ACT® International Subject Tests

The Research-Driven Solution

Powered by CONNEC ME EDUCATION

Math I

Math II

Physics

Chemistry

Biology

English I

English II

U.S. History

ACT®

CONNEC ME EDUCATION

The Research-Driven Solution

ACT® International Subject Tests
Powered by **CONNEC ME** EDUCATION

Math I:
Algebra I & Geometry

ACT Exam Standards

ACT®

CONNEC ME EDUCATION

The Research-
Driven Solution

ACT® International
Subject Tests
Powered by **CONNEC ME** EDUCATION

Math **I**:
Algebra I

ACT Exam Standards

ACT®

CONNEC ME EDUCATION

ACT Exam Standards
Algebra I

A set of empirically derived exam standards is the heart of each Subject Test. The ACT standards represent a solid evidence-based foundation in science. They were developed from an intensive study of high-performing high schools with significant minority and low-income enrollments that produced many graduates who met or exceeded ACT College Readiness Benchmark Scores.

This document contains a list of ACT Standards for a rigorous Algebra exam—what students should know and be able to do in the test. The ACT standards encompass the following overarching themes and/or foundational concepts:

A. Prerequisites

B. Exploring the Skills and Strategies Underlying Mathematics

C. Establishing Number Sense and Operations Skills

D. Exploring Expressions, Equations, and Functions in the First Degree

E. Exploring Quadratic Equations and Functions

F. Exploring Advanced Functions

G. Organizing and Analyzing Data and Applying Probability

ACT Exam Standards—Algebra I

A. Prerequisites
1. Skills Acquired by Students Previously
a. Set up and solve problems following the correct order of operations (including proportions, percent, and absolute value) with rational numbers (integers, fractions, decimals)
b. Find the greatest common factor and least common multiple of a set of whole numbers
c. Use rational numbers to demonstrate knowledge of additive and multiplicative inverses
d. Simplify ratios
e. Use scientific notation when working with very large or very small quantities
f. Add, subtract, multiply, and divide rational numbers, including integers, fractions, and decimals, without calculators
B. Exploring the Skills and Strategies Underlying Mathematics
1. Mathematical Processes Learned in the Context of Increasingly Complex Mathematical and Real-World Problems   (Note: These mathematical processes are the same for Algebra I, Geometry, Algebra II, and Precalculus.)
a. Apply problem-solving skills (e.g., identifying irrelevant or missing information, making conjectures, extracting mathematical meaning, recognizing and performing multiple steps when needed, verifying results in the context of the problem) to the solution of real-world problems

b.	Use a variety of strategies to set up and solve increasingly complex problems
c.	Represent data, real-world situations, and solutions in increasingly complex contexts (e.g., expressions, formulas, tables, charts, graphs, relations, functions) and understand the relationships
d.	Use the language of mathematics to communicate increasingly complex ideas orally and in writing, using symbols and notations correctly
e.	Make appropriate use of estimation and mental mathematics in computations and to determine the reasonableness of solutions to increasingly complex problems
f.	Make mathematical connections among concepts, across disciplines, and in everyday experiences
g.	Demonstrate the appropriate role of technology (e.g., calculators, software programs) in mathematics (e.g., organize data, develop concepts, explore relationships, decrease time spent on computations after a skill has been established)
h.	Apply previously learned mathematical concepts in more advanced contexts

C. Establishing Number Sense and Operation Skills

1. Foundations

a.	Evaluate and simplify expressions requiring addition, subtraction, multiplication, and division with and without grouping symbols
b.	Translate real-world problems into expressions using variables to represent values
c.	Apply algebraic properties (e.g., commutative, associative, distributive, identity, inverse, substitution) to simplify algebraic expressions
d.	Add and subtract polynomials
e.	Factor a monomial from a polynomial
f.	Multiply monomials, binomials, trinomials, and polynomials

D. Exploring Expressions, Equations, and Functions in the First Degree

1. Expressions, Equations, and Inequalities

a.	Solve single-step and multistep equations and inequalities in one variable
b.	Solve equations that contain absolute value
c.	Solve formulas for a specified variable
d.	Write and graph linear equations and inequalities from real-world situations (e.g., a constant-rate distance/time problem)
e.	Write linear equations in standard form and slope-intercept form when given two points, a point and the slope, or the graph of the equation
f.	Identify, formulate, and obtain solutions to problems involving direct and inverse variation
g.	Solve systems of two equations using various methods, including elimination, substitution, and graphing with and without technology

2. Graphs, Relations, and Functions

a.	Graph linear inequalities in one variable on the real number line to solve problems
b.	Give the domain and range of relations and functions
c.	Evaluate functions at given values

d.	Identify graphs of relations and functions and analyze them to determine whether a relation is a function (e.g., vertical line test)
e.	Graph linear inequalities with two variables on the standard (x,y) coordinate plane
f.	Use the terminology associated with the Cartesian plane in describing points and lines
g.	Recognize the concept of slope as a rate of change and determine the slope when given the equation of a line in standard form or slope-intercept form, the graph of a line, two points, or a verbal description
h.	Graph a linear equation using a table of values, x- and y-intercepts, slope-intercept form, and technology
i.	Translate between different representations of relations and functions: graphs, equations, sets of ordered pairs, verbal descriptions, and tables

E. Exploring Quadratic Equations and Functions

1. Equations and Inequalities

a.	Factor perfect square trinomials and the difference of two squares
b.	Factor trinomials in the form $ax^2 + bx + c$
c.	Solve quadratic equations using multiple methods, including graphing, factoring, and the square root principle

2. Graphs, Relations, and Functions

a.	Identify graphs of quadratic functions
b.	Relate factors, solutions (roots), zeros of related functions, and x-intercepts in equations that arise from quadratic functions

F. Exploring Advanced Functions

1. Rational and Radical Expressions, Equations, and Functions

a.	Use properties of exponents (including zero and negative exponents) to evaluate and simplify expressions
b.	Evaluate and simplify rational expressions
c.	Add, subtract, multiply, and divide rational expressions
d.	Find rational number square roots (without calculators) and approximate irrational square roots (with and without calculators)
e.	Evaluate and simplify radical expressions
f.	Multiply radical expressions
g.	Simplify an algebraic quotient by rationalizing an irrational monomial denominator

G. Organizing and Analyzing Data and Applying Probability

1. Data Relations, Probability, and Statistics

a.	Identify the effect on mean, median, mode, and range when a set of data is changed
b.	Interpret data from line, bar, and circle graphs, histograms, scatterplots, box-and-whisker plots, stem-and-leaf plots, and frequency tables to draw inferences and make predictions
c.	Identify arithmetic sequences and patterns in a set of data
d.	Identify patterns of growth (e.g., patterns of exponential growth) in a set of data
e.	Find the probability of a simple event

f. Distinguish between independent and dependent events
g. Identify an approximate line of best fit to model data and make predictions
h. Identify the most efficient way to display data

The Research-
Driven Solution

ACT® International
Subject Tests
Powered by **CONNEC ME** EDUCATION

Math **I:**
Geometry

ACT Exam Standards

ACT®

CONNEC ME EDUCATION

ACT Exam Standards
Geometry

A set of empirically derived exam standards is the heart of each Subject Test.
The ACT standards represent a solid evidence-based foundation in science. They were developed from an intensive study of high-performing high schools with significant minority and low-income enrollments that produced many graduates who met or exceeded ACT College Readiness Benchmark Scores.

This document contains a list of ACT Standards for a rigorous Geometry exam—what students should know and be able to do in the test. The ACT standards encompass the following overarching themes and/or foundational concepts:

A. Prerequisites

B. Exploring the Skills and Strategies Underlying Mathematics

C. Using Logic and Proof to Reason Mathematically

D. Identifying, Classifying, and Applying the Properties of Geometric Figures in Space

E. Comparing Congruent and Similar Geometric Figures

F. Using Length, Area, Perimeter, and Volume to Find Quantities and Solve Problems

G. Relating Geometric Ideas to the Coordinate Plane

H. Investigating and Applying Basic Ideas of Trigonometry

ACT Exam Standards—Geometry

A. Prerequisites
1. Skills Acquired by Students Previously
a. Apply algebraic properties (e.g., commutative, associative, distributive, identity, inverse, substitution) to simplify algebraic expressions
b. Solve single-step and multistep equations and inequalities in one variable
c. Write linear equations in standard form and slope-intercept form when given two points, a point and the slope, or the graph of the equation
d. Recognize the concept of slope as a rate of change and determine the slope when given the equation of a line in standard form or slope-intercept form, the graph of a line, two points, or a verbal description
e. Graph a linear equation using a table of values, x- and y-intercepts, or slope-intercept form
f. Find the probability of a simple event

B. Exploring the Skills and Strategies Underlying Mathematics

1. Mathematical Processes Learned in the Context of Increasingly Complex Mathematical and Real-World Problems
(Note: These mathematical processes are the same for Algebra I, Geometry, Algebra II, and Precalculus.)

a.	Apply problem-solving skills (e.g., identifying irrelevant or missing information, making conjectures, extracting mathematical meaning, recognizing and performing multiple steps when needed, verifying results in the context of the problem) to the solution of real-world problems
b.	Use a variety of strategies to set up and solve increasingly complex problems
c.	Represent data, real-world situations, and solutions in increasingly complex contexts (e.g., expressions, formulas, tables, charts, graphs, relations, functions) and understand the relationships
d.	Use the language of mathematics to communicate increasingly complex ideas orally and in writing, using symbols and notations correctly
e.	Make appropriate use of estimation and mental mathematics in computations and to determine the reasonableness of solutions to increasingly complex problems
f.	Make mathematical connections among concepts, across disciplines, and in everyday experiences
g.	Demonstrate the appropriate role of technology (e.g., calculators, software programs) in mathematics (e.g., organize data, develop concepts, explore relationships, decrease time spent on computations after a skill has been established)
h.	Apply previously learned algebraic concepts in geometric contexts

C. Using Logic and Proof to Reason Mathematically

1. Logic and Proof

a.	Use definitions, basic postulates, and theorems about points, segments, lines, angles, and planes to write proofs and to solve problems
b.	Use inductive reasoning to make conjectures and deductive reasoning to arrive at valid conclusions
c.	Identify and write conditional and biconditional statements along with the converse, inverse, and contrapositive of a conditional statement; use these statements to form conclusions
d.	Use various methods to prove that two lines are parallel or perpendicular (e.g., using coordinates, angle measures)
e.	Read and write different types and formats of proofs including two-column, flowchart, paragraph, and indirect proofs
f.	Prove that two triangles are congruent by applying the SSS, SAS, ASA, AAS, and HL congruence statements
g.	Use the principle that corresponding parts of congruent triangles are congruent to solve problems
h.	Use several methods, including AA, SAS, and SSS, to prove that two triangles are similar, corresponding sides are proportional, and corresponding angles are congruent
i.	Use properties of special quadrilaterals in a proof

D. Identifying, Classifying, and Applying the Properties of Geometric Figures in Space

1. Points, Lines, Planes, and Space

a.	Identify and model plane figures, including collinear and noncollinear points, lines, segments, rays, and angles using appropriate mathematical symbols
b.	Identify vertical, adjacent, complementary, and supplementary angle pairs and use them to solve problems (e.g., solve equations, use in proofs)
c.	Identify corresponding, same-side interior, same-side exterior, alternate interior, and alternate exterior angle pairs formed by a pair of parallel lines and a transversal and use these special angle pairs to solve problems (e.g., solve equations, use in proofs)

d.	Use construction techniques, including straightedge and compass, to bisect and trisect segments and to create parallel and perpendicular lines, perpendicular bisectors, and angle bisectors
e.	Locate, describe, and draw a locus in a plane or space
f.	Apply properties and theorems of parallel and perpendicular lines to solve problems

2. Polygons

a.	Identify and classify triangles by their sides and angles
b.	Identify medians, altitudes, perpendicular bisectors, and angle bisectors of triangles and use their properties to solve problems (e.g., find points of concurrency, segment lengths, or angle measures)
c.	Apply the Triangle Inequality Theorem to determine if a triangle exists and the order of sides and angles
d.	Solve problems involving the relationships formed when the altitude to the hypotenuse of a right triangle is drawn
e.	Apply the Pythagorean Theorem and its converse to triangles to solve mathematical and real-world problems (e.g., shadows and poles, ladders)
f.	Identify and use Pythagorean triples in right triangles to find lengths of the unknown side
g.	Identify and classify quadrilaterals, including parallelograms, rectangles, rhombi, squares, kites, trapezoids, and isosceles trapezoids, using their properties
h.	Identify and classify regular and nonregular polygons (e.g., pentagons, hexagons, heptagons, octagons, nonagons, decagons, dodecagons) based on the number of sides, the angle measures, and the side lengths
i.	Apply the Angle Sum Theorem for triangles and polygons to find interior and exterior angle measures given the number of sides, to find the number of sides given angle measures, and to solve real-world problems
j.	Apply the Isosceles Triangle Theorem and its converse to triangles to solve mathematical and real-world problems

3. Circles

a.	Identify and define line segments associated with circles (e.g., radii, diameters, chords, secants, tangents)
b.	Determine the measure of central and inscribed angles and their intercepted arcs
c.	Find segment lengths, angle measures, and intercepted arc measures formed by chords, secants, and tangents intersecting inside and outside circles
d.	Solve problems using inscribed and circumscribed polygons

4. Solids

a.	Identify and classify prisms, pyramids, cylinders, cones, and spheres and use their properties to solve problems
b.	Describe and draw cross sections of prisms, cylinders, pyramids, and cones

E. Comparing Congruent and Similar Geometric Figures

1. Similarity and Congruence

a.	Determine points or lines of symmetry and apply the properties of symmetry to figures
b.	Identify congruent figures and their corresponding parts
c.	Identify similar figures and use ratios and proportions to solve mathematical and real-world problems (e.g., finding the height of a tree using the shadow of the tree and the height and shadow of a person)
d.	Use the definition of similarity to establish the congruence of angles, proportionality of sides, and scale factor of two similar polygons
e.	Identify and draw images of transformations and use their properties to solve problems
f.	Apply relationships between perimeters of similar figures, areas of similar figures, and volumes of similar figures, in terms of scale factor, to solve mathematical and real-world problems
g.	Determine the geometric mean between two numbers and use it to solve problems (e.g., find the lengths of segments in right triangles)
h.	Identify and give properties of congruent or similar solids

F. Using Length, Area, Perimeter, and Volume to Find Quantities and Solve Problems

1. Area and Perimeter

a.	Find the perimeter and area of common plane figures, including triangles, quadrilaterals, regular polygons, and irregular figures, from given information using appropriate units of measurement
b.	Manipulate perimeter and area formulas to solve problems (e.g., finding missing lengths)
c.	Use area to solve problems involving geometric probability
d.	Find arc lengths and circumferences of circles from given information (e.g., radius, diameter, coordinates)
e.	Find the area of a circle and the area of a sector of a circle from given information (e.g., radius, diameter, coordinates)

2. Lateral Area, Surface Area, and Volume

a.	Find the lateral area, surface area, and volume of prisms, cylinders, cones, and pyramids in mathematical and real-world settings
b.	Use cross sections of prisms, cylinders, pyramids, and cones to solve volume problems
c.	Find the surface area and volume of a sphere in mathematical and real-world settings

G. Relating Geometric Ideas to the Coordinate Plane

1. Coordinate Geometry

a.	Use slope to distinguish between and write equations for parallel and perpendicular lines
b.	Apply the midpoint and distance formulas to points and segments to find midpoints, distances, and missing information
c.	Use coordinate geometry to solve problems about geometric figures (e.g., segments, triangles, quadrilaterals)
d.	Write equations for circles in standard form and solve problems using equations and graphs
e.	Determine the effect of reflections, rotations, translations, and dilations and their compositions on the coordinate plane

H. Investigating and Applying Basic Ideas of Trigonometry

1. Introduction to Trigonometry

a.	Apply properties of 45°-45°-90° and 30°-60°-90° triangles to determine lengths of sides of triangles
b.	Find the sine, cosine, and tangent ratios of acute angles given the side lengths of right triangles
c.	Use trigonometric ratios to find the sides or angles of right triangles and to solve real-world problems (e.g., use angles of elevation and depression to find missing measures)

The Research-Driven Solution

ACT® International Subject Tests

Powered by CONNEC ME EDUCATION

Math II:

Algebra II & Precalculus

ACT Exam Standards

ACT®

CONNEC ME EDUCATION

Dr. Ahmad Bani Yaseen

The Research-Driven Solution

ACT® International Subject Tests

Powered by CONNEC ME EDUCATION

Math II: Algebra II

ACT Exam Standards

ACT®

CONNEC ME EDUCATION

Dr. Ahmad Bani Yaseen

ACT Exam Standards
Algebra II

A set of empirically derived exam standards is the heart of each Subject Test.
The ACT standards represent a solid evidence-based foundation in science. They were developed from an intensive study of high-performing high schools with significant minority and low-income enrollments that produced many graduates who met or exceeded ACT College Readiness Benchmark Scores.

This document contains a list of ACT Standards for a rigorous Algebra II exam—what students should know and be able to do in the test. The ACT standards encompass the following overarching themes and/or foundational concepts:

A. Prerequisites

B. Exploring the Skills and Strategies Underlying Mathematics

C. Establishing Number Sense and Operation Skills

D. Exploring Expressions, Equations, and Functions in the First Degree

E. Exploring Quadratic Equations and Functions

F. Exploring Polynomial Expressions, Equations, and Functions

G. Exploring Advanced Functions

H. Organizing and Analyzing Data and Applying Probability

I.   Using Matrices to Organize Data and Solve Problems

ACT Exam Standards—Algebra II

A. Prerequisites	
1. Skills Acquired by Students Previously	
a.	Identify properties of real numbers and use them and the correct order of operations to simplify expressions
b.	Multiply monomials and binomials
c.	Factor trinomials in the form $ax^2 + bx + c$
d.	Solve single-step and multistep equations and inequalities in one variable
e.	Solve systems of two linear equations using various methods, including elimination, substitution, and graphing
f.	Write linear equations in standard form and slope-intercept form when given two points, a point and the slope, or the graph of the equation
g.	Graph a linear equation using a table of values, x- and y-intercepts, or slope-intercept form
h.	Find the distance and midpoint between two points in the coordinate plane
i.	Use sine, cosine, and tangent ratios to find the sides or angles of right triangles
j.	Use inductive reasoning to make conjectures and deductive reasoning to arrive at valid conclusions

Dr. Ahmad Bani Yaseen

	B. Exploring the Skills and Strategies Underlying Mathematics
	1. Mathematical Processes Learned in the Context of Increasingly Complex Mathematical and Real-World Problems (Note: These mathematical processes are the same for Algebra I, Geometry, Algebra II, and Precalculus.)
a.	Apply problem-solving skills (e.g., identifying irrelevant or missing information, making conjectures, extracting mathematical meaning, recognizing and performing multiple steps when needed, verifying results in the context of the problem) to the solution of real-world problems
b.	Use a variety of strategies to set up and solve increasingly complex problems
c.	Represent data, real-world situations, and solutions in increasingly complex contexts (e.g., expressions, formulas, tables, charts, graphs, relations, functions) and understand the relationships
d.	Use the language of mathematics to communicate increasingly complex ideas orally and in writing, using symbols and notations correctly
e.	Make appropriate use of estimation and mental mathematics in computations and to determine the reasonableness of solutions to increasingly complex problems
f.	Make mathematical connections among concepts, across disciplines, and in everyday experiences
g.	Demonstrate the appropriate role of technology (e.g., calculators, software programs) in mathematics (e.g., organize data, develop concepts, explore relationships, decrease time spent on computations after a skill has been established)
h.	Apply previously learned algebraic and geometric concepts to more advanced problems
	C. Establishing Number Sense and Operation Skills
	1. Foundations
a.	Identify complex numbers and write their conjugates
b.	Add, subtract, and multiply complex numbers
c.	Simplify quotients of complex numbers
d.	Perform operations on functions, including function composition, and determine domain and range for each of the given functions
	D. Exploring Expressions, Equations, and Functions in the First Degree
	1. Expressions, Equations, and Inequalities
a.	Solve linear inequalities containing absolute value
b.	Solve compound inequalities containing "and" and "or" and graph the solution set
c.	Solve algebraically a system containing three variables
	2. Graphs, Relations, and Functions
a.	Graph a system of linear inequalities in two variables with and without technology to find the solution set to the system
b.	Solve linear programming problems by finding maximum and minimum values of a function over a region defined by linear inequalities
	E. Exploring Quadratic Equations and Functions
	1. Equations and Inequalities
a.	Solve quadratic equations and inequalities using various techniques, including completing the square and using the quadratic formula
b.	Use the discriminant to determine the number and type of roots for a given quadratic equation
c.	Solve quadratic equations with complex number solutions
d.	Solve quadratic systems graphically and algebraically with and without technology
	2. Graphs, Relations, and Functions
a.	Determine the domain and range of a quadratic function; graph the function with and without technology
b.	Use transformations (e.g., translation, reflection) to draw the graph of a relation and determine a relation that fits a graph
c.	Graph a system of quadratic inequalities with and without technology to find the solution set to the system
	3. Conic Sections
a.	Identify conic sections (e.g., parabola, circle, ellipse, hyperbola) from their equations in standard form
b.	Graph circles and parabolas and their translations from given equations or characteristics with and without technology

3

Dr. Ahmad Bani Yaseen

c.	Determine characteristics of circles and parabolas from their equations and graphs
d.	Identify and write equations for circles and parabolas from given characteristics and graphs

F. Exploring Polynomial Expressions, Equations, and Functions

1. Expressions and Equations

a.	Evaluate and simplify polynomial expressions and equations
b.	Factor polynomials using a variety of methods (e.g., factor theorem, synthetic division, long division, sums and differences of cubes, grouping)

2. Functions

a.	Determine the number and type of rational zeros for a polynomial function
b.	Find all rational zeros of a polynomial function
c.	Recognize the connection among zeros of a polynomial function, x-intercepts, factors of polynomials, and solutions of polynomial equations
d.	Use technology to graph a polynomial function and approximate the zeros, minimum, and maximum; determine domain and range of the polynomial function

G. Exploring Advanced Functions

1. Rational and Radical Expressions, Equations, and Functions

a.	Solve mathematical and real-world rational equation problems (e.g., work or rate problems)
b.	Simplify radicals that have various indices
c.	Use properties of roots and rational exponents to evaluate and simplify expressions
d.	Add, subtract, multiply, and divide expressions containing radicals
e.	Rationalize denominators containing radicals and find the simplest common denominator
f.	Evaluate expressions and solve equations containing nth roots or rational exponents
g.	Evaluate and solve radical equations given a formula for a real-world situation

2. Exponential and Logarithmic Functions

a.	Graph exponential and logarithmic functions with and without technology
b.	Convert exponential equations to logarithmic form and logarithmic equations to exponential form

3. Trigonometric and Periodic Functions

a.	Use the law of cosines and the law of sines to find the lengths of sides and measures of angles of triangles in mathematical and real-world problems
b.	Use the unit-circle definition of the trigonometric functions and trigonometric relationships to find trigonometric values for general angles
c.	Measure angles in standard position using degree or radian measure and convert a measure from one unit to the other
d.	Graph the sine and cosine functions with and without technology
e.	Determine the domain and range of the sine and cosine functions, given a graph
f.	Find the period and amplitude of the sine and cosine functions, given a graph
g.	Use sine, cosine, and tangent functions, including their domains and ranges, periodic nature, and graphs, to interpret and analyze relations

H. Organizing and Analyzing Data and Applying Probability

1. Data Relations, Probability, and Statistics

a.	Use the fundamental counting principle to count the number of ways an event can happen
b.	Use counting techniques, like combinations and permutations, to solve problems (e.g., to calculate probabilities)
c.	Find the probability of mutually exclusive and nonmutually exclusive events
d.	Find the probability of independent and dependent events
e.	Use unions, intersections, and complements to find probabilities
f.	Solve problems involving conditional probability

Dr. Ahmad Bani Yaseen

	2. Sequences and Series
a.	Find the *n*th term of an arithmetic or geometric sequence
b.	Find the position of a given term of an arithmetic or geometric sequence
c.	Find sums of a finite arithmetic or geometric series
d.	Use sequences and series to solve real-world problems
e.	Use sigma notation to express sums
	I. Using Matrices to Organize Data and Solve Problems
	1. Matrices
a.	Add, subtract, and multiply matrices
b.	Use addition, subtraction, and multiplication of matrices to solve real-world problems
c.	Calculate the determinant of 2 × 2 and 3 × 3 matrices
d.	Find the inverse of a 2 × 2 matrix
e.	Solve systems of equations by using inverses of matrices and determinants
f.	Use technology to perform operations on matrices, find determinants, and find inverses

Dr. Ahmad Bani Yaseen

ACT® International Subject Tests
Powered by CONNEC ME EDUCATION

Math II:
Precalculus

ACT Exam Standards

ACT®

CONNEC ME EDUCATION

Dr. Ahmad Bani Yaseen

ACT Exam Standards
Precalculus

A set of empirically derived exam standards is the heart of each Subject Test.
The ACT standards represent a solid evidence-based foundation in science. They were developed from an intensive study of high-performing high schools with significant minority and low-income enrollments that produced many graduates who met or exceeded ACT College Readiness Benchmark Scores.

This document contains a list of ACT Standards for a rigorous Precalculus exam—what studentsshould know and be able to do in the test. The ACT standards encompass the following overarching themes and/or foundational concepts:

A. Prerequisites

B. Exploring the Skills and Strategies Underlying Mathematics

C. Establishing Number Sense and Operation Skills

D. Exploring Quadratic Equations and Functions

E. Exploring Polynomial Expressions, Equations, and Functions

F. Exploring Advanced Functions

G. Organizing and Analyzing Data and Applying Probability

H. Using Matrices to Organize Data and Solve Problems

I. Exploring Polar Coordinates and Vectors

ACT Exam Standards—Precalculus

A. Prerequisites
1. Skills Acquired by Students Previously
a. Solve linear, quadratic, rational, and radical equations
b. Graph linear, quadratic, polynomial, exponential, logarithmic, sine, and cosine functions
c. Factor polynomials using a variety of methods
d. Use inductive reasoning to make conjectures and deductive reasoning to arrive at valid conclusions
B. Exploring the Skills and Strategies Underlying Mathematics
1. Mathematical Processes Learned in the Context of Increasingly Complex Mathematical and Real-World Problems (**Note:** These mathematical processes are the same for Algebra I, Geometry, Algebra II, and Precalculus.)
a. Apply problem-solving skills (e.g., identifying irrelevant or missing information, making conjectures, extracting mathematical meaning, recognizing and performing multiple steps when needed, verifying results in the context of the problem) to the solution of real-world problems
b. Use a variety of strategies to set up and solve increasingly complex problems

Dr. Ahmad Bani Yaseen

c.	Represent data, real-world situations, and solutions in increasingly complex contexts (e.g., expressions, formulas, tables, charts, graphs, relations, functions) and understand the relationships
d.	Use the language of mathematics to communicate increasingly complex ideas orally and in writing, using symbols and notations correctly
e.	Make appropriate use of estimation and mental mathematics in computations and to determine the reasonableness of solutions to increasingly complex problems
f.	Make mathematical connections among concepts, across disciplines, and in everyday experiences
g.	Demonstrate the appropriate role of technology (e.g., calculators, software programs) in mathematics (e.g., organize data, develop concepts, explore relationships, decrease time spent on computations after a skill has been established)
h.	Apply previously learned algebraic and geometric concepts to more advanced problems

C. Establishing Number Sense and Operation Skills

1. Foundations

a.	Identify and graph piecewise functions, including greatest integer, step, and absolute value functions
b.	Identify, graph, and write equations for inverses and transformations of various functions—including polynomial, rational, radical, absolute value, and trigonometric—with and without technology

D. Exploring Quadratic Equations and Functions

1. Conic Sections

a.	Graph ellipses and hyperbolas and their translations from given equations or characteristics
b.	Solve systems of conics with and without technology
c.	Convert conic equations in general form to standard form
d.	Determine characteristics of ellipses and hyperbolas from given equations and graphs
e.	Identify and write equations for ellipses and hyperbolas from given characteristics and graphs

E. Exploring Polynomial Expressions, Equations, and Functions

1. Expressions and Equations

a.	Solve polynomial equations using a variety of methods (e.g., factoring, rational roots theorem)
b.	Use technology to approximate the real roots of a polynomial equation

2. Functions

a.	Use algebraic tests to determine whether the graph of a relation is symmetrical
b.	Classify functions as even, odd, or neither
c.	Graph general polynomial functions from given characteristics such as degree, sign of lead coefficient, and roots and their multiplicity
d.	Find the rational roots, real roots, and complex roots of a polynomial function
e.	Describe the binomial theorem and Pascal's triangle; use them to expand polynomials
f.	Use limits to approximate the slope of a curve at a point
g.	Use limits to approximate the area under a curve

F. Exploring Advanced Functions

1. Rational and Radical Expressions, Equations, and Functions

a.	Graph and analyze radical functions, including square root and cube root functions, with and without technology
b.	Graph rational functions using intercepts, symmetry, asymptotes, and removable discontinuities

2. Exponential and Logarithmic Functions

a.	Use properties of exponents to simplify and evaluate expressions involving real exponents
b.	Use properties of logarithms to simplify and evaluate expressions involving logarithms
c.	Solve equations involving real exponents

Dr. Ahmad Bani Yaseen

d.	Solve equations with variable exponents by using logarithms
e.	Use the natural base *e* to evaluate exponential expressions, solve exponential equations, and graph exponential functions
f.	Solve exponential and logarithmic equations and real-world problems involving exponential and logarithmic equations (e.g., compound interest, exponential growth and decay)

3. Trigonometric and Periodic Functions

a.	Use various methods to find the area of a triangle (e.g., given the length of two sides and the included angle)
b.	Graph tangent, cotangent, secant, and cosecant functions and their transformations
c.	State the amplitude, period, phase, and vertical translation of transformations of the sine and cosine functions
d.	Graph transformations (e.g., vertical and horizontal translations, reflections, stretches) of the sine and cosine functions
e.	Determine periodicity and amplitude from graphs, stretch and shrink graphs both vertically and horizontally, and translate graphs
f.	Graph and write the equations of sine and cosine functions given the amplitude, period, phase shift, and vertical translation; use the functions to model real-life situations (e.g., spring problems, ocean tides)
g.	Identify the sum and difference identities for the sine, cosine, and tangent functions; apply the identities to solve mathematical problems
h.	Derive, identify, and apply double-angle and half-angle formulas to solve mathematical problems
i.	Apply the fundamental trigonometric identities, the double-angle and half-angle identities, and the sum and difference identities to simplify and evaluate trigonometric expressions and prove trigonometric identities
j.	Use trigonometric identities or technology to solve trigonometric equations
k.	Identify and graph inverse sine, cosine, and tangent functions
l.	Use and evaluate inverse sine, cosine, and tangent functions to solve trigonometric equations

G. Organizing and Analyzing Data and Applying Probability

1. Data Relations, Probability, and Statistics

a.	Use the standard normal curve to study properties of normal distributions of data (e.g., give percent of data within a given interval)
b.	Identify uniform, skewed, and normal distributions in a set of data
c.	Determine the quartiles and interquartile range for a set of data
d.	Recognize different types of sampling procedures and identify their strengths and limitations
e.	Estimate population characteristics based on samples
f.	Find the variance and standard deviation of a set of data and convert data to standard values

2. Sequences and Series

a.	Find the sum of an infinite geometric series
b.	Find or estimate the limit of an infinite sequence or determine that the limit does not exist
c.	Use mathematical induction to prove the validity of mathematical statements

H. Using Matrices to Organize Data and Solve Problems

1. Matrices

a.	Use matrices to determine the coordinates of polygons under a given transformation
b.	Find the reduced row-echelon form of an augmented matrix to solve systems of equations

I. Exploring Polar Coordinates and Vectors

1. Polar Coordinates and Vectors

a.	Define polar coordinates to locate a point on a graph
b.	Graph polar functions by plotting points and by using technology
c.	Express two-dimensional points and equations in rectangular and polar coordinates

Dr. Ahmad Bani Yaseen

d.	Find powers and roots of complex numbers in polar form using De Moivre's theorem
e.	Graphically add and subtract vectors and perform scalar multiplication
f.	Use coordinates to perform vector operations and to determine the magnitude and direction of a vector
g.	Use the dot product to calculate the angle between two vectors
h.	Resolve a vector into horizontal and vertical components
i.	Solve real-world problems involving vector displacements (e.g., airplane in the wind, weight of an object on a ramp)
j.	Graph parametric equations and write parametric equations of lines

Dr. Ahmad Bani Yaseen

ACT® International Subject Tests

Powered by CONNEC ME EDUCATION

Physics

ACT Exam Standards

ACT®

CONNEC ME EDUCATION

ACT Exam Standards
Physics

A set of empirically derived exam standards is the heart of each Subject Test.
The ACT standards represent a solid evidence-based foundation in science. They were developed from an intensive study of high-performing high schools with significant minority and low-income enrollments that produced many graduates who met or exceeded ACT College Readiness Benchmark Scores.

This document contains a list of ACT Standards for a rigorous Exam exam—what students should know and be able to do in the test. The ACT standards encompass the following overarching themes and/or foundational concepts:

A. Understanding Physics as Inquiry

B. Understanding and Applying Knowledge of Forces and Motion

C. Understanding and Applying Knowledge of Fundamental Forces

D. Understanding and Applying Knowledge of Waves and Periodic Motion

ACT Exam Standards—Physics

A. Understanding Physics as Inquiry
(Note: Some of the process standards in this section are similar to those found in Biology and Chemistry.)
1. Scientific Inquiry
a. Identify and clarify research questions and design experiments
b. Design experiments with controlled variables and appropriate numbers of trials
c. Collect, organize, and analyze data accurately and use appropriate techniques and devices
d. Interpret results and draw conclusions, revising hypotheses as necessary and/or formulating additional questions or explanations
e. Write and speak effectively to present and explain scientific results, using appropriate terminology and graphics
f. Safely use laboratory equipment and techniques when conducting scientific investigations
g. Routinely make predictions and estimations
2. Mathematics and Measurement in Science
a. Distinguish between precision and accuracy with respect to experimental data
b. Use appropriate SI units for length, mass, time, temperature, area, volume, and density; describe the relationships among SI unit prefixes (e.g., centi-, milli-, kilo-) and how to convert between English units and SI units
c. Calculate slope and explain its physical significance (e.g., velocity is slope on a displacement-time graph)
d. Calculate/estimate, using significant figures, the uncertainty in experimental results, and use the uncertainty to evaluate and interpret results

e.	Express numbers in scientific notation when appropriate
f.	Solve for unknown quantities by manipulating variables
g.	Use graphical, mathematical, and/or statistical models to express patterns and relationships inferred from sets of scientific data

3. Science in Practice

a.	Understand the fundamental assumptions of science (e.g., the physical world is measurable and can be modeled)
b.	Explain and apply criteria that scientists use to evaluate the validity of scientific claims and theories
c.	Explain why experimental replication and peer review are essential to eliminate as much error and bias as possible in scientific claims
d.	Explain the criteria that explanations must meet to be considered scientific (e.g., be consistent with experimental/observational evidence about nature, be open to critique and modification, use ethical reporting methods and procedures)
e.	Explain why all scientific knowledge is subject to change as new evidence becomes available to the scientific community
f.	Use a variety of appropriate sources (e.g., Internet, scientific journals) to retrieve relevant information; cite references properly

B. Understanding and Applying Knowledge of Forces and Motion

1. Speed, Velocity, and Acceleration

a.	Write equations for the displacement and velocity of an object over time; based on these equations, recognize and/or draw graphs of the object's displacement and velocity versus time
b.	Solve problems in kinematics using the equations $v = v_o + at$, $s = s_o + v_o t + (1/2)at^2$, and $v_{avg} = (s - s_o)/t$
c.	Construct the two graphs *not* given, when given a linear motion graph of displacement, velocity, or acceleration versus time

2. One- and Two-Dimensional Motion

a.	Write equations for the horizontal and vertical components of both a projectile's displacement over time and its velocity over time
b.	Calculate the displacement, velocity, and altitude over time for a projectile that is launched at a given initial velocity from a launch site at a given altitude above a horizontal plane
c.	Relate the magnitude of the centripetal acceleration to the speed or rate of revolution and to the radius of orbit for a particle undergoing uniform circular motion
d.	Describe the direction of the velocity and acceleration vectors for a particle undergoing uniform circular motion at any given position in its orbit
e.	Determine vector sums by graphical and mathematical means
f.	Resolve a vector into mutually perpendicular components

3. Work and Energy

a.	Describe the relationship between work and energy
b.	Distinguish between kinetic energy and potential energy
c.	Discuss the relationship between work and kinetic energy and between work and gravitational potential energy, using Newton's second law
d.	Calculate the amount of work done by a given force exerted on a body that is constrained to move on a given plane
e.	Calculate the change in energy (kinetic, gravitational potential, and elastic potential) that results from performing a specified amount of work on a body

3

f.	Use the laws of the conservation of momentum and the conservation of mechanical energy to solve problems involving elastic collisions
g.	Write the equation for the force exerted by an ideal spring, both as a function of the amount the spring is stretched and as a function of the amount the spring is compressed; in each case, write the equation for the potential energy stored in the spring
h.	Identify and explain situations in which mechanical energy is conserved and in which mechanical energy is not conserved, even though energy is conserved
i.	Relate power to work, and solve problems involving acceleration, force, distance, and time

4. Momentum

a.	Define *momentum* and *impulse*
b.	Calculate the total linear momentum of an isolated system of moving masses
c.	Calculate the time-averaged force acting on a body when an impulsive force is exerted on the body
d.	Identify and discuss situations in which linear momentum is conserved, using Newton's second and third laws (the concepts of external and internal forces)
e.	Solve problems using the conservation of linear momentum, including those involving two bodies following paths that intersect at arbitrary angles

5. Newton's Laws

a.	Describe the condition under which a body under the influence of several forces will remain at rest or in a state of unaccelerated motion
b.	Contrast mass and weight
c.	Calculate, for a body initially moving in a straight line at a constant speed, the net change in the velocity of the body that will result when a constant net force is applied to the body for a given amount of time
d.	Draw a free-body diagram, and write a vector equation for a body in the form of Newton's second law
e.	Write an equation that describes the dependence of the frictional force between a body and a surface on the normal force exerted on the surface by the body, and explain the meaning of the coefficient of friction
f.	Use Newton's third law to identify action-reaction pairs; for each pair, identify the body on which the reaction force acts and determine the magnitude and direction of the reaction force

C. Understanding and Applying Knowledge of Fundamental Forces

1. Gravity

a.	Express the dependence of gravitational field (i.e., gravitational acceleration) on mass and distance, using proportions
b.	Calculate the strength of the gravitational field of a spherical mass at a given point outside the mass

2. Electrical Charges and Coulomb's Law

a.	Compare Coulomb's law to Newton's universal law of gravitation, and explain how each variable affects the forces
b.	Calculate the Coulomb force exerted upon a specified point charge by one or more point charges
c.	Give a qualitative description of electrical charging by conduction and induction

3. Electrical Potential and Electric Fields

a.	Describe qualitatively the electric field produced by a point charge
b.	Use lines of force to represent the electric fields associated with various symmetrical charge distributions, and describe these fields
c.	Use vector addition to combine the electric fields of two or more point charges and to determine the strength of the resultant electric field at a prescribed location in space

d.	Calculate the magnitude and direction of the electrical force exerted by an electric field on a positive charge and by the same electric field on a negative charge
e.	Describe the motion of a particle of specified charge and mass in a uniform electric field
f.	Calculate the electrical work done on a positive or negative charge that moves through a uniform electric field
g.	Calculate the work done on a charged particle by an electric field as the particle moves through a potential gradient associated with the electric field
h.	Relate the intensity of an electric field between two points in space to the difference in electrical potential between the two points and to the distance between the two points
i.	Calculate the potential difference between two points in a uniform electric field, and determine which point is at the higher potential

4. Magnetism

a.	Describe conditions under which magnetic fields are produced
b.	Describe the most general path for a charged particle moving in a uniform magnetic field
c.	Describe the conditions under which magnetic flux through a current loop will induce an electromagnetic field in the loop
d.	Describe how electromagnetic induction applies to the motor and generator

5. Electrical Circuits

a.	Describe the relationship between the current flowing through a resistor and the voltage across a resistor
b.	Calculate the magnitude and determine the direction of the electrical current in a conducting wire
c.	Distinguish between direct current and alternating current
d.	Describe the relationship between the resistance of a resistor and the composition, length, and cross-sectional area of the resistor; describe the effect of temperature on the resistance of a resistor
e.	Use Ohm's law to calculate the voltage across, the current through, or the resistance of a circuit element in a direct current circuit
f.	Identify the elements in an electrical circuit that are in series or in parallel
g.	Calculate the ratio of the voltages across two resistors that are connected in series, and calculate the ratio of the currents through two resistors that are connected in parallel
h.	Calculate the equivalent resistance of a network of resistors
i.	Calculate, for any resistor in a network of resistors connected to a single power source, the voltage, current, and amount of power dissipated
j.	Design, given a predetermined terminal voltage, a circuit element containing resistors in series and/or parallel such that a predetermined current flows through the element
k.	Describe the placement of a voltmeter and an ammeter in an electrical circuit to properly measure voltage and current

D. Understanding and Applying Knowledge of Waves and Periodic Motion

1. Wave Properties

a.	Use a graph of the displacement of a point in a given medium versus time to measure or calculate the frequency, wavelength, and amplitude of the wave that produced the displacement over time
b.	Explain how wavelength and frequency are related to the velocity of a wave
c.	Describe the reflection of a wave from the fixed end of a string and from the free end of a string
d.	State what factors determine the speed of waves on a string
e.	Sketch the standing waves for various modes, and determine the frequency, wavelength, and amplitude of each mode, for a string that has been pulled taut and fastened at both ends

f. Describe the conditions under which the superposition of waves will produce constructive or destructive interference
g. Describe the conditions under which a standing wave may be formed by the superposition of other waves
h. Solve problems involving wave speed, frequency, and wavelength
i. Discuss the factors that determine the energy of a wave
j. Compare transverse and longitudinal waves
k. Describe the refraction of a wave as it passes from one medium to another
l. Describe the Doppler effect and give examples of its occurrences and applications

2. Periodic Motion

a. Describe the physical conditions needed to cause a particular body to undergo simple harmonic motion (SHM)
b. Describe the relationship between the frequency of oscillation of a body undergoing SHM and the period of the body's oscillations

3. Sound Waves

a. Explain how sound intensity is measured, and discuss its relationship to the decibel scale
b. Sketch the standing waves for pipes with various combinations of open and closed ends (i.e., both ends open, both ends closed, and one end open and one closed), and find the wavelength and frequency of each mode

4. Light Waves

a. Describe how the intensity of light from a point source varies with distance, using proportions
b. Calculate the intensity of light at various distances from a point source having a given luminosity, and use the results to illustrate the inverse square law
c. Discuss the relationship between the intensity of light and the amplitude of light waves
d. Describe the electromagnetic spectrum in relation to energy, frequency, and wavelength, and discuss how our lives are affected by radiation in the various regions of this spectrum
e. Relate the wavelength, frequency, speed, and index of refraction of light as it passes from one medium to another
f. Draw and diagram the directions of reflected and refracted rays when incident light rays approach a rectangular glass block obliquely
g. Calculate the direction of the refracted ray using Snell's law when the direction of the incident ray and the index of refraction are known
h. Describe the conditions under which total internal reflection will occur
i. Use ray tracing to show the positions of an object, an image, and the focal point of a mirror or thin lens, and determine whether the image is real or virtual, upright or inverted
j. Use the thin lens (mirror) equation to relate the positions of an object, an image, and the focal point of a mirror or thin lens; determine whether the image is real or virtual, upright or inverted; and use the image and object distances to find the lateral magnification

ACT International
Subject Tests
Powered by CONNEC ME
EDUCATION

Chemistry

ACT Exam Standards

ACT

CONNEC ME
EDUCATION

ACT Exam Standards
Chemistry

A set of empirically derived exam standards is the heart of each Subject Test.
The ACT standards represent a solid evidence-based foundation in science. They were developed from an intensive study of high-performing high schools with significant minority and low-income enrollments that produced many graduates who met or exceeded ACT College Readiness Benchmark Scores.

This document contains a list of ACT Standards for a rigorous Chemistry exam—what students should know and be able to do in the test. The ACT standards encompass the following overarching themes and/or foundational concepts:

A. Understanding Chemistry as Inquiry

B. Exploring the Physical World

C. Discovering the Language of Chemistry

D. Building Models of Matter

E. Integrating the Macroscopic, Microscopic, and Symbolic Worlds

ACT Exam Standards—Chemistry

I. UNDERSTANDING CHEMISTRY AS INQUIRY
(Note: Some of the process standards in this section are similar to those found in Biology and Physics.)

A. Foundations

1. Scientific Inquiry
a. Identify and clarify research questions and design experiments
b. Design experiments so that variables are controlled and appropriate numbers of trials are used
c. Collect, organize, and analyze data accurately and use techniques and equipment appropriately
d. Interpret results and draw conclusions, revising hypotheses as necessary and/or formulating additional questions or explanations
e. Write and speak effectively to present and explain scientific results, using appropriate terminology and graphics
f. Safely use laboratory equipment and techniques when conducting scientific investigations
g. Routinely make predictions and estimations
2. Mathematics and Measurement in Science
a. Distinguish between precision and accuracy with respect to experimental data
b. Use appropriate SI units for length, mass, time, temperature, quantity of matter, area, volume, and density; describe the relationships among SI unit prefixes (e.g., centi-, milli-, kilo-); recognize commonly used non-SI units
c. Use the correct number of significant figures in reporting measurements and the results of calculations
d. Use appropriate statistical methods to represent the results of investigations
e. Express numbers in scientific notation when appropriate
f. Solve for unknown quantities by manipulating variables
g. Use graphical, mathematical, and/or statistical models to express patterns and relationships inferred from sets of scientific data

3. Science in Practice
a. Explain and apply criteria that scientists use to evaluate the validity of scientific claims and theories
b. Explain why experimental replication and peer review are essential to eliminate as much error and bias as possible in scientific claims
c. Explain the criteria that explanations must meet to be considered scientific (e.g., be consistent with experimental/observational evidence about nature, be open to critique and modification, use ethical reporting methods and procedures)
d. Explain why all scientific knowledge is subject to change as new evidence becomes available to the scientific community
e. Use a variety of appropriate sources (e.g., Internet, scientific journals) to retrieve relevant information; cite references properly
f. Identify and analyze the advantages and disadvantages of widespread use of and reliance on technology
g. Compare the scientific definitions of fact, law, and theory, and give examples of each in chemistry

II. EXPLORING THE PHYSICAL WORLD

A. Introduction to Chemistry
1. Mass, Volume, and Density
a. Explain why mass is used as a quantity of matter and differentiate between mass and weight
b. Explain density qualitatively and solve density problems by applying an understanding of the concept of density
2. Elements, Atomic Mass, and Nomenclature
a. Use the IUPAC symbols of the most commonly referenced elements
b. Compare the characteristics of elements, compounds, and mixtures
c. Compare characteristics of isotopes of the same element

B. Properties of Matter and Gases
1. Phases of Matter, Phase Changes, and Physical Changes
a. Compare the definition of matter and energy and the laws of conservation of matter and energy
b. Describe how matter is classified by state of matter and by composition
c. Describe the phase and energy changes associated with boiling/condensing, melting/freezing, sublimation, and crystallization (deposition)
d. Explain the difference between chemical and physical changes and demonstrate how these changes can be used to separate mixtures and compounds into their components
e. Define chemical and physical properties and compare them by providing examples
2. The Nature of Gases
a. Define gas pressure and the various pressure units (e.g., torr, kilopascals, mm Hg, atmospheres)
b. Describe the use and operation of mercury barometers and manometers to find atmospheric pressure or relative gas pressures
c. Define the gas laws given by Boyle, Charles, Gay-Lussac, and Dalton and solve problems based on these laws
d. Predict boiling point changes based on changes in atmospheric pressure
e. Explain the basis for gaseous diffusion and effusion
f. Describe Avogadro's hypothesis and use it to solve stoichiometric problems
3. Ideal Gas Law
a. Explain the difference between an ideal and real gas, the assumptions made about an ideal gas, and what conditions favor ideal behavior for a real gas
b. Apply the mathematical relationships that exist among the volume, temperature, pressure, and number of particles in an ideal gas
c. Compute gas density when given molar mass, temperature, and pressure
d. Apply the ideal gas law to determine the molar mass of a volatile compound
e. Solve gas stoichiometry problems at standard and nonstandard conditions

III. DISCOVERING THE LANGUAGE OF CHEMISTRY

A. Formulas and Equations

1. Empirical Formulas, Molecular Formulas, and Percentage Composition

a.	Distinguish between chemical symbols, empirical formulas, molecular formulas, and structural formulas
b.	Interpret the information conveyed by chemical formulas for numbers of atoms of each element represented
c	Use the names, formulas, and charges of commonly referenced polyatomic ions
d.	Provide the interconversion of molecular formulas, structural formulas, and names, including common binary and ternary acids
e.	Calculate the percent composition of a substance, given its formula or masses of each component element in a sample
f.	Determine the empirical formulas and molecular formulas of compounds, given percent composition data or mass composition data
g.	Determine percent composition experimentally and derive empirical formulas from the data (e.g., for hydrates)

2. Mole Concept, Molar Mass, Gram Formula Mass, and Molecular Mass

a.	Explain the meaning of mole and Avogadro's number
b.	Interconvert between mass, moles, and number of particles
c.	Distinguish between formula mass, empirical mass, molecular mass, gram molecular mass, and gram formula mass

3. Chemical Equations and Stoichiometry

a.	Explain how conservation laws form the basis for balancing chemical reactions and know what quantities are conserved in physical, chemical, and nuclear changes
b.	Write and balance chemical equations, given the names of reactants and products
c.	Describe what is represented, on a molecular and molar level, by chemical equations
d.	Use the appropriate symbols for state (i.e., solid, liquid, gaseous, aqueous) and reaction direction when writing chemical equations
e.	Classify chemical reactions as being synthesis, decomposition, single replacement, or double replacement reactions
f.	Predict the products of synthesis, combustion, and decomposition reactions and write balanced equations for these reactions
g.	Predict products of single replacement reactions, using the activity series, and write balanced equations for these reactions
h.	Predict the products of double replacement reactions, using solubility charts to identify precipitates, and write balanced equations for these reactions
i.	Use chemical equations to perform basic mole-mole, mass-mass, and mass-mole computations for chemical reactions
j.	Identify limiting reagents and use this information when solving reaction stoichiometry problems
k.	Compute theoretical yield, actual (experimental) yield, and percent yield
l.	Calculate percent error and analyze experimental errors that affect percent error
m.	Write ionic equations, identifying spectator ions and the net ionic equation

IV. BUILDING MODELS OF MATTER

A. Microscopic Nature of Matter

1. Structure of Liquids and Solids

a.	Describe differences between solids, liquids, and gases at the atomic and molecular levels
b.	Describe and perform common separation techniques (e.g., filtration, distillation, chromatography)

2. Kinetic Molecular Theory of Gases

a.	Use the kinetic molecular theory to explain the states and properties (i.e., microscopic and macroscopic) of matter and phase changes
b.	Explain the basis and importance of the absolute temperature scale and convert between the Kelvin and Celsius scales
c.	Use the kinetic-molecular theory as a basis for explaining gas pressure, Avogadro's hypothesis, and Boyle's/Charles's laws

B. Atomic Structure and Chemical Bonding
1. Atomic Theory (Dalton), Atomic Structure, and Quantum Theory
a. Describe the importance of models for the study of atomic structure
b. Describe the crucial contributions of scientists and the critical experiments that led to the development of the modern atomic model
c. Describe characteristics of a wave, such as wavelength, frequency, energy, and speed
d. Describe the role of probability in orbital theory
e. Describe atomic orbitals (s, p, d, f) and their basic shapes
f. Apply Hund's rule and the Aufbau process to specify the electron configurations of the elements
2. Periodic Table and Periodicity
a. Describe the historical development of the modern periodic table, including work by Mendeleev and then Moseley
b. Describe and explain the organization of elements into periods and groups in the periodic table
c. Use the periodic table to determine the atomic number; atomic mass; mass number; and number of protons, electrons, and neutrons in isotopes of elements
d. Calculate the weighted average atomic mass of an element from isotopic abundance, given the atomic mass of each contributor
e. Identify regions (e.g., groups, families, series) of the periodic table and describe the chemical characteristics of each
f. Compare the periodic properties of the elements (e.g., metal/nonmetal/metalloid behavior, electrical/heat conductivity, electronegativity and electron affinity, ionization energy, atomic/covalent/ionic radius) and how they relate to position in the periodic table
g. Use the periodic table to predict and explain the valence electron configurations of the elements, to identify members of configuration families, and to predict the common valences of the elements
3. Intermolecular Forces and Types of Bonds
a. Describe the characteristics of ionic and covalent bonding
b. Explain ionic stability, recognize typical ionic configurations, and predict ionic configurations for elements (e.g., electron configurations, Lewis dot models)
c. Describe the nature of the chemical bond with respect to valence electrons in bonding atoms
d. Explain how ionic and covalent compounds differ
e. Describe the unique features of bonding in carbon compounds
f. Compare the different types of intermolecular forces (e.g., van der Waals, dispersion)
g. Explain and provide examples for dipole moments, bond polarity, and hydrogen bonding
h. Describe the unique physical and chemical properties of water resulting from hydrogen bonding
i. Explain the relationship between evaporation, vapor pressure, molecular kinetic energy, and boiling point for a single pure substance
j. Explain the relationship between intermolecular forces, boiling points, and vapor pressure when comparing differences in the properties of pure substances
k. Classify solids as ionic, molecular, metallic, or network
4. Orbital Theory Applied to Bonding
a. Use Lewis dot diagrams to represent bonding in ionic and covalent compounds
b. Draw Lewis structures for molecules and polyatomic ions, including those that must be represented by a set of resonance structures
c. Use VSEPR theory to explain geometries of molecules and polyatomic ions
d. Describe how orbital hybridization models relate to molecular geometry
e. Describe the molecular orbital models for double bonds, triple bonds, and delocalized pi electrons
f. Describe the relationship between molecular polarity and bond polarity

V. INTEGRATING THE MACROSCOPIC, MICROSCOPIC, AND SYMBOLIC WORLDS

A. Solutions

1. Types of Solutions, Concentration, and Solubility

a.	Define solution, solute, and solvent
b.	Compare properties of suspensions, colloids, and true solutions
c.	Define the terms *saturated*, *unsaturated*, *supersaturated*, *dilute*, and *concentrated* as they pertain to solutions
d.	Give examples of solid, liquid, or gas medium solutions
e.	Define and calculate the molarity of a solution
f.	Define and calculate the percent composition of a solution
g.	Describe the preparation and properties of solutions
h.	Solve stoichiometry calculations based on reactions involving aqueous solutions
i.	Describe the relationship between temperature or pressure and the solubility of gases in liquids
j.	Describe the relationship between solvent character and solute character and explain miscibility
k.	Apply the general rules of solubility to aqueous salt solutions
l.	Describe the factors affecting the solubility of a solute in a given solvent and its rate of solution

2. Colligative Properties

a.	Describe qualitatively the effect of adding solute on freezing point, boiling point, and vapor pressure of a solvent
b.	Define molality and mole fraction
c.	Calculate changes in the boiling point and freezing point when nonvolatile, nonelectrolyte solutes are added to solvents

B. Kinetics, Equilibrium, and Thermodynamics

1. Chemical Equilibrium and Factors Affecting Reaction Rates; Le Châtelier's Principle

a.	Explain the collision theory of reactions
b.	Analyze factors (e.g., temperature, nature of reactants) affecting reaction rates in relation to the kinetic theory
c.	Relate reaction mechanism, rate-determining step, activated complex, heat of reaction, and activation energy to reaction kinetics
d.	Interpret potential energy diagrams for chemical reactions
e.	Describe the conditions that define equilibrium systems on a dynamic molecular level and on a static macroscopic scale
f.	Apply Le Châtelier's principle to explain a variety of changes in physical and chemical equilibria
g.	Define K_{sp} and manipulate K_{sp} to predict solubility
h.	Explain the law of concentration (mass) action and write equilibrium law expressions for chemical equilibria
i.	Determine solubility product constants from solubilities (and vice versa) for a given solubility equilibrium system

2. Mechanism, Rate-Determining Step, Activation Energy, and Catalysts

a.	Relate the rate of a chemical reaction to the appearance of products and the disappearance of reactants
b.	Describe the meaning of reaction mechanism and rate-determining step
c.	Relate collision theory to the factors that affect the rate of reaction
d.	Describe the meaning of activation energy and activated complex
e.	Interpret and label a plot of energy versus reaction coordinate
f.	Explain the effects of catalysts on reaction rates (e.g., mechanism, activation energy/activated complex)

3. Chemical Processes and Heat; Calorimetry

a.	Explain the law of conservation of energy in chemical reactions
b.	Describe the concept of heat, and explain the difference between heat energy and temperature

c.	Explain physical and chemical changes as endothermic or exothermic energy changes
d.	Solve heat capacity and heat transfer problems involving specific heat, heat of fusion, and heat of vaporization
e.	Calculate the heat of reaction for a given chemical reaction when given calorimetric data

4. Enthalpy and Entropy

a.	Define enthalpy and explain how changes in enthalpy determine whether a reaction is endothermic or exothermic
b.	Compute ΔH_{rxn} from ΔH_f^o values and explain why the ΔH_f^o values for elements are zero
c.	Explain and apply, mathematically, the relationship between ΔH_{rxn}^o (forward) and ΔH_{rxn}^o (reverse)
d.	Define entropy and explain the role of entropy in chemical and physical changes, and explain the changes that favor increases in entropy

C. Salts, Acids, and Bases

1. Acid/Base Theories

a.	Describe the nature and interactions of acids and bases
b.	Describe the hydronium ion and the concept of amphoterism
c.	Describe Arrhenius and Brønsted-Lowry acids and bases; identify conjugate acids and bases in reactions
d.	Relate solvent interaction to the formation of acidic and basic solutions
e.	Define the water constant, K_w, and the pH scale
f.	Describe characteristics of strong and weak acids and bases, and identify common examples of both

2. Acid/Base Constants and pH; Titration; Buffers

a.	Write and balance a simple equation for a neutralization reaction
b.	Calculate hydrogen ion concentration, hydroxide ion concentration, pH, and pOH for acidic or basic solutions
c.	Explain how the acid-base indicators work
d.	Define percent ionization, K_a, and K_b and explain how they relate to acid/base strength
e.	Conduct a titration experiment in order to determine the concentration of an acid or base solution
f.	Qualitatively understand the behavior of a buffer and explain why buffer solutions maintain pH upon dilution

D. REDOX Reactions and Electrochemistry

a.	Define REDOX reaction, oxidation, reduction, oxidizing agent, and reducing agent
b.	Assign oxidation numbers (states) to reaction species; identify the species oxidized and reduced, and the oxidizing agent and reducing agent, in a REDOX reaction
c.	Balance REDOX equations by the ion-electron and half-reaction methods
d.	Diagram and explain the operation of a voltaic cell
e.	Determine the net voltage obtained when standard half-cells are paired to form a voltaic cell, and use this voltage to predict reaction spontaneity

E. Nuclear Chemistry

a.	Describe alpha, beta, and gamma decay, half-life, and fission and fusion
b.	Write appropriate equations for nuclear decay reactions, using particle balance; describe how the nucleus changes during these reactions and compare the resulting radiation with regard to penetrating ability

Biology

ACT Exam Standards

ACT Exam Standards
Biology

A set of empirically derived exam standards is the heart of each Subject Test.
The ACT standards represent a solid evidence-based foundation in science. They were developed from an intensive study of high-performing high schools with significant minority and low-income enrollments that produced many graduates who met or exceeded ACT College Readiness Benchmark Scores .

This document contains a list of ACT Standards for a rigorous Biology exam—what students should know and be able to do in the test. The ACT standards encompass the following overarching themes and/or foundational concepts:

A. Exploring and Defining the Fundamental Unifying Concepts, Organization, and Inquiry Techniques Underlying the Science of Biology

B. Investigating Life Processes at the Cellular Level and Understanding Both How These Processes Work and How They Are Maintained and Regulated

C. Delving Into Heredity by Investigating How Genetic Structures and Processes Provide the Mechanism for Continuity and Variety Among Organisms

D. Investigating Processes That Allow Populations to Change in Response to Different Environmental and Genetic Pressures

E. Identifying and Deciphering the Distinguishing Characteristics of All Categories of Living Things and Establishing the Genetic, Ancestral, and Behavioral Relationships Among Them

F. Analyzing the Ecological Processes by Which Living Things Interact With Their Environments and With Each Other

ACT Exam Standards—Biology

A. Exploring and Defining the Fundamental Unifying Concepts, Organization, and Inquiry Techniques Underlying the Science of Biology (Note: Some of the process standards in this section are similar to those found in Chemistry and Physics)
1. Scientific Inquiry
a. Identify and clarify biological research questions and design experiments
b. Manipulate variables in experiments using appropriate procedures (e.g., controls, multiple trials)
c. Collect, organize, and analyze data accurately and precisely (e.g., using scientific techniques and mathematics in experiments)
d. Interpret results and draw conclusions, revising hypotheses as necessary and/or formulating additional questions or explanations
e. Write and speak effectively to present and explain scientific results, using appropriate terminology and graphics
f. Safely use laboratory equipment and techniques when conducting scientific investigations

2. Mathematics and Measurement in Science	
a.	Use appropriate SI units for length, mass, time, temperature, quantity, area, volume, and density, and describe the relationships among SI unit prefixes (e.g., centi-, milli-, kilo-) and how SI units are related to analogous English units
b.	Calculate the mean of a set of values
c.	Use graphical models, mathematical models, and simple statistical models to express patterns and relationships determined from sets of scientific data

3. Science in Practice	
a.	Describe the fundamental assumptions of science
b.	Assess how scientific and technological progress has affected other fields of study, careers, and aspects of everyday life
c.	Recognize and apply criteria that scientists use to evaluate the validity of scientific claims and theories
d.	Explain why scientific explanations must meet certain criteria (e.g., be consistent with experimental/observational evidence about nature, be open to critique and modification, be subject to peer review, use ethical reporting methods and procedures)
e.	Explain why all scientific knowledge is subject to change as new evidence becomes available to the scientific community
f.	Use a variety of appropriate sources (e.g., Internet, scientific journals) to retrieve relevant information; cite references properly
g.	Compare the goals and procedures followed in basic science with the goals and procedures of applied science and technology; discuss the important contributions of each and how citizens need to understand the ramifications of funding both endeavors
h.	Explain how the contributions of basic science drive the potential of applied science (e.g., advantages found in nature can be emulated for our own benefit/product development, such as observations of gecko feet suggesting new adhesives; understanding of basic cell biology leading to cancer treatments)

4. Foundations	
a.	Describe the biological criteria that need to be met in order for an organism to be considered alive
b.	Define and provide examples of each level of organization (e.g., biosphere, biome, ecosystem, community, population, multicellular organism, organ system, organ, tissue, cell, organelle, molecule, atom, subatomic particle)
c.	Design and conduct investigations appropriately using essential processes of scientific inquiry
d.	Use mathematics to enhance the scientific inquiry process (e.g., choosing appropriate units of measurement, graphing and manipulating experimental data)

5. Biochemistry	
a.	Identify subatomic particles and describe how they are arranged in atoms
b.	Describe the difference between ions and atoms and the importance of ions in biological processes
c.	Compare the types of bonding between atoms to form molecules
d.	Show how chemical reactions (e.g., photosynthesis, fermentation, cellular respiration) can be represented by chemical formulas
e.	Explain the difference between organic and inorganic compounds
f.	Explain the fundamental principles of the pH scale and the consequences of having the different concentrations of hydrogen and hydroxide ions
g.	Describe the general structure and function(s), including common functional groups, of monosaccharides, disaccharides, polysaccharides, carbohydrates, fatty acids, glycerol, glycerides, lipids, amino acids, dipeptides, polypeptides, proteins, and nucleic acids

h.	Describe the function of enzymes, including how enzyme-substrate specificity works, in biochemical reactions
i.	Define and explain the unique properties of water that are essential to living organisms
j.	Explain how cells store energy temporarily as ATP

B. Investigating Life Processes at the Cellular Level and Understanding Both How These Processes Work and How They Are Maintained and Regulated

1. Cells

a.	Analyze the similarities and differences among (a) plant versus animal cells and (b) eukaryotic versus prokaryotic cells
b.	Describe the functions of all major cell organelles, including nucleus, ER, RER, Golgi apparatus, ribosome, mitochondria, microtubules, microfilaments, lysosomes, centrioles, and cell membrane
c.	Illustrate how all cell organelles work together by describing the step-by-step process of the translation of an mRNA strand into a protein and its subsequent processing by organelles so that the protein is appropriately packaged, labeled, and eventually exported by the cell
d.	Contrast the structure and function of subcellular components of motility (e.g., cilia, flagella, pseudopodia)
e.	Explain how the cell membrane controls movement of substances both into and out of the cell and within the cell
f.	Explain how the cell membrane maintains homeostasis
g.	Describe and contrast these types of cell transport: osmosis, diffusion, facilitated diffusion, and active transport
h.	Identify the cellular sites of and follow through the major pathways of anaerobic and aerobic respiration, compare reactants and products for each process, and account for how aerobic respiration produces more ATP per monosaccharide
i.	Explain how photosynthetic organisms use the processes of photosynthesis and respiration
j.	Describe the basic process of mitosis

C. Delving Into Heredity by Investigating How Genetic Structures and Processes Provide the Mechanism for Continuity and Variety Among Organisms

1. Genetics

a.	Describe the basic structure and function of DNA, mRNA, tRNA, amino acids, polypeptides, and proteins (e.g., replication, transcription, and translation)
b.	Describe the experiments of major scientists in determining both the structure of DNA and the central dogma
c.	Use mRNA codon charts to determine amino acid sequences of example polypeptides
d.	Use mRNA codon charts to determine the effects of different types of mutations on amino acid sequence and protein structure (e.g., sickle cell anemia resulting from base substitution mutation)
e.	Describe how gene expression is regulated in organisms such that specific proteins are synthesized only when they are needed by the cell (e.g., allowing cell specialization)
f.	Describe the basic process of meiosis
g.	Identify and explain Mendel's law of segregation and law of independent assortment
h.	Explain how the process of meiosis reveals the mechanism behind Mendel's conclusions about segregation and independent assortment on a molecular level
i.	Define and provide an example of the following: genotype, phenotype, dominant allele, recessive allele, codominant alleles, incompletely dominant alleles, homozygous, heterozygous, and carrier

j.	Explain sex-linked patterns of inheritance in terms of some genes being absent from the smaller Y chromosome, and thus males (XY) having a different chance of exhibiting certain traits than do females (XX)
k.	Construct and interpret Punnett squares and pedigree charts (e.g., calculate and predict phenotypic and genotypic ratios and probabilities)
l.	Infer parental genotypes and phenotypes from offspring data presented in pedigree charts and from the phenotypic and genotypic ratios of offspring
m.	Describe the mode of inheritance in commonly inherited disorders (e.g., sickle cell anemia, Down syndrome, Turner's syndrome, PKU)
n.	Complete a major project relating to recombinant DNA, cloning, or stem cell research

D. Investigating Processes That Allow Populations to Change in Response to Different Environmental and Genetic Pressures

1. Evolution

a.	Describe the experiments of Redi, Needham, Spallanzani, and Pasteur to support or falsify the hypothesis of spontaneous generation
b.	Explain the biological definition of evolution
c.	Differentiate among chemical evolution, organic evolution, and the evolutionary steps along the way to aerobic heterotrophs and photosynthetic autotrophs
d.	Discuss Darwin's principle of survival of the fittest and explain what Darwin meant by natural selection
e.	Explain the influences of other scientists (e.g., Malthus, Wallace, Lamarck, Lyell) and of Darwin's trip on HMS *Beagle* in formulating Darwin's ideas about natural selection
f.	Contrast Lamarck's and Darwin's ideas about changes in organisms over time
g.	Provide examples of behaviors that have evolved through natural selection (e.g., migration, courtship rituals)
h.	Design, perform, and analyze a laboratory simulation of natural selection on a working population (e.g., teacher chooses prey items [hard candy, marshmallows]; students choose feeding adaptation [fork, toothpick, spoon] and hunt; students record results and then change prey or adaptation; and students analyze results using statistical methods)
i.	Specifically describe the conditions required to be considered a species (e.g., reproductive isolation, geographic isolation)
j.	Describe the basic types of selection, including disruptive, stabilizing, and directional
k.	Explain how natural selection and its evolutionary consequences (e.g., adaptation or extinction) provide a scientific explanation for the fossil record of ancient life-forms and the striking molecular similarities observed among the diverse species of living organisms
l.	Discuss evidence from the fields of geology, biochemistry, embryology, comparative anatomy, and comparative physiology that points to shared evolutionary relationships
m.	Explain how Earth's life-forms have evolved from earlier species as a consequence of interactions of (a) the potential of a species to increase its numbers and (b) genetic variability of offspring due to mutation and recombinations of DNA
n.	Distinguish between catastrophism, gradualism, and punctuated equilibrium

E. Identifying and Deciphering the Distinguishing Characteristics of All Categories of Living Things and Establishing the Genetic, Ancestral, and Behavioral Relationships Among Them

1. Animals

a. Identify major types of animal cells and tissues

b. Describe the major components and functions of physiological systems, including skeletal, muscle, circulatory, respiratory, digestive, urinary, endocrine, nervous, reproductive, and immune

2. Plants

a. Describe the basic mechanisms of plant processes, especially movement of materials and plant reproduction

b. Explain the functions of unique plant structures, including the cell wall, chloroplasts, and critical parts of the flower and the seed

c. Explain the interaction between pigments, absorption of light, and reflection of light

d. Describe the light-dependent and light-independent reactions of photosynthesis

e. Relate the products of the light-dependent reactions to the products of the light-independent reactions

f. Design and conduct an experiment (including the calculations necessary to make dilutions and prepare reagents) demonstrating effects of environmental factors on photosynthesis

3. Relationships Among Organisms

a. Explain how organisms are classified into a hierarchy of groups and subgroups based on similarities that reflect their evolutionary relationships

b. List each of the major levels in the hierarchy of taxa: kingdom, phylum, class, order, family, genus, and species

c. Explain the binomial nomenclature system

d. Construct and use a dichotomous taxonomic key

e. Distinguish between and among viruses, bacteria, and protists, and give examples of each

f. Explain classification criteria for fungi, plants, and animals

g. Compare the major divisions of animals

F. Analyzing the Ecological Processes by Which Living Things Interact With Their Environments and With Each Other

1. Ecology

a. Define and provide examples of biosphere, biome, ecosystem, community, population, species, habitat, and niche

b. Discuss biotic and abiotic factors that affect land and aquatic biomes

c. Discuss the role of beneficial bacteria (e.g., in the recycling of nutrients)

d. Explain how energy flows through ecosystems in one direction, from photosynthetic organisms to herbivores to carnivores and decomposers

e. Explain how the amount of life any environment can support is limited by the available matter and energy and by the ability of ecosystems to recycle the residue of dead organic materials

f. Explain how organisms cooperate and compete in ecosystems and how interrelationships and interdependencies of organisms may generate ecosystems that are stable for thousands of years

g. Diagram the flow of energy using food webs, food chains, and pyramids (e.g., pyramid of energy, pyramid of biomass, and pyramid of numbers)

h.	Describe examples of competition, symbiosis, and predation
i.	Explain the concept of carrying capacity
j.	Describe the growth of populations, including exponential and logistic growth (e.g., design and conduct an experiment investigating bacterial growth using appropriate calculations)
k.	Explain the process of ecological succession, and describe the different communities that result
l.	Read and describe current journal articles relating to environmental concerns (e.g., loss of biodiversity, habitat loss, pollution)
m.	Discuss and evaluate the significance of human interference with major ecosystems (e.g., the loss of genetic diversity in cloned crops or animals)

ACT® International Subject Tests

Powered by CONNEC ME EDUCATION

English I

ACT Exam Standards

ACT®

CONNEC ME EDUCATION

ACT Exam Standards
English I

A set of empirically derived exam standards is the heart of each Subject Test.
The ACT standards represent a solid evidence-based foundation in science. They were developed from an intensive study of high-performing high schools with significant minority and low-income enrollments that produced many graduates who met or exceeded ACT College Readiness Benchmark Scores.

This document contains a list of ACT Standards for a rigorous English I exam—what students should know and be able to do in the test. The ACT standards encompass the following overarching themes and/or foundational concepts:

A. Reading

B. Writing

C. Research

D. Listening, Viewing, and Speaking

E. Study Skills and Test Taking

ACT Exam Standards—English I

Becoming well versed in the English Language Arts requires students to develop skills and understandings that are closely intertwined; such connectedness helps students become discerning and thoughtful readers, writers, listeners, speakers, and viewers of texts both inside and outside of the classroom.

A. Reading
1. Reading Across the Curriculum
a. Choose materials for independent reading on the basis of specific criteria (e.g., personal interest, own reading level, knowledge of authors and literary or nonliterary forms)
b. Read independently for a variety of purposes (e.g., for enjoyment, to gain information, to perform a task)
c. Read increasingly challenging whole texts in a variety of literary (e.g., poetry, drama, fiction, nonfiction) and nonliterary (e.g., textbooks, news articles, memoranda) forms
2. Reading Strategies
a. Apply strategies before, during, and after reading to increase fluency and comprehension (e.g., adjusting purpose, previewing, scanning, making predictions, comparing, inferring, summarizing, using graphic organizers) with increasingly challenging texts
b. Use metacognitive skills (i.e., monitor, regulate, and orchestrate one's understanding) when reading increasingly challenging texts, using the most appropriate "fix-up" strategies (e.g., rereading, reading on, changing rate of reading, subvocalizing)
c. Demonstrate comprehension of increasingly challenging texts (both print and nonprint sources) by asking and answering literal, interpretive, and evaluative questions

d.	Use close-reading strategies (e.g., visualizing, annotating, questioning) in order to interpret increasingly challenging texts
e.	Compare texts to previously read texts, past and present events, and/or content learned in other coursework

3. Knowledge of Literary and Nonliterary Forms

a.	Identify, analyze, and evaluate the defining characteristics of specific literary and nonliterary forms (e.g., satire, allegory, parody, editorial, essay, memorandum) and describe how form affects the meaning and function of the texts
b.	Read contrasting literary works (e.g., romantic and ironic, comic and tragic) and determine how the forms influence structure and movement within the texts (e.g., reading William Shakespeare's tragic play *Hamlet* and Tom Stoppard's comedic play *Rosencrantz and Guildenstern Are Dead*)
c.	Read dramatic literature (e.g., *M. Butterfly*, *The Night Thoreau Spent in Jail*) and analyze its conventions to identify how they express a writer's meaning
d.	Identify and interpret works in various poetic forms (e.g., ballad, ode, sonnet) and explain how meaning is conveyed through features of poetry, including sound (e.g., rhythm, repetition, alliteration), structure (e.g., meter, rhyme scheme), graphic elements (e.g., punctuation, line length, word position), and poetic devices (e.g., metaphor, imagery, personification, tone, symbolism)

4. Influences on Texts

a.	Explain the relationship between the time in which a literary work is set, the time during which the author wrote, and the time in which the reader reads (e.g., Arthur Miller's play *The Crucible* as a comment on the McCarthy era)
b.	Analyze and evaluate the influence of traditional and mythic literature on later literature and film (e.g., the quest for the holy grail as depicted in Terry Gilliam's film *The Fisher King*)
c.	Explain the effects of the author's life upon his or her work (e.g., Alexander Solzhenitsyn's experience in the gulag as reflected in his novel *One Day in the Life of Ivan Denisovich*)

5. Author's Voice and Method

a.	Critique the effectiveness of the organizational pattern (e.g., comparison/contrast, cause/effect, problem/solution) and how clarity of meaning is affected by the writer's techniques (e.g., repetition of ideas, syntax, word choice) in increasingly challenging texts
b.	Recognize an author's choice of narration and evaluate how it affects characterization and credibility in increasingly challenging texts
c.	Identify, analyze, and evaluate plot, character development, setting, theme, mood, and point of view as they are used together to create meaning in increasingly challenging texts
d.	Identify, analyze, and evaluate the author's use of parallel plots and subplots in increasingly challenging texts
e.	Identify, analyze, and evaluate the ways in which the devices the author chooses (e.g., irony, imagery, tone, sound techniques, foreshadowing, symbolism) achieve specific effects and shape meaning in increasingly challenging texts
f.	Critique the treatment and scope of ideas from multiple sources on the same topic, noting the authors' implicit and explicit philosophical assumptions and beliefs (e.g., analyze the treatment of Africa in Chinua Achebe's novel *Things Fall Apart* and Joseph Conrad's novel *Heart of Darkness*)
g.	Evaluate ways authors develop style to achieve specific rhetorical and aesthetic purposes, noting the impact of diction and figurative language on tone, mood, and theme; cite specific examples from increasingly challenging texts
h.	Identify the author's stated or implied purpose in increasingly challenging texts

6. Persuasive Language and Logic

a.	Distinguish between valid and invalid arguments; provide evidence to support the author's findings; and note instances of unsupported inferences, fallacious reasoning, and propaganda techniques used in literature, film, advertising, and/or speeches

3

b.	Summarize and paraphrase information in increasingly challenging texts, identifying key ideas, supporting details, inconsistencies, and ambiguities
c.	Locate important details and facts that support ideas, arguments, or inferences in increasingly challenging texts and substantiate analyses with textual examples that may be in widely separated sections of the text or in other sources
d.	Distinguish between fact and opinion, basing judgments on evidence and reasoning

7. Literary Criticism	
a.	Select and apply to increasingly challenging texts the relevant terms (e.g., *archetypal*, *oedipal*, *hegemony*) from a number of critical theories
b.	Evaluate a work of literature from a variety of perspectives (e.g., applying a feminist perspective to Kate Chopin's novel *The Awakening*)
c.	Read literary criticism to learn different ways of interpreting increasingly challenging literary texts

8. Words and Their History	
a.	Apply knowledge of Greek, Latin, and Anglo-Saxon affixes, inflections, and roots to understand unfamiliar words and new subject matter vocabulary in increasingly challenging texts (e.g., words in science, mathematics, and social studies)
b.	Infer word meanings by analyzing relationships between words (e.g., synonyms, antonyms, metaphors, analogies) in increasingly challenging texts
c.	Use general and specialized dictionaries, thesauruses, and glossaries (print and electronic) to determine the definition, pronunciation, derivation, spelling, and usage of words
d.	Use context clues (e.g., author's restatement, example) to understand unfamiliar words in increasingly challenging texts
e.	Comprehend foreign words and phrases in texts that are commonly used in English
f.	Identify and interpret common idioms and literary, classical, and biblical allusions (e.g., the garden of Eden as it is used in Thomas Hardy's novel *Tess of the D'Urbervilles*) in increasingly challenging texts
g.	Describe and provide examples of the ways past and present events (e.g., cultural, political, technological, scientific) have influenced the English language
h.	Apply knowledge of connotation and denotation to determine the meanings of words and phrases in increasingly challenging texts

B. Writing

1. Writing Process	
a.	Use prewriting strategies (e.g., brainstorming, webbing, note taking, interviewing, background reading) to generate, focus, and organize ideas as well as to gather information
b.	Analyze writing assignments in terms of purpose and audience to determine which strategies to use (e.g., writing a speech to inform versus a speech to persuade)
c.	Create and use various tools (e.g., rubrics, checklists, models, writing conferences) to revise, refine, edit, and proofread own and others' writing, using appropriate rhetorical, logical, and stylistic criteria for assessing the final versions of compositions
d.	Prepare writing for publication by choosing the most appropriate format, considering principles of design (e.g., margins, tabs, spacing, columns) and the use of various fonts and graphics (e.g., drawings, charts, graphs); use electronic resources to enhance the final product

2. Modes of Writing for Different Purposes and Audiences	
a.	Craft first and final drafts of expressive, reflective, or creative texts (e.g., poetry, scripts) that use a range of literary devices (e.g., figurative language, sound devices, stage directions) to convey a specific effect
b.	Craft first and final drafts of informational essays or reports that provide clear and accurate perspectives on the subject; support the main ideas with facts, details, and examples; and make distinctions about the relative value and significance of those facts, details, and examples

c.	Craft first and final drafts of persuasive papers that articulate a clear position; support assertions using rhetorical devices, including personal anecdotes and appeals to emotion or logic; and develop arguments using a variety of methods
d.	Craft first and final drafts of responses to literature that organize an insightful interpretation around several clear ideas, premises, or images and support judgments with specific references to the original text and to other texts or authors
e.	Craft first and final drafts of workplace and other real-life writing (e.g., resumes, editorials, college entrance and/or scholarship essays) that are appropriate to the audience, provide clear and purposeful information, and use a format appropriate to the task

3. Organization, Unity, and Coherence

a.	Establish and develop a clear thesis statement for informational writing or a clear plan or outline for narrative writing
b.	Organize writing to create a coherent whole with effective, fully developed paragraphs, similar ideas grouped together for unity, and paragraphs arranged in a logical sequence
c.	Add important information and delete irrelevant information and details to more clearly establish a central idea
d.	Rearrange words, sentences, and/or paragraphs and add transitional words and phrases to clarify meaning and to achieve specific aesthetic and rhetorical purposes
e.	Write an introduction that engages the reader and a conclusion that summarizes, extends, or elaborates points or ideas in the writing

4. Sentence-Level Constructions

a.	Recognize and correct errors that weaken writing, including nonparallel structure, shifts from active to passive voice, misused modifiers, and awkward sentence construction
b.	Combine phrases and clauses to create sentences of varying lengths and sophistication (e.g., simple, compound-complex, balanced, periodic, cumulative) and to coordinate or subordinate meaning for effect
c.	Use parallel structure to present items in a series and items juxtaposed for emphasis
d.	Evaluate own sentence style by identifying common sentence patterns and constructions
e.	Use resources and reference materials (e.g., dictionaries and thesauruses) to select effective and precise vocabulary that maintains consistent style, tone, and voice
f.	Use formal, informal, standard, and technical language effectively to meet the needs of audience and purpose
g.	Use strong action verbs, sensory details, vivid imagery, and precise words

5. Conventions of Usage

a.	Correctly spell commonly misspelled/confused words
b.	Correctly choose verb forms in terms of tense, voice (i.e., active and passive), and mood for continuity
c.	Make subject and verb agree in number, even when a phrase or clause between the two suggests a different number for the verb
d.	Use pronouns correctly (e.g., appropriate case, pronoun-antecedent agreement, clear pronoun reference)
e.	Correctly choose adjectives, adjective phrases, adjective clauses, adverbs, adverb phrases, and adverb clauses and their forms for logical connection to word(s) modified
f.	Correctly use parts of speech

6. Conventions of Punctuation

a.	Recognize that several correct punctuation choices create different effects (e.g., joining two independent clauses in a variety of ways)
b.	Use punctuation correctly within sentences and words
c.	Demonstrate correct use of capitalization

C. Research

a.	Use research methods (e.g., background reading, online searches, surveys, interviews) to locate and collect reliable information from print and nonprint sources

b.	Decide on a research question and develop a hypothesis, modifying questions as necessary during the project to further narrow the focus or extend the investigation
c.	Evaluate multiple sources of information for accuracy, credibility, currency, utility, relevance, reliability, and perspective
d.	Identify discrepancies in information, recognize the complexities of issues conveyed about the topic, and systematically organize the information to support central ideas, concepts, or themes
e.	Summarize, paraphrase, and directly quote from sources, including the Internet, to support the thesis of the paper and/or presentation; accurately cite every source to avoid compromising others' intellectual property (i.e., plagiarism)
f.	Compose a research paper that maintains an appropriate balance between researched information and original ideas, anticipates counterarguments, blends quotations into its body gracefully, and includes title page, outline, first and final drafts, and works-cited page, adhering to MLA or other stylebook guidelines

D. Listening, Viewing, and Speaking

1. Comprehension and Analysis

a.	Recognize the main ideas in a variety of oral presentations and draw valid conclusions
b.	Identify and evaluate the effect of logical fallacies (e.g., overgeneralization, bandwagon) and the presence of biases and stereotypes in television and print advertising, speeches, newspaper articles, and Internet advertisements
c.	Analyze the effectiveness and validity of arguments (e.g., causation, analogy, inductive and deductive reasoning, appeals to emotion or authority) in visual and oral texts
d.	Compare how different media forms (e.g., television news, news magazines, documentaries, online news sources) cover the same event
e.	Analyze and evaluate the way language choice (e.g., repetition, use of rhetorical questions) and delivery style (e.g., eye contact, nonverbal messages) affect the mood and tone of the communication and make an impact on the audience

2. Application

a.	Use elements of speech forms—introduction, transitions, body, and conclusion—including the use of facts, literary quotations, anecdotes, and/or references to authoritative sources
b.	Use effective delivery skills (e.g., appropriate volume, inflection, articulation, gestures, eye contact, posture, facial expression)
c.	Give impromptu and planned presentations (e.g., debates, formal meetings) that stay on topic and/or adhere to prepared notes
d.	Write and deliver informational speeches that present a clear and distinctive perspective on the subject and support the controlling idea with well-chosen and well-organized facts and details from a variety of sources
e.	Write and deliver persuasive speeches that use logical, emotional, and ethical appeals; establish and develop a logical and structured argument; anticipate audience concerns and counterarguments; and include relevant evidence from a variety of sources
f.	Apply analytic and active listening strategies (e.g., paraphrasing, monitoring messages for clarity, selecting and organizing essential information, noting change-of-pace cues) in formal and informal settings
g.	Actively participate in small-group and large-group discussions, assuming various roles

E. Study Skills and Test Taking

a.	Apply active reading, listening, and viewing techniques by taking notes on classroom discussions, lectures, oral and/or video presentations, or assigned at-home reading, and by underlining key passages and writing comments in journals or in margins of texts, where permitted
b.	Demonstrate organizational skills such as keeping a daily calendar of assignments and activities and maintaining a notebook of classwork
c.	Use appropriate essay-test-taking and timed-writing strategies that address and analyze the question (prompt)
d.	Demonstrate familiarity with test formats and test administration procedures to increase speed and accuracy

The Research-
Driven Solution

ACT International Subject Tests
Powered by CONNEC ME EDUCATION

English II

ACT Exam Standards

ACT

CONNEC ME EDUCATION

ACT Exam Standards
English II

A set of empirically derived exam standards is the heart of each Subject Test.
The ACT standards represent a solid evidence-based foundation in science. They were developed from an intensive study of high-performing high schools with significant minority and low-income enrollments that produced many graduates who met or exceeded ACT College Readiness Benchmark Scores.

This document contains a list of ACT Standards for a rigorous English II exam—what students should know and be able to do in the test. The ACT standards encompass the following overarching themes and/or foundational concepts:

A. Reading

B. Writing

C. Research

D. Listening, Viewing, and Speaking

E. Study Skills and Test Taking

ACT Exam Standards—English II

Becoming well versed in the English Language Arts requires students to develop skills and understandings that are closely intertwined; such connectedness helps students become discerning and thoughtful readers, writers, listeners, speakers, and viewers of texts both inside and outside of the classroom.

A. Reading
1. Reading Across the Curriculum
a. Choose materials for independent reading on the basis of specific criteria (e.g., personal interest, own reading level, knowledge of authors and literary or nonliterary forms)
b. Read independently for a variety of purposes (e.g., for enjoyment, to gain information, to perform a task)
c. Read increasingly challenging whole texts in a variety of literary (e.g., poetry, drama, fiction, nonfiction) and nonliterary (e.g., textbooks, news articles, memoranda) forms
2. Reading Strategies
a. Apply strategies before, during, and after reading to increase fluency and comprehension (e.g., adjusting purpose, previewing, scanning, making predictions, comparing, inferring, summarizing, using graphic organizers) with increasingly challenging texts
b. Use metacognitive skills (i.e., monitor, regulate, and orchestrate one's understanding) when reading increasingly challenging texts, using the most appropriate "fix-up" strategies (e.g., rereading, reading on, changing rate of reading, subvocalizing)
c. Demonstrate comprehension of increasingly challenging texts (both print and nonprint sources) by asking and answering literal, interpretive, and evaluative questions
d. Use close-reading strategies (e.g., visualizing, annotating, questioning) in order to interpret increasingly challenging texts
e. Compare texts to previously read texts, past and present events, and/or content learned in other coursework

3. Knowledge of Literary and Nonliterary Forms
a. Identify, analyze, and evaluate the defining characteristics of specific literary and nonliterary forms (e.g., satire, allegory, parody, editorial, essay, memorandum) and describe how form affects the meaning and function of the texts
b. Read contrasting literary works (e.g., classic and contemporary) and determine how the forms influence structure and movement within the texts (e.g., comparing the poem *Beowulf* to John Gardner's contemporary novel *Grendel*)
c. Read dramatic literature (e.g., *Macbeth*, *A Man for All Seasons*) and analyze its conventions to identify how they express a writer's meaning
d. Identify and interpret works in various poetic forms (e.g., ballad, ode, sonnet) and explain how meaning is conveyed through features of poetry, including sound (e.g., rhythm, repetition, alliteration), structure (e.g., meter, rhyme scheme), graphic elements (e.g., punctuation, line length, word position), and poetic devices (e.g., metaphor, imagery, personification, tone, symbolism)

4. Influences on Texts
a. Explain the relationship between the time in which a literary work is set, the time during which the author wrote, and the time in which the reader reads (e.g., Charles Dickens' novel *A Tale of Two Cities* as a comment on the French Revolution and life in Victorian England)
b. Analyze and evaluate the influence of traditional and mythic literature on later literature and film (e.g., the Aristotelian concept of the tragic hero as depicted in William Shakespeare's play *King Lear*)
c. Explain the effects of the author's life upon his or her work (e.g., Charlotte Bronte's experience as a governess as reflected in her novel *Jane Eyre*)

5. Author's Voice and Method
a. Critique the effectiveness of the organizational pattern (e.g., comparison/contrast, cause/effect, problem/solution) and how clarity of meaning is affected by the writer's techniques (e.g., repetition of ideas, syntax, word choice) in increasingly challenging texts
b. Recognize an author's choice of narration and evaluate the overall impact of that choice in increasingly challenging texts
c. Identify, analyze, and evaluate plot, character development, setting, theme, mood, and point of view as they are used together to create meaning in increasingly challenging texts
d. Identify, analyze, and evaluate the author's use of parallel plots and subplots in increasingly challenging texts
e. Identify, analyze, and evaluate the ways in which the devices the author chooses (e.g., irony, imagery, tone, sound techniques, foreshadowing, symbolism) achieve specific effects and shape meaning in increasingly challenging texts
f. Critique the treatment and scope of ideas from multiple sources on the same topic, noting the authors' implicit and explicit philosophical assumptions and beliefs (e.g., analyze Chris Hedges' book *War Is a Force that Gives Us Meaning* and James Hillman's book *A Terrible Love of War*)
g. Evaluate ways authors develop style to achieve specific rhetorical and aesthetic purposes, noting the impact of diction and figurative language on tone, mood, and theme; cite specific examples from increasingly challenging texts
h. Identify the author's stated or implied purpose in increasingly challenging texts

6. Persuasive Language and Logic
a. Distinguish between valid and invalid arguments; provide evidence to support the author's findings; and note instances of unsupported inferences, fallacious reasoning, and propaganda techniques used in literature, film, advertising, and/or speeches
b. Summarize and paraphrase information in increasingly challenging texts, identifying key ideas, supporting details, inconsistencies, and ambiguities
c. Locate important details and facts that support ideas, arguments, or inferences in increasingly challenging texts and substantiate analyses with textual examples that may be in widely separated sections of the text or in other sources
d. Distinguish between fact and opinion, basing judgments on evidence and reasoning

7. Literary Criticism	
a.	Select and apply to increasingly challenging texts the relevant terms (e.g., *archetype*, *oedipal*, *hegemony*) from a number of critical theories
b.	Evaluate a work of literature from a variety of perspectives (e.g., applying a postcolonialist perspective to E.M. Forster's novel *Passage to India*)
c.	Read literary criticism to learn different ways of interpreting increasingly challenging literary texts

8. Words and Their History	
a.	Apply knowledge of Greek, Latin, and Anglo-Saxon affixes, inflections, and roots to understand unfamiliar words and new subject matter vocabulary in increasingly challenging texts (e.g., words in science, mathematics, and social studies)
b.	Infer word meanings by analyzing relationships between words (e.g., synonyms, antonyms, metaphors, analogies) in increasingly challenging texts
c.	Use general and specialized dictionaries, thesauruses, and glossaries (print and electronic) to determine the definition, pronunciation, derivation, spelling, and usage of words
d.	Use context clues (e.g., author's restatement, example) to understand unfamiliar words in increasingly challenging texts
e.	Comprehend foreign words and phrases in texts that are commonly used in English
f.	Identify and interpret common idioms and literary, classical, and biblical allusions (e.g., the folk tale of the slave who could fly as used in Toni Morrison's novel *Song of Solomon*) in increasingly challenging texts
g.	Describe and provide examples of the ways past and present events (e.g., cultural, political, technological, scientific) have influenced the English language
h.	Apply knowledge of connotation and denotation to determine the meanings of words and phrases in increasingly challenging texts

B. Writing

1. Writing Process	
a.	Use prewriting strategies (e.g., brainstorming, webbing, note taking, interviewing, background reading) to generate, focus, and organize ideas as well as to gather information
b.	Analyze writing assignments in terms of purpose and audience to determine which strategies to use (e.g., writing a letter to a potential employer versus writing a college-entrance essay)
c.	Create and use various tools (e.g., rubrics, checklists, models, writing conferences) to revise, refine, edit, and proofread own and others' writing, using appropriate rhetorical, logical, and stylistic criteria for assessing the final versions of compositions
d.	Prepare writing for publication by choosing the most appropriate format, considering principles of design (e.g., margins, tabs, spacing, columns) and the use of various fonts and graphics (e.g., drawings, charts, graphs); use electronic resources to enhance the final product

2. Modes of Writing for Different Purposes and Audiences	
a.	Craft first and final drafts of expressive, reflective, or creative texts (e.g., poetry, scripts) that use a range of literary devices (e.g., figurative language, sound devices, stage directions) to convey a specific effect
b.	Craft first and final drafts of informational essays or reports that provide clear and accurate perspectives on the subject; support the main ideas with facts, details, and examples; and make distinctions about the relative value and significance of those facts, details, and examples
c.	Craft first and final drafts of persuasive papers that articulate a clear position; support assertions using rhetorical devices, including personal anecdotes and appeals to emotion or logic; and develop arguments using a variety of methods
d.	Craft first and final drafts of responses to literature that organize an insightful interpretation around several clear ideas, premises, or images and support judgments with specific references to the original text and to other texts or authors
e.	Craft first and final drafts of workplace and other real-life writing (e.g., resumes, editorials, college entrance and/or scholarship essays) that are appropriate to the audience, provide clear and purposeful information, and use a format appropriate to the task

3. Organization, Unity, and Coherence
a. Establish and develop a clear thesis statement for informational writing or a clear plan or outline for narrative writing
b. Organize writing to create a coherent whole with effective, fully developed paragraphs, similar ideas grouped together for unity, and paragraphs arranged in a logical sequence
c. Add important information and delete irrelevant information and details to more clearly establish a central idea
d. Rearrange words, sentences, and/or paragraphs and add transitional words and phrases to clarify meaning and to achieve specific aesthetic and rhetorical purposes
e. Write an introduction that engages the reader and a conclusion that summarizes, extends, or elaborates points or ideas in the writing

4. Sentence-Level Constructions
a. Recognize and correct errors that weaken writing, including nonparallel structure, shifts from active to passive voice, misused modifiers, and awkward sentence construction
b. Combine phrases and clauses to create sentences of varying lengths and sophistication (e.g., simple, compound-complex, balanced, periodic, cumulative) and to coordinate or subordinate meaning for effect
c. Use parallel structure to present items in a series and items juxtaposed for emphasis
d. Evaluate own sentence style by identifying common sentence patterns and constructions
e. Use resources and reference materials (e.g., dictionaries and thesauruses) to select effective and precise vocabulary that maintains consistent style, tone, and voice
f. Use formal, informal, standard, and technical language effectively to meet the needs of audience and purpose
g. Use strong action verbs, sensory details, vivid imagery, and precise words

5. Conventions of Usage
a. Correctly spell commonly misspelled/confused words
b. Correctly choose verb forms in terms of tense, voice (i.e., active and passive), and mood for continuity
c. Make subject and verb agree in number, even when a phrase or clause between the two suggests a different number for the verb
d. Use pronouns correctly (e.g., appropriate case, pronoun-antecedent agreement, clear pronoun reference)
e. Correctly choose adjectives, adjective phrases, adjective clauses, adverbs, adverb phrases, and adverb clauses and their forms for logical connection to word(s) modified
f. Correctly use parts of speech

6. Conventions of Punctuation
a. Recognize that several correct punctuation choices create different effects (e.g., joining two independent clauses in a variety of ways)
b. Use punctuation correctly within sentences and words
c. Demonstrate correct use of capitalization

C. Research
a. Use research methods (e.g., background reading, online searches, surveys, interviews) to locate and collect reliable information from print and nonprint sources
b. Decide on a research question and develop a hypothesis, modifying questions as necessary during the project to further narrow the focus or extend the investigation
c. Evaluate multiple sources of information for accuracy, credibility, currency, utility, relevance, reliability, and perspective
d. Identify discrepancies in information, recognize the complexities of issues conveyed about the topic, and systematically organize the information to support central ideas, concepts, or themes

e.	Summarize, paraphrase, and directly quote from sources, including the Internet, to support the thesis of the paper and/or presentation; accurately cite every source to avoid compromising others' intellectual property (i.e., plagiarism)
f.	Compose a research paper that maintains an appropriate balance between researched information and original ideas, anticipates counterarguments, blends quotations into its body gracefully, and includes title page, outline, first and final drafts, and works-cited page, adhering to MLA or other stylebook guidelines

D. Listening, Viewing, and Speaking

1. Comprehension and Analysis

a.	Recognize the main ideas in a variety of oral presentations and draw valid conclusions
b.	Identify and evaluate the effect of logical fallacies (e.g., overgeneralization, bandwagon) and the presence of biases and stereotypes in television and print advertising, speeches, newspaper articles, and Internet advertisements
c.	Analyze the effectiveness and validity of arguments (e.g., causation, analogy, inductive and deductive reasoning, appeals to emotion or authority) in visual and oral texts
d.	Compare how different media forms (e.g., television news, news magazines, documentaries, online news sources) cover the same event
e.	Analyze and evaluate the way language choice (e.g., repetition, use of rhetorical questions) and delivery style (e.g., eye contact, nonverbal messages) affect the mood and tone of the communication and make an impact on the audience

2. Application

a.	Use elements of speech forms—introduction, transitions, body, and conclusion—including the use of facts, literary quotations, anecdotes, and/or references to authoritative sources
b.	Use effective delivery skills (e.g., appropriate volume, inflection, articulation, gestures, eye contact, posture, facial expression)
c.	Give impromptu and planned presentations (e.g., debates, formal meetings) that stay on topic and/or adhere to prepared notes
d.	Write and deliver informational speeches that present a clear, distinctive perspective on the subject and support the controlling idea with well-chosen and well-organized facts and details from a variety of sources
e.	Write and deliver persuasive speeches that use logical, emotional, and ethical appeals; establish and develop a logical and structured argument; anticipate audience concerns and counterarguments; and include relevant evidence from a variety of sources
f.	Apply analytic and active listening strategies (e.g., paraphrasing, monitoring messages for clarity, selecting and organizing essential information, noting change-of-pace cues) in formal and informal settings
g.	Actively participate in small-group and large-group discussions, assuming various roles

E. Study Skills and Test Taking

a.	Apply active reading, listening, and viewing techniques by taking notes on classroom discussions, lectures, oral and/or video presentations, or assigned at-home reading, and by underlining key passages and writing comments in journals or in margins of texts, where permitted
b.	Demonstrate organizational skills such as keeping a daily calendar of assignments and activities and maintaining a notebook of classwork
c.	Use appropriate essay-test-taking and timed-writing strategies that address and analyze the question (prompt)
d.	Demonstrate familiarity with test formats and test administration procedures to increase speed and accuracy

ACT® International Subject Tests

Powered by CONNEC ME EDUCATION

U.S. History

ACT Exam Standards

ACT®

CONNEC ME EDUCATION

ACT Exam Standards
U.S. History

A set of empirically derived exam standards is the heart of each Subject Test.
The ACT standards represent a solid evidence-based foundation in science. They were developed from an intensive study of high-performing high schools with significant minority and low-income enrollments that produced many graduates who met or exceeded ACT College Readiness Benchmark Scores.

This document contains a list of ACT Standards for a rigorous U.S. History exam—what students should know and be able to do in the test. The ACT standards encompass the following overarching themes and/or foundational concepts:

A. Exploring the Skills and Strategies Underlying U.S. History

B. Building a Nation (Colonization–ca. 1877)

C. Rebuilding a Nation (ca. 1877–ca. 1914)

D. Challenges at Home and Abroad (ca. 1914–1941)

E. America Since World War II (1941–Present)

ACT Exam Standards—U.S. History

A. Exploring the Skills and Strategies Underlying U.S. History
1. Process Skills
a. Apply terms relevant to the content appropriately and accurately
b. Identify and interpret different types of primary and secondary sources of fundamental importance and relevance to topical inquiry and understanding
c. Interpret timelines of key historical events, people, and periods; locate significant historical places and events on maps
d. Analyze the importance of context and point of view in historical interpretation (e.g., interpret past events and issues in historical context rather than in terms of present norms and values); recognize that historians interpret the same events differently due to personal values and societal norms
e. Analyze and evaluate historical sources and interpretations (e.g., credibility, perspective, bias, and authenticity; verifiable or unverifiable; fact or interpretation)
f. Utilize research strategies, methods, and sources to obtain, organize, and interpret historical data
g. Compose arguments/position papers, and participate in debates on different interpretations of the same historical events; synthesize primary and secondary sources to justify position
h. Compose an analytical, historical essay containing a thesis, supporting evidence, and a conclusion

i.	Identify, analyze, and understand elements of historical cause and effect; recognize and understand patterns of change and continuity in history
j.	Develop open-ended historical questions that can be addressed through historical research and interpretation
k.	Analyze how the past influences the lives of individuals and the development of societies

B. Building a Nation (Colonization–ca. 1877)

1. Colonization and Forging a New Nation

a.	Identify the reasons for colonization, evaluate its impacts, and analyze the success or failure of settlements in North America
b.	Analyze religious development and its significance in colonial America (e.g., religious settlements, the Great Awakening)
c.	Describe significant aspects of the variety of social structures of colonial America
d.	Compare the economies of the various colonies, and analyze the development and impact of indentured servitude and African slavery in North America (e.g., social, political, and economic)
e.	Explain the origins and development of colonial governments
f.	Evaluate the influence of Enlightenment ideas on the development of American government as embodied in the Declaration of Independence
g.	Identify and evaluate the ideas and events that contributed to the outbreak of the American Revolution, and determine the key turning points of the war
h.	Identify the impetus for the Constitutional Convention (limitations of government under the Articles of Confederation), and analyze the events and outcomes of the Convention (i.e., the "bundle of compromises")
i.	Interpret the ideas and principles expressed in the U.S. Constitution
j.	Explain the development of the Bill of Rights, and assess various debates of the day
k.	Identify and evaluate the political and territorial changes resulting from westward expansion of the United States in the early nineteenth century
l.	Analyze and evaluate federal and state policies toward American Indians in the first half of the nineteenth century
m.	Evaluate, take, and defend positions on the development of U.S. foreign policy during the early nineteenth century (e.g., Embargo Act, Monroe Doctrine)

2. Antebellum America

a.	Describe and evaluate the impacts of the First Industrial Revolution during the nineteenth century (e.g., the Lowell system, immigration, changing technologies, transportation innovations)
b.	Identify and evaluate the major events and issues that promoted sectional conflicts and strained national cohesiveness in the antebellum period
c.	Identify significant religious, philosophical, and social reform movements of the nineteenth century and their impact on American society
d.	Identify the major characteristics of the abolition movement in the antebellum period, its achievements, failures, and Southern opposition to it
e.	Analyze the women's rights and the suffrage movements and the impact of women on other reform movements in the antebellum period
f.	Compare and contrast the economic, social, and cultural differences of the North and South during the antebellum period

3. Civil War and Reconstruction
a. Identify and analyze the technological, social, and strategic aspects of the Civil War
b. Explain the influence of Abraham Lincoln's philosophy of the Union and his executive actions and leadership on the course of the Civil War
c. Describe the basic provisions and immediate impact of the Thirteenth, Fourteenth, and Fifteenth Amendments to the Constitution
d. Evaluate different Reconstruction plans and their social, economic, and political impact on the South and the rest of the United States
e. Analyze the immediate and long-term influences of Reconstruction on the lives of African Americans and U.S. society as a whole

C. Rebuilding a Nation (ca. 1877–ca. 1914)
1. Industrialization and Urbanization
a. Evaluate the impact of new inventions and technologies of the late nineteenth century
b. Identify and evaluate the influences on business and industry in the late nineteenth and early twentieth centuries
c. Identify labor and workforce issues of the late nineteenth century, including perspectives of owners/managers and Social Darwinists
d. Explain the challenges and contributions of immigrants of the late nineteenth century
e. Explain the causes and impact of urbanization in the late nineteenth century
f. Compare and contrast the experiences of African Americans in various U.S. regions in the late nineteenth century
g. Identify and evaluate the influences on the development of the American West
h. Analyze significant events for Native American Indian tribes, and their responses to those events, in the late nineteenth century
2. Increasing Influence and Challenges
a. Identify and explain significant issues and components of the Populist movement and their impacts
b. Explain the origins and accomplishments of the Progressive movement
c. Analyze the efforts to achieve women's suffrage in the early twentieth century
d. Evaluate, take, and defend positions on the various U.S. foreign policies in the late nineteenth and early twentieth centuries
e. Analyze the causes and consequences of the Spanish-American War
f. Identify and evaluate the factors that influenced U.S. imperialism in the late nineteenth and early twentieth centuries and the ensuing debate over imperialism

D. Challenges at Home and Abroad (ca. 1914–1941)
1. The United States in a Changing World
a. Identify and analyze the causes and significant events of World War I and their impact; evaluate the impact of the Treaty of Versailles
b. Describe and evaluate the impact of scientific and technological innovations of the 1920s
c. Identify and evaluate the impact of new cultural movements on American society in the 1920s
d. Identify the characteristics of social conflict and social change that took place in the early 1920s
e. Identify and explain the economic factors that contributed to the stock market crash of 1929 and the Great Depression

f. Explain the economic, environmental, and social impact of the Great Depression on American society
g. Evaluate the impact of the New Deal on various elements of American society (e.g., social, political, environmental, economic)
E. America Since World War II (1941–Present)
1. America at War
a. Describe circumstances at home and abroad prior to U.S. involvement in World War II
b. Identify the significant military and political aspects of World War II
c. Analyze dimensions of the Holocaust and the Allies' response to the Holocaust and war crimes
d. Evaluate the social, political, and economic impacts of World War II on the home front
e. Identify and evaluate the scientific and technological developments in America during and after World War II
f. Analyze the social, cultural, and economic changes at the onset of the Cold War era
g. Analyze the origins of the Cold War, foreign policy developments, and major events of the administrations from Truman to present
h. Describe and evaluate the political and social impact of the Vietnam War
2. Changes at Home
a. Analyze major domestic issues and responses of the administrations from Truman to present
b. Evaluate the impact of innovations in technology and communication on American society
c. Identify the events and influential individuals of the civil rights, human rights, and counterculture movements and assess their impact
d. Evaluate the impact of changes in the national economy on contemporary American society
e. Identify the major contemporary social, environmental, and political issues (e.g., immigration, global warming, terrorism), the groups involved, and the controversies engendered by those issues
f. Assess increasing global interdependence, the potential for conflict, and the U.S. role in world events in the present and future