, and Inequalities Representation of Expressions and Equations
Algebra (A): Arithmetic with Polynomials and Rational Expressions (A-APR) A1.A-APR.A	Perform arithmetic operations on polynomials.	
Algebra (A): Arithmetic with Polynomials and Rational Expressions (A-APR) A1.A-APR.A.1	Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.	Algebra: Polynomial Expressions and Equations Quadratic Expressions, Equations, and Inequalities
Algebra (A): Arithmetic with Polynomials and Rational Expressions (A-APR) A1.A-APR.B	Understand the relationship between zeros and factors of polynomials.	
Algebra (A): Arithmetic with Polynomials and Rational Expressions (A-APR) A1.A-APR.B.3	Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial. Focus on quadratic and cubic polynomials in which linear and quadratic factors are available.	Algebra: Polynomial Expressions and Equations Quadratic Expressions, Equations, and Inequalities
Algebra (A): Creating Equations (A-CED) A1.A-CED.A	Create equations that describe numbers or relationships.	
Algebra (A): Creating Equations (A-CED) A1.A-CED.A.1	Create equations and inequalities in one variable and use them to solve problems. Include problem-solving opportunities utilizing real-world context. Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).	Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities Functions: Exponential and Logarithmic Functions
Algebra (A): Creating Equations (A-CED) A1.A-CED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities Functions: Exponential and Logarithmic Functions

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Algebra I	The ACT Mathematics Reporting Categories and Skill Areas
Algebra (A): Creating Equations (A-CED) A1.A-CED.A.3	Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context.	Algebra: Linear Expressions, Equations, and Inequalities Systems of Equations and Inequalities
Algebra (A): Creating Equations (A-CED) A1.A-CED.A.4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law $V = IR$ to highlight resistance R .	Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities Representation of Expressions and Equations
Algebra (A): Reasoning with Equations and Inequalities (A-REI) A1.A-REI.A	Understand solving equations as a process of reasoning and explain the reasoning.	
Algebra (A): Reasoning with Equations and Inequalities (A-REI) A1.A-REI.A.1	Explain each step in solving linear and quadratic equations as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities
Algebra (A): Reasoning with Equations and Inequalities (A-REI) A1.REI.B	Solve equations and inequalities in one variable.	
Algebra (A): Reasoning with Equations and Inequalities (A-REI) A1.A-REI.B.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	Algebra: Linear Expressions, Equations, and Inequalities
Algebra (A): Reasoning with Equations and Inequalities (A-REI) A1.A-REI.B.4	Solve quadratic equations in one variable.	Algebra: Quadratic Expressions, Equations, and Inequalities
Algebra (A): Reasoning with Equations and Inequalities (A-REI) A1.A-REI.B.4.a	Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x-k)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.	Algebra: Quadratic Expressions, Equations, and Inequalities
Algebra (A): Reasoning with Equations and Inequalities (A-REI) A1.A-REI.B.4.b	Solve quadratic equations by inspection (e.g., $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Focus on solutions for quadratic equations that have real roots. Include cases that recognize when a quadratic equation has no real solutions.	Algebra: Quadratic Expressions, Equations, and Inequalities
Algebra (A): Reasoning with Equations and Inequalities (A-REI) A1.A-REI.C	Solve systems of equations.	
Algebra (A): Reasoning with Equations and Inequalities (A-REI) A1.A-REI.C.5	Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.	Algebra: Systems of Equations and Inequalities
Algebra (A): Reasoning with Equations and Inequalities (A-REI) A1.A-REI.C.6	Solve systems of linear equations exactly and approximately, focusing on pairs of linear equations in two variables. Include problem solving opportunities utilizing real-world context.	Algebra: Systems of Equations and Inequalities
Algebra (A): Reasoning with Equations and Inequalities (A-REI) A1.A-REI.D	Represent and solve equations and inequalities graphically.	

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Algebra I	The ACT Mathematics Reporting Categories and Skill Areas
Algebra (A): Reasoning with Equations and Inequalities (A-REI) A1.A-REI.D.10	Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve, which could be a line.	Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities
Algebra (A): Reasoning with Equations and Inequalities (A-REI) A1.A-REI.D.11	Explain why the x-coordinates of the points where the graphs of the equations $y=f(x)$ and $y=g(x)$ intersect are the solutions of the equation $f(x)=g(x)$; find the solutions approximately (e.g., using technology to graph the functions, make tables of values, or find successive approximations). Focus on cases where $f(x)$ and/or $g(x)$ are linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).	Algebra: Systems of Equations and Inequalities Linear Expressions, Equations, and Inequalities Functions: Properties of Functions
Algebra (A): Reasoning with Equations and Inequalities (A-REI) A1.A-REI.D.12	Graph the solutions to a linear inequality in two variables as a half-plane, excluding the boundary in the case of a strict inequality, and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.	Algebra: Systems of Equations and Inequalities Linear Expressions, Equations, and Inequalities
Functions (F): Interpreting Functions (F-IF) A1.F-IF.A	Understand the concept of a function and use function notation.	
Functions (F): Interpreting Functions (F-IF) A1.F-IF.A.1	Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x . The graph of f is the graph of the equation $y = f(x)$.	Functions: Properties of Functions
Functions (F): Interpreting Functions (F-IF) A1.F-IF.A.2	Evaluate a function for inputs in the domain, and interpret statements that use function notation in terms of a context.	Functions: Properties of Functions
Functions (F): Interpreting Functions (F-IF) A1.F-IF.A.3	Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.	Functions: Sequences and Series
Functions (F): Interpreting Functions (F-IF) A1.F-IF.B	Interpret functions that arise in applications in terms of the context	
Functions (F): Interpreting Functions (F-IF) A1.F-IF.B.4	For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Include problem-solving opportunities utilizing real-world context. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums. Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).	Functions: Properties of Functions Exponential and Logarithmic Functions Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities
Functions (F): Interpreting Functions (F-IF) A1.F-IF.B.5	Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.	Functions: Properties of Functions

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Algebra I	The ACT Mathematics Reporting Categories and Skill Areas
Functions (F): Interpreting Functions (F-IF) A1.F-IF.B.6	Calculate and interpret the average rate of change of a continuous function (presented symbolically or as a table) on a closed interval. Estimate the rate of change from a graph. Include problem-solving opportunities utilizing real-world context. Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).	Functions: Properties of Functions Exponential and Logarithmic Functions Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities
Functions (F): Interpreting Functions (F-IF) A1.F-IF.C	Analyze functions using different representations.	
Functions (F): Interpreting Functions (F-IF) A1.F-IF.C.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).	Functions: Properties of Functions Exponential and Logarithmic Functions Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities
Functions (F): Interpreting Functions (F-IF) A1.F-IF.C.8	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.	Functions: Properties of Functions Exponential and Logarithmic Functions Algebra: Quadratic Expressions, Equations, and Inequalities
Functions (F): Interpreting Functions (F-IF) A1.F-IF.C.8.a	Use the process of factoring and completing the square of a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.	Functions: Properties of Functions Algebra: Quadratic Expressions, Equations, and Inequalities
Functions (F): Interpreting Functions (F-IF) A1.F-IF.C.9	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).	Functions: Properties of Functions Exponential and Logarithmic Functions Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities
Functions (F): Building Functions (F-BF) A1.F-BF.A	Build a function that models a relationship between two quantities.	
Functions (F): Building Functions (F-BF) A1.F-BF.A.1	Write a function that describes a relationship between two quantities. Determine an explicit expression, a recursive process, or steps for calculation from real-world context. Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).	Functions: Properties of Functions Exponential and Logarithmic Functions Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Algebra I	The ACT Mathematics Reporting Categories and Skill Areas
Functions (F): Building Functions (F-BF) A1.F-BF.B	Build new functions from existing functions.	
Functions (F): Building Functions (F-BF) A1.F-BF.B.3	Identify the effect on the graph of replacing $f(x)$ by $f(x)+k$, $k f(x)$, and $f(x+k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph. Focus on linear, quadratic, exponential and piecewise-defined functions (limited to absolute value and step).	Functions: Properties of Functions Exponential and Logarithmic Functions Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities
Functions (F): Linear, Quadratic, and Exponential Models (F-LE) A1.F-LE.A	Construct and compare linear, quadratic, and exponential models and solve problems.	
Functions (F): Linear, Quadratic, and Exponential Models (F-LE) A1.F-LE.A.1	Distinguish between situations that can be modeled with linear functions and with exponential functions.	Functions: Properties of Functions Exponential and Logarithmic Functions Algebra: Linear Expressions, Equations, and Inequalities
Functions (F): Linear, Quadratic, and Exponential Models (F-LE) A1.F-LE.A.1.a	Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.	Functions: Properties of Functions Exponential and Logarithmic Functions Algebra: Linear Expressions, Equations, and Inequalities
Functions (F): Linear, Quadratic, and Exponential Models (F-LE) A1.F-LE.A.1.b	Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.	Functions: Properties of Functions Algebra: Linear Expressions, Equations, and Inequalities
Functions (F): Linear, Quadratic, and Exponential Models (F-LE) A1.F-LE.A.1.c	Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.	Functions: Properties of Functions Exponential and Logarithmic Functions
Functions (F): Linear, Quadratic, and Exponential Models (F-LE) A1.F-LE.A.2	Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or input/output pairs.	Functions: Properties of Functions Sequences and Series Exponential and Logarithmic Functions Algebra: Linear Expressions, Equations, and Inequalities

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Algebra I	The ACT Mathematics Reporting Categories and Skill Areas
Functions (F): Linear, Quadratic, and Exponential Models (F-LE) A1.F-LE.A.3	Observe, using graphs and tables, that a quantity increasing exponentially eventually exceeds a quantity increasing linearly or quadratically.	Functions: Properties of Functions Exponential and Logarithmic Functions Algebra: Linear Expressions, Equations, and Inequalities Quadratic Expressions, Equations, and Inequalities
Functions (F): Linear, Quadratic, and Exponential Models (F-LE) A1.F-LE.B	Interpret expressions for functions in terms of the situation they model.	
Functions (F): Linear, Quadratic, and Exponential Models (F-LE) A1.F-LE.B.5	Interpret the parameters in a linear or exponential function with integer exponents utilizing real world context.	Functions: Properties of Functions Exponential and Logarithmic Functions Algebra: Linear Expressions, Equations, and Inequalities
Statistics and Probability (S): Summarize, represent, and interpret data on a single count or measurement variable. (S-ID) A1.S-ID.A	Summarize, represent, and interpret data on a single count or measurement variable.	
Statistics and Probability (S): Summarize, represent, and interpret data on a single count or measurement variable. (S-ID) A1.S-ID.A.1	Represent real-value data with plots for the purpose of comparing two or more data sets.	Statistics and Probability: Univariate Data Analysis Integrating Essential Skills: Data Summaries and Displays
Statistics and Probability (S): Summarize, represent, and interpret data on a single count or measurement variable. (S-ID) A1.S-ID.A.2	Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.	Statistics and Probability: Univariate Data Analysis Integrating Essential Skills: Data Summaries and Displays
Statistics and Probability (S): Summarize, represent, and interpret data on a single count or measurement variable. (S-ID) A1.S-ID.A.3	Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of outliers if present.	Statistics and Probability: Univariate Data Analysis Integrating Essential Skills: Data Summaries and Displays
Statistics and Probability (S): Summarize, represent, and interpret data on a single count or measurement variable. (S-ID) A1.S-ID.B	Summarize, represent, and interpret data on two categorical and quantitative variables.	
Statistics and Probability (S): Summarize, represent, and interpret data on a single count or measurement variable. (S-ID) A1.S-ID.B.5	Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data, including joint, marginal, and conditional relative frequencies. Recognize possible associations and trends in the data.	Statistics and Probability: Bivariate Data Analysis Integrating Essential Skills: Scatterplots

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Algebra I	The ACT Mathematics Reporting Categories and Skill Areas
Statistics and Probability (S): Summarize, represent, and interpret data on a single count or measurement variable. (S-ID) A1.S-ID.B.6	Represent data on two quantitative variables on a scatter plot, and describe how the quantities are related.	Statistics and Probability: Bivariate Data Analysis Integrating Essential Skills: Scatterplots
Statistics and Probability (S): Summarize, represent, and interpret data on a single count or measurement variable. (S-ID) A1.S-ID.B.6.a	Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Focus on linear models.	Statistics and Probability: Bivariate Data Analysis Integrating Essential Skills: Scatterplots
Statistics and Probability (S): Summarize, represent, and interpret data on a single count or measurement variable. (S-ID) A1.S-ID.B.6.b	Informally assess the fit of a function by plotting and analyzing residuals.	Statistics and Probability: Bivariate Data Analysis Integrating Essential Skills: Scatterplots
Statistics and Probability (S): Summarize, represent, and interpret data on a single count or measurement variable. (S-ID) A1.S-ID.C	Interpret linear models.	
Statistics and Probability (S): Summarize, represent, and interpret data on a single count or measurement variable. (S-ID) A1.S-ID.C.7	Interpret the slope as a rate of change and the constant term of a linear model in the context of the data.	Statistics and Probability: Bivariate Data Analysis Integrating Essential Skills: Scatterplots
Statistics and Probability (S): Summarize, represent, and interpret data on a single count or measurement variable. (S-ID) A1.S-ID.C.8	Compute and interpret the correlation coefficient of a linear relationship.	Statistics and Probability: Bivariate Data Analysis Integrating Essential Skills: Scatterplots
Statistics and Probability (S): Summarize, represent, and interpret data on a single count or measurement variable. (S-ID) A1.S-ID.C.9	Distinguish between correlation and causation.	Statistics and Probability: Bivariate Data Analysis Integrating Essential Skills: Scatterplots
Statistics and Probability (S): Conditional Probability and the Rules of Probability (S-CP) A1.S-CP.A	Understand independence and conditional probability and use them to interpret data.	
Statistics and Probability (S): Conditional Probability and the Rules of Probability (S-CP) A1.S-CP.A.1	Describe events as subsets of a sample space using characteristics of the outcomes, or as unions, intersections, or complements of other events.	Statistics and Probability: Rules of Probability Integrating Essential Skills: Basic Probability

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Algebra I	The ACT Mathematics Reporting Categories and Skill Areas
Statistics and Probability (S): Conditional Probability and the Rules of Probability (S-CP) A1.S-CP.A.2	Use the Multiplication Rule for independent events to understand that two events <i>A</i> and <i>B</i> are independent if the probability of <i>A</i> and <i>B</i> occurring together is the product of their probabilities, and use this characterization to determine if they are independent.	Statistics and Probability: Rules of Probability Integrating Essential Skills: Basic Probability
Standards for Mathematical Practice (MP): A1.MP.1	Make sense of problems and persevere in solving them. Mathematically proficient students explain to themselves the meaning of a problem, look for entry points to begin work on the problem, and plan and choose a solution pathway. While engaging in productive struggle to solve a problem, they continually ask themselves, “Does this make sense?” to monitor and evaluate their progress and change course if necessary. Once they have a solution, they look back at the problem to determine if the solution is reasonable and accurate. Mathematically proficient students check their solutions to problems using different methods, approaches, or representations. They also compare and understand different representations of problems and different solution pathways, both their own and those of others.	Modeling: Producing Interpreting Understanding Evaluating
Standards for Mathematical Practice (MP): A1.MP.2	Reason abstractly and quantitatively. Mathematically proficient students make sense of quantities and their relationships in problem situations. Students can contextualize and decontextualize problems involving quantitative relationships. They contextualize quantities, operations, and expressions by describing a corresponding situation. They decontextualize a situation by representing it symbolically. As they manipulate the symbols, they can pause as needed to access the meaning of the numbers, the units, and the operations that the symbols represent. Mathematically proficient students know and flexibly use different properties of operations, numbers, and geometric objects and when appropriate they interpret their solution in terms of the context.	Modeling: Producing Interpreting

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Algebra I	The ACT Mathematics Reporting Categories and Skill Areas
Standards for Mathematical Practice (MP): A1.MP.3	Construct viable arguments and critique the reasoning of others. Mathematically proficient students construct mathematical arguments (explain the reasoning underlying a strategy, solution, or conjecture) using concrete, pictorial, or symbolic referents. Arguments may also rely on definitions, assumptions, previously established results, properties, or structures. Mathematically proficient students make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. Mathematically proficient students present their arguments in the form of representations, actions on those representations, and explanations in words (oral or written). Students critique others by affirming or questioning the reasoning of others. They can listen to or read the reasoning of others, decide whether it makes sense, ask questions to clarify or improve the reasoning, and validate or build on it. Mathematically proficient students can communicate their arguments, compare them to others, and reconsider their own arguments in response to the critiques of others.	Modeling: Producing Interpreting Understanding
Standards for Mathematical Practice (MP): A1.MP.4	Model with mathematics. Mathematically proficient students apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. When given a problem in a contextual situation, they identify the mathematical elements of a situation and create a mathematical model that represents those mathematical elements and the relationships among them. Mathematically proficient students use their model to analyze the relationships and draw conclusions. They interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.	Modeling: Producing Interpreting Understanding Evaluating Improving
Standards for Mathematical Practice (MP): A1.MP.5	Use appropriate tools strategically. Mathematically proficient students consider available tools when solving a mathematical problem. They choose tools that are relevant and useful to the problem at hand. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful recognizing both the insight to be gained and their limitations. Students deepen their understanding of mathematical concepts when using tools to visualize, explore, compare, communicate, make and test predictions, and understand the thinking of others.	Modeling: Producing Understanding Evaluating

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Algebra I	The ACT Mathematics Reporting Categories and Skill Areas
Standards for Mathematical Practice (MP): A1.MP.6	Attend to precision. Mathematically proficient students clearly communicate to others using appropriate mathematical terminology, and craft explanations that convey their reasoning. When making mathematical arguments about a solution, strategy, or conjecture, they describe mathematical relationships and connect their words clearly to their representations. Mathematically proficient students understand meanings of symbols used in mathematics, calculate accurately and efficiently, label quantities appropriately, and record their work clearly and concisely.	Modeling: Interpreting Understanding
Standards for Mathematical Practice (MP): A1.MP.7	Look for and make use of structure. Mathematically proficient students use structure and patterns to assist in making connections among mathematical ideas or concepts when making sense of mathematics. Students recognize and apply general mathematical rules to complex situations. They are able to compose and decompose mathematical ideas and notations into familiar relationships. Mathematically proficient students manage their own progress, stepping back for an overview and shifting perspective when needed.	Modeling: Producing Understanding Evaluating
Standards for Mathematical Practice (MP): A1.MP.8	Look for and express regularity in repeated reasoning. Mathematically proficient students look for and describe regularities as they solve multiple related problems. They formulate conjectures about what they notice and communicate observations with precision. While solving problems, students maintain oversight of the process and continually evaluate the reasonableness of their results. This informs and strengthens their understanding of the structure of mathematics which leads to fluency.	Modeling: Understanding Evaluating

Table 5: Arizona Mathematics Standards—Geometry (adopted 2016), Aligned to the ACT

Note: Rows with gray shading indicate the beginning of a new standards category or subcategory.

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Geometry	The ACT Mathematics Reporting Categories and Skill Areas
Number and Quantity (N): Quantities (N-Q) G.N-Q.A	Reason quantitatively and use units to solve problems.	
Number and Quantity (N): Quantities (N-Q) G.N-Q.A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays, include utilizing real-world context.	Geometry: Geometric Measurement and Modeling Integrating Essential Skills: Measurement Units and Unit Conversion
Number and Quantity (N): Quantities (N-Q) G.N-Q.A.2	Define appropriate quantities for the purpose of descriptive modeling.	Geometry: Geometric Measurement and Modeling

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Geometry	The ACT Mathematics Reporting Categories and Skill Areas
Number and Quantity (N): Quantities (N-Q) G.N-Q.A.3	Include problem-solving opportunities utilizing real-world context.	Geometry: Geometric Measurement and Modeling
Geometry (G): Congruence (G-CO) G.G-CO.A	Experiment with transformations in the plane.	
Geometry (G): Congruence (G-CO) G.G-CO.A.1	Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.	Geometry: Coordinate Geometry Integrating Essential Skills: Properties of Lines, Angles, and Shapes
Geometry (G): Congruence (G-CO) G.G-CO.A.2	Represent and describe transformations in the plane as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not.	Geometry: Transformations Coordinate Geometry
Geometry (G): Congruence (G-CO) G.G-CO.A.3	Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.	Geometry: Transformations Coordinate Geometry
Geometry (G): Congruence (G-CO) G.G-CO.A.4	Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.	Geometry: Transformations Coordinate Geometry
Geometry (G): Congruence (G-CO) G.G-CO.A.5	Given a geometric figure and a rotation, reflection, or translation draw the transformed figure. Specify a sequence of transformations that will carry a given figure onto another.	Geometry: Transformations Coordinate Geometry
Geometry (G): Congruence (G-CO) G.G-CO.B	Understand congruence in terms of rigid motions.	
Geometry (G): Congruence (G-CO) G.G-CO.B.6	Use geometric definitions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.	Geometry: Transformations Proof, Reasoning, and Constructions
Geometry (G): Congruence (G-CO) G.G-CO.B.7	Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.	Geometry: Transformations Proof, Reasoning, and Constructions
Geometry (G): Congruence (G-CO) G.G-CO.B.8	Explain how the criteria for triangle congruence (ASA, AAS, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.	Geometry: Transformations Proof, Reasoning, and Constructions
Geometry (G): Congruence (G-CO) G.G-CO.C	Prove geometric theorems.	

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Geometry	The ACT Mathematics Reporting Categories and Skill Areas
Geometry (G): Congruence (G-CO) G.G-CO.C.9	Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.	Geometry: Proof, Reasoning, and Constructions
Geometry (G): Congruence (G-CO) G.G-CO.C.10	Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180° base angles of isosceles triangle are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.	Geometry: Proof, Reasoning, and Constructions Integrating Essential Skills: Properties of Lines, Angles, and Shapes
Geometry (G): Congruence (G-CO) G.G-CO.C.11	Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and rectangles are parallelograms with congruent diagonals.	Geometry: Proof, Reasoning, and Constructions Integrating Essential Skills: Properties of Lines, Angles, and Shapes
Geometry (G): Congruence (G-CO) G.G-CO.D	Make geometric constructions.	
Geometry (G): Congruence (G-CO) G.G-CO.D.12	Make formal geometric constructions with a variety of tools and methods. Constructions include: copying segments; copying angles; bisecting segments; bisecting angles; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.	Geometry: Proof, Reasoning, and Constructions
Geometry (G): Congruence (G-CO) G.G-CO.D.13	Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle with a variety of tools and methods.	Geometry: Proof, Reasoning, and Constructions
Geometry (G): Similarity, Right Triangles, and Trigonometry (G-SRT) G.G-SRT.A	Understand similarity in terms of similarity transformations.	
Geometry (G): Similarity, Right Triangles, and Trigonometry (G-SRT) G.G-SRT.A.1	Verify experimentally the properties of dilations given by a center and a scale factor:	Geometry: Similarity, Right Triangles, and Trigonometry Transformations
Geometry (G): Similarity, Right Triangles, and Trigonometry (G-SRT) G.G-SRT.A.1.a	Dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.	Geometry: Similarity, Right Triangles, and Trigonometry Transformations
Geometry (G): Similarity, Right Triangles, and Trigonometry (G-SRT) G.G-SRT.A.1.b	The dilation of a line segment is longer or shorter in the ratio given by the scale factor.	Geometry: Similarity, Right Triangles, and Trigonometry Transformations
Geometry (G): Similarity, Right Triangles, and Trigonometry (G-SRT) G.G-SRT.A.2	Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.	Geometry: Similarity, Right Triangles, and Trigonometry Transformations

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Geometry	The ACT Mathematics Reporting Categories and Skill Areas
Geometry (G): Similarity, Right Triangles, and Trigonometry (G-SRT) G.G-SRT.A.3	Use the properties of similarity transformations to establish the AA, SAS, and SSS criterion for two triangles to be similar.	Geometry: Similarity, Right Triangles, and Trigonometry Proof, Reasoning, and Constructions
Geometry (G): Similarity, Right Triangles, and Trigonometry (G-SRT) G.G-SRT.B	Prove theorems involving similarity.	
Geometry (G): Similarity, Right Triangles, and Trigonometry (G-SRT) G.G-SRT.B.4	Prove theorems about triangles. Theorems include: an interior line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.	Geometry: Similarity, Right Triangles, and Trigonometry Proof, Reasoning, and Constructions
Geometry (G): Similarity, Right Triangles, and Trigonometry (G-SRT) G.G-SRT.B.5	Use congruence and similarity criteria to prove relationships in geometric figures and solve problems utilizing real-world context.	Geometry: Similarity, Right Triangles, and Trigonometry Proof, Reasoning, and Constructions
Geometry (G): Similarity, Right Triangles, and Trigonometry (G-SRT) G.G-SRT.C	Define trigonometric ratios and solve problems involving right triangles.	
Geometry (G): Similarity, Right Triangles, and Trigonometry (G-SRT) G.G-SRT.C.6	Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.	Geometry: Similarity, Right Triangles, and Trigonometry
Geometry (G): Similarity, Right Triangles, and Trigonometry (G-SRT) G.G-SRT.C.7	Explain and use the relationship between the sine and cosine of complementary angles.	Geometry: Similarity, Right Triangles, and Trigonometry
Geometry (G): Similarity, Right Triangles, and Trigonometry (G-SRT) G.G-SRT.C.8	Use trigonometric ratios (including inverse trigonometric ratios) and the Pythagorean Theorem to find unknown measurements in right triangles utilizing real-world context.	Geometry: Similarity, Right Triangles, and Trigonometry Integrating Essential Skills: Pythagorean Theorem
Geometry (G): Circles (G-C) G.G-C.A	Understand and apply theorems about circles.	
Geometry (G): Circles (G-C) G.G-C.A.1	Prove that all circles are similar.	Geometry: Properties of Circles
Geometry (G): Circles (G-C) G.G-C.A.2	Identify and describe relationships among inscribed angles, radii, and chords. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.	Geometry: Properties of Circles
Geometry (G): Circles (G-C) G.G-C.A.3	Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.	Geometry: Properties of Circles
Geometry (G): Circles (G-C) G.G-C.B	Find arc lengths and areas of sectors of circles.	

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Geometry	The ACT Mathematics Reporting Categories and Skill Areas
Geometry (G): Circles (G-C) G.G-C.B.5	Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector. Convert between degrees and radians.	Geometry: Properties of Circles
Geometry (G): Expressing Geometric Properties with Equations (G-GPE) G.G-GPE.A	Translate between the geometric description and the equation for a conic section.	
Geometry (G): Expressing Geometric Properties with Equations (G-GPE) G.G-GPE.A.1	Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.	Geometry: Conic Sections Integrating Essential Skills: Pythagorean Theorem
Geometry (G): Expressing Geometric Properties with Equations (G-GPE) G.G-GPE.B	Use coordinates to prove geometric theorems algebraically.	
Geometry (G): Expressing Geometric Properties with Equations (G-GPE) G.G-GPE.B.4	Use coordinates to algebraically prove or disprove geometric relationships. Relationships include: proving or disproving geometric figures given specific points in the coordinate plane; and proving or disproving if a specific point lies on a given circle.	Geometry: Coordinate Geometry Proof, Reasoning, and Constructions
Geometry (G): Expressing Geometric Properties with Equations (G-GPE) G.G-GPE.B.5	Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems, including finding the equation of a line parallel or perpendicular to a given line that passes through a given point.	Geometry: Coordinate Geometry Proof, Reasoning, and Constructions
Geometry (G): Expressing Geometric Properties with Equations (G-GPE) G.G-GPE.B.6	Find the point on a directed line segment between two given points that partitions the segment in a given ratio.	Geometry: Coordinate Geometry
Geometry (G): Expressing Geometric Properties with Equations (G-GPE) G.G-GPE.B.7	Use coordinates to compute perimeters of polygons and areas of triangles and rectangles.	Geometry: Coordinate Geometry Integrating Essential Skills: Perimeter, Circumference, and Area
Geometry (G): Geometric Measurement and Dimension (G-GMD) G.G-GMD.A	Explain volume formulas and use them to solve problems.	
Geometry (G): Geometric Measurement and Dimension (G-GMD) G.G-GMD.A.1	Analyze and verify the formulas for the volume of a cylinder, pyramid, and cone.	Geometry: Geometric Measurement and Modeling Integrating Essential Skills: Surface Area and Volume

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Geometry	The ACT Mathematics Reporting Categories and Skill Areas
Geometry (G): Geometric Measurement and Dimension (G-GMD) G.G-GMD.A.3	Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems utilizing real-world context.	Geometry: Geometric Measurement and Modeling Integrating Essential Skills: Surface Area and Volume
Geometry (G): Geometric Measurement and Dimension (G-GMD) G.G-GMD.B	Visualize relationships between two-dimensional and three-dimensional objects.	
Geometry (G): Geometric Measurement and Dimension (G-GMD) G.G-GMD.B.4	Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.	Geometry: Geometric Measurement and Modeling
Geometry (G): Modeling with Geometry (G-GMG) G.G-GMG.A	Apply geometric concepts in modeling situations.	
Geometry (G): Modeling with Geometry (G-GMG) G.G-MG.A.1	Use geometric shapes, their measures, and their properties to describe objects utilizing real-world context.	Geometry: Geometric Measurement and Modeling Integrating Essential Skills: Properties of Lines, Angles, and Shapes
Geometry (G): Modeling with Geometry (G-GMG) G.G-MG.A.2	Apply concepts of density based on area and volume in modeling situations utilizing real-world context.	Geometry: Geometric Measurement and Modeling Integrating Essential Skills: Surface Area and Volume
Geometry (G): Modeling with Geometry (G-GMG) G.G-MG.A.3	Apply geometric methods to solve design problems utilizing real-world context.	Geometry: Geometric Measurement and Modeling
Standards for Mathematical Practice (MP): G.MP.1	Make sense of problems and persevere in solving them. Mathematically proficient students explain to themselves the meaning of a problem, look for entry points to begin work on the problem, and plan and choose a solution pathway. While engaging in productive struggle to solve a problem, they continually ask themselves, “Does this make sense?” to monitor and evaluate their progress and change course if necessary. Once they have a solution, they look back at the problem to determine if the solution is reasonable and accurate. Mathematically proficient students check their solutions to problems using different methods, approaches, or representations. They also compare and understand different representations of problems and different solution pathways, both their own and those of others.	Modeling: Producing Interpreting Understanding Evaluating

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Geometry	The ACT Mathematics Reporting Categories and Skill Areas
Standards for Mathematical Practice (MP): G.MP.2	Reason abstractly and quantitatively. Mathematically proficient students make sense of quantities and their relationships in problem situations. Students can contextualize and decontextualize problems involving quantitative relationships. They contextualize quantities, operations, and expressions by describing a corresponding situation. They decontextualize a situation by representing it symbolically. As they manipulate the symbols, they can pause as needed to access the meaning of the numbers, the units, and the operations that the symbols represent. Mathematically proficient students know and flexibly use different properties of operations, numbers, and geometric objects and when appropriate they interpret their solution in terms of the context.	Modeling: Producing Interpreting
Standards for Mathematical Practice (MP): G.MP.3	Construct viable arguments and critique the reasoning of others. Mathematically proficient students construct mathematical arguments (explain the reasoning underlying a strategy, solution, or conjecture) using concrete, pictorial, or symbolic referents. Arguments may also rely on definitions, assumptions, previously established results, properties, or structures. Mathematically proficient students make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. Mathematically proficient students present their arguments in the form of representations, actions on those representations, and explanations in words (oral or written). Students critique others by affirming or questioning the reasoning of others. They can listen to or read the reasoning of others, decide whether it makes sense, ask questions to clarify or improve the reasoning, and validate or build on it. Mathematically proficient students can communicate their arguments, compare them to others, and reconsider their own arguments in response to the critiques of others.	Modeling: Producing Interpreting Understanding
Standards for Mathematical Practice (MP): G.MP.4	Model with mathematics. Mathematically proficient students apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. When given a problem in a contextual situation, they identify the mathematical elements of a situation and create a mathematical model that represents those mathematical elements and the relationships among them. Mathematically proficient students use their model to analyze the relationships and draw conclusions. They interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.	Modeling: Producing Interpreting Understanding Evaluating Improving

Arizona Standards Categories and Numbers	Arizona Mathematics Standards—Geometry	The ACT Mathematics Reporting Categories and Skill Areas
Standards for Mathematical Practice (MP): G.MP.5	Use appropriate tools strategically. Mathematically proficient students consider available tools when solving a mathematical problem. They choose tools that are relevant and useful to the problem at hand. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful recognizing both the insight to be gained and their limitations. Students deepen their understanding of mathematical concepts when using tools to visualize, explore, compare, communicate, make and test predictions, and understand the thinking of others.	Modeling: Producing Understanding Evaluating
Standards for Mathematical Practice (MP): G.MP.6	Attend to precision. Mathematically proficient students clearly communicate to others using appropriate mathematical terminology, and craft explanations that convey their reasoning. When making mathematical arguments about a solution, strategy, or conjecture, they describe mathematical relationships and connect their words clearly to their representations. Mathematically proficient students understand meanings of symbols used in mathematics, calculate accurately and efficiently, label quantities appropriately, and record their work clearly and concisely.	Modeling: Interpreting Understanding
Standards for Mathematical Practice (MP): G.MP.7	Look for and make use of structure. Mathematically proficient students use structure and patterns to assist in making connections among mathematical ideas or concepts when making sense of mathematics. Students recognize and apply general mathematical rules to complex situations. They are able to compose and decompose mathematical ideas and notations into familiar relationships. Mathematically proficient students manage their own progress, stepping back for an overview and shifting perspective when needed.	Modeling: Producing Understanding Evaluating
Standards for Mathematical Practice (MP): G.MP.8	Look for and express regularity in repeated reasoning. Mathematically proficient students look for and describe regularities as they solve multiple related problems. They formulate conjectures about what they notice and communicate observations with precision. While solving problems, students maintain oversight of the process and continually evaluate the reasonableness of their results. This informs and strengthens their understanding of the structure of mathematics which leads to fluency.	Modeling: Understanding Evaluating

VII. Science

The ACT Science Content Description

- **Item tally and time:** The ACT science test has 40 items (34 scored and 6 non-scored, field-test items) and a 40-minute time limit.
- **Concept:** The test measures science and engineering knowledge, practices, and skills that are highly correlated with college success. The correlations are based on both decades of empirical research and the responses of post-secondary educators on the ACT National Curriculum Survey.
- **Knowledge and skills tested:** The test measures knowledge areas and related skills reflected in the reporting categories for this test (further described in a table below):
 - ***Interpretation of Data:*** Students locate, translate, infer, and extend from and evaluate data and information in scientific graphs, tables, and diagrams of varying complexity. This reporting category is divided into the following three subcategories:
 - Locating and Understanding
 - Inferring and Translating
 - Extending and Re-evaluating
 - ***Scientific Investigation:*** Students understand the tools, procedures, and designs of scientific experiments and compare, extend, and modify those experiments. This reporting category is divided into the following three subcategories:
 - Locating and Comparing
 - Designing and Implementing
 - Extending and Improving
 - ***Evaluating Scientific Arguments and Models with Evidence:*** Students evaluate the validity of scientific claims based on evidence and formulate conclusions and predictions based on that information using a claim, evidence, or reasoning model of

scientific argument. This reporting category is divided into the following three subcategories:

- Inferences and Results: Evaluating and Extending
 - Models— Understanding and Comparing
 - Models— Evaluating and Extending
- **Format and item type:** Science and engineering knowledge, skills, and practices are applied to rich scientific passages that are written in one of three formats: Data Representation, Research Summaries, or Conflicting Viewpoints. Each passage is accompanied by multiple-choice items. Interaction with each passage format requires students to engage in scientific sense-making around the following:
- Experimental procedures and phenomena (Research Summaries)
 - Data presentations (Data Representation)
 - Scientific models and explanations (Conflicting Viewpoints)

Four scores are reported for the ACT science test: a total test score based on all 40 scored items, and the three reporting category scores. The reporting categories constitute a specific number of items and percentage of the test, as shown below.

Reporting Category	Number of Items	Percentage of Test
Interpretation of Data	13-17	38–50%
Scientific Investigation	6-11	18–32%
Evaluating Scientific Arguments and Models with Evidence	8–13	24–38%

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

Topics from all major disciplines (biology, chemistry, physics, and Earth and space science) are used on the test to elicit evidence of how students apply science practices. Some items will require specific content knowledge to successfully complete the task; however, these tasks always involve the use of a science practice as well. Consequently,

no science scores are reported in relation to the major science disciplines.

The ACT Science Reporting Category Descriptions

Reporting Category	Skill Area	Description/Examples
Interpretation of Data	Locating and Understanding	Locate one or more pieces of data and understand features of graphics and tables, such as units, legends, and axes.
Interpretation of Data	Inferring and Translating	Use data from one or more graphs and/or tables to identify trends, make inferences and comparisons, or translate into other graphic formats.
Interpretation of Data	Extending and Re-evaluating	Make predictions based on trends in data.
Scientific Investigation	Locating and Comparing	Locate, compare, and contrast information about one or more scientific investigations or experiments.
Scientific Investigation	Designing and Implementing	Understand and evaluate aspects of experimental design such as methods, tools, variables, and controls.
Scientific Investigation	Extending and Implementing	Make predictions about future experiments or experimental conditions and determine additional methods to improve or evaluate investigations.
Evaluating Scientific Arguments and Models with Evidence	Inferences and Results: Evaluating and Extending	Evaluate and formulate hypotheses, predictions, and conclusions based on experimental results and other scientific data and knowledge.

Reporting Category	Skill Area	Description/Examples
Evaluating Scientific Arguments and Models with Evidence	Models—Understanding and Comparing	Locate and compare information within a theoretical model or across competing models. (Note: These skills are only used with conflicting viewpoints passages.)
Evaluating Scientific Arguments and Models with Evidence	Models—Evaluating and Extending	Evaluate and formulate predictions and hypotheses based on the examination of competing theoretical models. (Note: These skills are only used with conflicting viewpoints passages.)

CROSSWALK:

Arizona Science Standards Aligned to ACT Assessments

Table 6: Arizona Science Standards, High School (adopted 2018, modified 2023), Aligned to the ACT

Note: Rows with gray shading indicate the beginning of a new standards category.

Arizona Standards Categories and Numbers	Arizona Science Standards High School	ACT Science Reporting Categories and Skill Areas
Essential HS. PIU1.1	Develop and use models to explain the relationship of the structure of atoms to patterns and properties observed within the Periodic Table and describe how these models are revised with new evidence.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending
Essential HS. PIU1.2	Develop and use models for the transfer or sharing of electrons to predict the formation of ions, molecules, and compounds in both natural and synthetic processes.	Interpretation of Data: Locating and Understanding Inferring and Translating Extending and Reevaluating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending
Essential HS. PIU1.3	Ask questions, plan, and carry out investigations to explore the cause and effect relationship between reaction rate factors.	Interpretation of Data: Locating and Understanding Inferring and Translating Scientific Investigation: Locating and Comparing Designing and Implementing Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Essential HS. PIU1.4	Obtain, evaluate, and communicate information about how the use of chemistry related technologies have had positive and negative ethical, social, economic, and/or political implications.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending

Arizona Standards Categories and Numbers	Arizona Science Standards High School	ACT Science Reporting Categories and Skill Areas
Essential HS. P2U1.5	Construct an explanation for a field’s strength and influence on an object (electric, gravitational, magnetic).	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Essential HS. P3U1.6	Collect, analyze, and interpret data regarding the change in motion of an object or system in one dimension, to construct an explanation using Newton’s Laws.	Interpretation of Data: Locating and Understanding Inferring and Translating Scientific Investigation: Locating and Comparing Designing and Implementing Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Essential HS. P3U2.7	Use mathematics and computational thinking to explain how Newton’s laws are used in engineering and technologies to create products to serve human ends.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Essential HS. P4U1.8	Engage in argument from evidence that the net change of energy in a system is always equal to the total energy exchanged between the system and the surroundings.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Essential HS. P4U3.9	Engage in argument from evidence regarding the ethical, social, economic, and/or political benefits and liabilities of energy usage and transfer.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Essential HS. P4U1.10	Construct an explanation about the relationships among the frequency, wavelength, and speed of waves traveling in various media, and their applications to modern technology.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending

Arizona Standards Categories and Numbers	Arizona Science Standards High School	ACT Science Reporting Categories and Skill Areas
Essential HS. E1U1.11	Analyze and interpret data to determine how energy from the Sun affects weather patterns and climate.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Essential HS. E1U1.12	Develop and use models of the Earth that explains the role of energy and matter in Earth’s constantly changing internal and external systems (geosphere, hydrosphere, atmosphere, biosphere).	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending
Essential HS. E1U1.13	Evaluate explanations and theories about the role of energy and matter in geologic changes over time.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending
Essential HS. E1U3.14	Engage in argument from evidence about the availability of natural resources, occurrence of natural hazards, changes in climate, and human activity and how they influence each other.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Essential HS. E2U1.15	Construct an explanation based on evidence to illustrate the role of nuclear fusion in the life cycle of a star.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Essential HS. E2U1.16	Construct an explanation of how gravitational forces impact the evolution of planetary motion, structure, surfaces, atmospheres, moons, and rings.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending

Arizona Standards Categories and Numbers	Arizona Science Standards High School	ACT Science Reporting Categories and Skill Areas
Essential HS. E2U1.17	Construct an explanation of the origin, expansion, and scale of the universe based on astronomical evidence.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Essential HS. L2U3.18	Obtain, evaluate, and communicate about the positive and negative ethical, social, economic, and political implications of human activity on the biodiversity of an ecosystem.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Essential HS. L2U1.19	Develop and use models that show how changes in the transfer of matter and energy within an ecosystem and interactions between species may affect organisms and their environment.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending
Essential HS. L1U1.20	Ask questions and/or make predictions based on observations and evidence to demonstrate how cellular organization, structure, and function allow organisms to maintain homeostasis.	Interpretation of Data: Locating and Understanding Inferring and Translating Extending and Reevaluating Scientific Investigation: Locating and Comparing Designing and Implementing Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Essential HS. L2U1.21	Obtain, evaluate, and communicate data showing the relationship of photosynthesis and cellular respiration flow of energy and cycling of matter.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Essential HS. L1U1.22	Construct an explanation for how cellular division (mitosis) is the process by which organisms grow and maintain complex, interconnected systems.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending

Arizona Standards Categories and Numbers	Arizona Science Standards High School	ACT Science Reporting Categories and Skill Areas
Essential HS. L1U3.23	Obtain, evaluate, and communicate the ethical, social, economic and/or political implications of the detection and treatment of abnormal cell function.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Essential HS. L3U1.24	Construct an explanation of how the process of sexual reproduction contributes to genetic variation.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Essential HS. L3U1.25	Obtain, evaluate, and communicate information about the causes and implications of DNA mutation.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Essential HS. L3U3.26	Engage in argument from evidence regarding the ethical, social, economic, and/or political implications of a current genetic technology.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Essential HS. L4U1.27	Obtain, evaluate, and communicate evidence that describes how changes in frequency of inherited traits in a population can lead to biological diversity.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Essential HS. L4U1.28	Gather, evaluate, and communicate multiple lines of empirical evidence to explain the mechanisms of biological evolution.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending

Arizona Standards Categories and Numbers	Arizona Science Standards High School	ACT Science Reporting Categories and Skill Areas
Biology: Plus HS+ B.L2U1.1	Develop a model showing the relationship between limiting factors and carrying capacity, and use the model to make predictions on how environmental changes impact biodiversity.	Interpretation of Data: Locating and Understanding Inferring and Translating Extending and Reevaluating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending
Biology: Plus HS+ B.L4U1.2	Engage in argument from evidence that changes in environmental conditions or human interventions may change species diversity in an ecosystem.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Biology: Plus HS+ B.L2U1.3	Use mathematics and computational thinking to support claims for the cycling of matter and flow of energy through trophic levels in an ecosystem.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Biology: Plus HS+ B.L1U1.4	Develop and use models to explain the interdependency and interactions between cellular organelles.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending
Biology: Plus HS+ B.L1U1.5	Analyze and interpret data that demonstrates the relationship between cellular function and the diversity of protein functions.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Biology: Plus HS+ B.L1U1.6	Develop and use models to show how transport mechanisms function in cells.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending

Arizona Standards Categories and Numbers	Arizona Science Standards High School	ACT Science Reporting Categories and Skill Areas
Biology: Plus HS+ B.L1U1.7	Develop and use models to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms (plant and animal).	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending
Biology: Plus HS+ B.L2U1.8	Develop and use models to develop a scientific explanation that illustrates how photosynthesis transforms light energy into stored chemical energy and how cellular respiration breaks down macromolecules for use in metabolic processes.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending
Biology: Plus HS+ B.L1U1.9	Develop and use a model to communicate how a cell copies genetic information to make new cells during asexual reproduction (mitosis).	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending
Biology: Plus HS+ B.L3U1.10	Use mathematics and computational thinking to explain the variation that occurs through meiosis and calculate the distribution of expressed traits in a population.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Biology: Plus HS+ B.L3U1.11	Construct an explanation for how the structure of DNA and RNA determine the structure of proteins that perform essential life functions.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Biology: Plus HS+ B.L3U1.12	Analyze and interpret data on how mutations can lead to increased genetic variation in a population.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending

Arizona Standards Categories and Numbers	Arizona Science Standards High School	ACT Science Reporting Categories and Skill Areas
Biology: Plus HS+ B.L4U1.13	Obtain, evaluate, and communicate multiple lines of empirical evidence to explain the change in genetic composition of a population over successive generations.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Biology: Plus HS+ B.L4U1.14	Construct an explanation based on scientific evidence that the process of natural selection can lead to adaption.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Chemistry: Plus HS+ C.P1U1.1	Develop and use models to demonstrate how changes in the number of subatomic particles (protons, neutrons, electrons) affect the identity, stability, and properties of the element.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending
Chemistry: Plus HS+ C.P1U1.2	Obtain, evaluate, and communicate the qualitative evidence supporting claims about how atoms absorb and emit energy in the form of electromagnetic radiation.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Chemistry: Plus HS+ C.P1U1.3	Analyze and interpret data to develop and support an explanation for the relationships between kinetic molecular theory and gas laws.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Chemistry: Plus HS+ C.P1U1.4	Develop and use models to predict and explain forces within and between molecules.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending

Arizona Standards Categories and Numbers	Arizona Science Standards High School	ACT Science Reporting Categories and Skill Areas
Chemistry: Plus HS+ C.PIU1.5	Plan and carry out investigations to test predictions of the outcomes of various reactions, based on patterns of physical and chemical properties.	Interpretation of Data: Locating and Understanding Inferring and Translating Scientific Investigation: Locating and Comparing Designing and Implementing Extending and Implementing Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Chemistry: Plus HS+ C.PIU1.6	Construct an explanation, design a solution, or refine the design of a chemical system in equilibrium to maximize production.	Interpretation of Data: Locating and Understanding Inferring and Translating Scientific Investigation: Locating and Comparing Designing and Implementing Extending and Implementing Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Chemistry: Plus HS+ C.PIU1.7	Use mathematics and computational thinking to determine stoichiometric relationships between reactants and products in chemical reactions.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Chemistry: Plus HS+ C.PIU3.8	Engage in argument from evidence regarding the ethical, social, economic, and/or political benefits and liabilities of fission, fusion, and radioactive decay.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Earth and Space: Plus HS+ E.EIU1.1	Construct an explanation based on evidence for how the Sun’s energy transfers between Earth’s systems.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending

Arizona Standards Categories and Numbers	Arizona Science Standards High School	ACT Science Reporting Categories and Skill Areas
Earth and Space: Plus HS+ E.E1U1.2	Develop and use models to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending
Earth and Space: Plus HS+ E.E1U1.3	Analyze geoscience data and the results from global climate models to make evidence-based predictions of current rate and scale of global or regional climate changes.	Interpretation of Data: Locating and Understanding Inferring and Translating Extending and Reevaluating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending
Earth and Space: Plus HS+ E.E1U1.4	Analyze and interpret geoscience data to make the claim that dynamic interactions with Earth's surface can create feedbacks that cause changes to other Earth systems	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Earth and Space: Plus HS+ E.E1U1.5	Obtain, evaluate, and communicate information on the effect of water on Earth's materials, surface processes, and groundwater systems.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Earth and Space: Plus HS+ E.E1U1.6	Obtain, evaluate, and communicate information of the theory of plate tectonics to explain the differences in age, structure, and composition of Earth's crust.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending
Earth and Space: Plus HS+ E.E1U1.7	Engage in argument from evidence of ancient Earth materials, meteorites, and other planetary surfaces to explain Earth's formation and early history.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending

Arizona Standards Categories and Numbers	Arizona Science Standards High School	ACT Science Reporting Categories and Skill Areas
Earth and Space: Plus HS+ E.E1U1.8	Develop and use models to illustrate ho Earth’s internal and surface processes operate over time to form, modify, and recycle continental and ocean floor features.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending
Earth and Space: Plus HS+ E.E1U3.9	Construct an explanation, based on evidence, for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Earth and Space: Plus HS+ E.E1U3.10	Ask questions, define problems, and evaluate a solution to a complex problem, based on prioritized criteria and tradeoffs, that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.	Interpretation of Data: Locating and Understanding Inferring and Translating Scientific Investigation: Locating and Comparing Designing and Implementing Extending and Implementing Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Earth and Space: Plus HS+ E.E1U3.11	Develop and use a quantitative model to illustrate the relationship among Earth systems and the degree to which those relationships are being modified due to human activity.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending
Earth and Space: Plus HS+ E.E2U1.12	Obtain, evaluate, and communicate scientific information about the way stars, throughout their stellar stages, produce elements and energy.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Earth and Space: Plus HS+ E.E2U1.13	Analyze and interpret data showing how gravitational forces are influenced by mass, and the distance between objects.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending

Arizona Standards Categories and Numbers	Arizona Science Standards High School	ACT Science Reporting Categories and Skill Areas
Earth and Space: Plus HS+ E.E2U1.14	Use mathematics and computational thinking to explain the movement of planets and objects in the solar system.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Earth and Space: Plus HS+ E.E2U1.15	Obtain, evaluate, and communicate information on how the nebular theory explains solar system formation with distinct regions characterized by different types of planetary and other bodies.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending
Earth and Space: Plus HS+ E.E2U1.16	Obtain, evaluate, and communicate information about patterns of size and scale of our solar system, our galaxy, and the universe.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Earth and Space: Plus HS+ E.E2U2.17	Obtain, evaluate, and communicate the impact of technology on human understanding of the formation, scale, and composition of the universe.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Physics: Plus HS+ Phy.P2U1.1	Plan and carry out investigations to design, build, and refine a device that works within given constraints to demonstrate that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current.	Interpretation of Data: Locating and Understanding Inferring and Translating Scientific Investigation: Locating and Comparing Designing and Implementing Extending and Implementing Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending

Arizona Standards Categories and Numbers	Arizona Science Standards High School	ACT Science Reporting Categories and Skill Areas
Physics: Plus HS+ Phy.P3U1.2	Develop and use mathematical models of Newton’s law of gravitation and Coulomb’s law to describe and predict the gravitational and electrostatic forces between objects.	Interpretation of Data: Locating and Understanding Inferring and Translating Extending and Reevaluating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending
Physics: Plus HS+ Phy.P3U1.3	Develop a mathematical model, using Newton’s laws, to predict the motion of an object or system in two dimensions (projectile and circular motion).	Interpretation of Data: Locating and Understanding Inferring and Translating Extending and Reevaluating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending
Physics: Plus HS+ Phy.P3U1.4	Engage in argument from evidence regarding the claim that the total momentum of a system is conserved when there is no net force on the system.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Physics: Plus HS+ Phy.P3U2.5	Design, evaluate, and refine a device that minimizes or maximizes the force on a macroscopic object during a collision.	Interpretation of Data: Locating and Understanding Inferring and Translating Scientific Investigation: Locating and Comparing Designing and Implementing Extending and Implementing Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Physics: Plus HS+ Phy.P4U1.6	Analyze and interpret data to quantitatively describe changes in energy within a system and/or energy flows in and out of a system.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending

Arizona Standards Categories and Numbers	Arizona Science Standards High School	ACT Science Reporting Categories and Skill Areas
Physics: Plus HS+ Phy.P4U2.7	Design, evaluate, and refine a device that works within given constraints to transfer energy within a system.	Interpretation of Data: Locating and Understanding Inferring and Translating Scientific Investigation: Locating and Comparing Designing and Implementing Extending and Implementing Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Physics: Plus HS+ Phy.P4U1.8	Use mathematics and computational thinking to explain the relationships between power, current, voltage, and resistance.	Interpretation of Data: Locating and Understanding Inferring and Translating Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending
Appendix 1 CCC: Patterns	Observed patterns of forms and events guide organization and classification and prompt questions about relationships and the factors that influence them.	Interpretation of Data: Locating and Understanding Inferring and Translating Extending and Reevaluating Scientific Investigation: Locating and Comparing Designing and Implementing Extending and Implementing Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending
Appendix 1 CCC: Cause and effect	Events have causes, sometimes simple, sometimes multifaceted. A major activity of both science and engineering is investigating and explaining causal relationships and the mechanisms by which they are mediated. Such mechanisms can then be tested across given contexts and used to predict and explain events in new contexts.	Interpretation of Data: Locating and Understanding Inferring and Translating Extending and Reevaluating Scientific Investigation: Locating and Comparing Designing and Implementing Extending and Implementing Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending

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Appendix 1 CCC: Scale, proportion, and quantity	In considering phenomena, it is critical to recognize what is relevant at different measures of size, time, and energy and to recognize how changes in scale, proportion, or quantity affect a system’s structure or performance.	Interpretation of Data: Locating and Understanding Inferring and Translating Extending and Reevaluating Scientific Investigation: Locating and Comparing Designing and Implementing Extending and Implementing Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending
Appendix 1 CCC: Systems and system models	Because the world is too large and complex to comprehend all at once, students must define the system under study, specify its boundaries, and make explicit a model of that system provides tools for understanding and testing ideas that are applicable throughout science and engineering.	Interpretation of Data: Locating and Understanding Inferring and Translating Extending and Reevaluating Scientific Investigation: Locating and Comparing Designing and Implementing Extending and Implementing Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending
Appendix 1 CCC: Energy and matter	Tracking fluxes of energy and matter into, out of, and within systems helps one understand the systems’ possibilities and limitations.	Interpretation of Data: Locating and Understanding Inferring and Translating Extending and Reevaluating Scientific Investigation: Locating and Comparing Designing and Implementing Extending and Implementing Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending

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Appendix 1 CCC: Structure and function	The way in which an object or living thing is shaped and its substructure determines many of its properties and functions.	Interpretation of Data: Locating and Understanding Inferring and Translating Extending and Reevaluating Scientific Investigation: Locating and Comparing Designing and Implementing Extending and Implementing Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending
Appendix 1 CCC: Stability and change	For natural and built systems alike, conditions of stability and determinants of rates of change or evolution of a system are critical elements of study.	Interpretation of Data: Locating and Understanding Inferring and Translating Extending and Reevaluating Scientific Investigation: Locating and Comparing Designing and Implementing Extending and Implementing Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending
Appendix 2 SEP: Ask questions and define problems	Note: <i>This practice is most strongly associated with the Scientific Investigation reporting category.</i>	Interpretation of Data: Locating and Understanding Inferring and Translating Extending and Reevaluating Scientific Investigation: Locating and Comparing Designing and Implementing Extending and Implementing Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending

Arizona Standards Categories and Numbers	Arizona Science Standards High School	ACT Science Reporting Categories and Skill Areas
Appendix 2 SEP: Develop and use models	Note: <i>This practice is most strongly associated with the Evaluating Scientific Arguments and Models with Evidence reporting category.</i>	Interpretation of Data: Locating and Understanding Inferring and Translating Extending and Reevaluating Scientific Investigation: Locating and Comparing Designing and Implementing Extending and Implementing Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending
Appendix 2 SEP: Plan and carry out investigations	Note: <i>This practice is most strongly associated with Scientific Investigation reporting category.</i>	Interpretation of Data: Locating and Understanding Inferring and Translating Extending and Reevaluating Scientific Investigation: Locating and Comparing Designing and Implementing Extending and Implementing Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending
Appendix 2 SEP: Analyze and interpret data	Note: <i>This practice is most strongly associated with Interpretation of Data reporting category.</i>	Interpretation of Data: Locating and Understanding Inferring and Translating Extending and Reevaluating Scientific Investigation: Locating and Comparing Designing and Implementing Extending and Implementing Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending

Arizona Standards Categories and Numbers	Arizona Science Standards High School	ACT Science Reporting Categories and Skill Areas
Appendix 2 SEP: Use mathematical and computational thinking	Note: <i>This practice is most strongly associated with Interpretation of Data reporting category.</i>	Interpretation of Data: Locating and Understanding Inferring and Translating Extending and Reevaluating Scientific Investigation: Locating and Comparing Designing and Implementing Extending and Implementing Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending
Appendix 2 SEP: Construct explanations and design solutions	Note: <i>This practice is most strongly associated with the Evaluating Scientific Arguments and Models with Evidence reporting category.</i>	Interpretation of Data: Locating and Understanding Inferring and Translating Extending and Reevaluating Scientific Investigation: Locating and Comparing Designing and Implementing Extending and Implementing Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending
Appendix 2 SEP: Engage in argument from evidence	Note: <i>This practice is most strongly associated with the Evaluating Scientific Arguments and Models with Evidence reporting category.</i>	Interpretation of Data: Locating and Understanding Inferring and Translating Extending and Reevaluating Scientific Investigation: Locating and Comparing Designing and Implementing Extending and Implementing Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending

Arizona Standards Categories and Numbers	Arizona Science Standards High School	ACT Science Reporting Categories and Skill Areas
Appendix 2 SEP: Obtain, evaluate, and communicate information	Note: <i>This practice is most strongly associated with the Evaluating Scientific Arguments and Models with Evidence reporting category.</i>	Interpretation of Data: Locating and Understanding Inferring and Translating Extending and Reevaluating Scientific Investigation: Locating and Comparing Designing and Implementing Extending and Implementing Evaluating Scientific Arguments and Models with Evidence: Inferences and Results—Evaluating and Extending Models—Understanding and Comparing Models—Evaluating and Extending

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