TEST SUMMARY AND FRAMEWORK

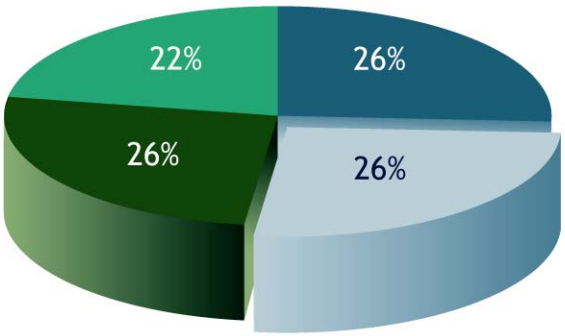
TEST SUMMARY

MIDDLE LEVEL SCIENCE

The Washington Educator Skills Tests—Endorsements™ (WEST-E™) are designed to measure a candidate's knowledge of the subject-area content contained in the test framework for each field. All WEST-E tests are fully aligned with the state's teacher endorsement competencies and, as applicable, the Essential Academic Learning Requirements.

This test summary describes general testing information as well as the approximate percentage of the total test score derived from each content domain. The test framework, organized by content domain, contains the objectives that define the content for the test.

Test Format	Multiple-choice questions
Number of Questions	Approximately 110
Test Session	Up to 5 hours (examinees may take more than one test per session)
Passing Score	240 (scores are calculated in a range from 100 to 300)
Test Code	013



Key	Approximate Percentage of Test	Content Domain	Range of Objectives
	26%	Physical Science	0001-0005
	26%	Earth and Space Science	0006-0010
	26%	Life Science	0011-0015
	22%	Scientific Processes and Inquiry	0016-0019

TEST FRAMEWORK

MIDDLE LEVEL SCIENCE

PHYSICAL SCIENCE

0001 Understand the structure and properties of matter.

For example:

- identifying the properties of the component parts of matter (e.g., atoms, ions, molecules) and models of atomic and molecular structure
- recognizing the difference between pure substances (e.g., elements, compounds) and mixtures (e.g., solutions, alloys)
- demonstrating knowledge of the physical and chemical properties of matter (e.g., density, melting point, combustibility) and their use in identifying substances
- identifying the characteristics of ionic, covalent, and metallic bonds and their influence on the chemical and physical properties of a substance
- identifying the properties of water in its different physical states
- demonstrating knowledge of the organization of the periodic table and its relationship to the properties of matter
- demonstrating knowledge of chemical notation and related concepts (e.g., chemical symbols, molecular and ionic formulas, the mole concept, stoichiometry, laws of composition)

0002 Analyze changes that occur in matter.

For example:

- identifying physical, chemical, and nuclear changes in matter and examples of these changes in everyday life
- applying the law of conservation of matter to the analysis of physical and chemical changes
- recognizing the characteristics (e.g., temperature, density, molecular motion) of physical states of matter
- identifying properties of solvents and solutions (e.g., concentration, pH, conductivity)
- analyzing factors that affect rates of physical changes and chemical reactions (e.g., temperature, catalysts)
- identifying the characteristics and functions of basic biochemical processes (e.g., photosynthesis, respiration, anabolism, catabolism)

0003 Analyze different forms of energy and energy transformations and the relationships among force, mass, and motion.

For example:

- comparing the characteristics of and relationships between different forms of energy (e.g., heat, light, kinetic, potential)
- applying the law of conservation of energy to the analysis of physical and chemical changes
- applying the kinetic molecular theory to the analysis of the properties and behaviors of matter as solids, liquids, gases, and plasma
- demonstrating knowledge of energy transformations and the processes by which energy is transferred (e.g., conduction, radiation, convection)
- identifying the kinds of forces (e.g., frictional, gravitational) that act on objects in particular situations
- analyzing graphs and solving problems involving distance, direction, time, velocity, and acceleration
- applying knowledge of Newton's three laws of motion and solving quantitative problems involving the force, mass, and motion of objects
- applying knowledge of simple machines and their uses in everyday life

0004 Analyze the properties of waves, sound, and light.

For example:

- recognizing the characteristics of mechanical waves (e.g., wavelength, amplitude)
- demonstrating knowledge of the properties of sound in everyday phenomena (e.g., echoes, Doppler effect)
- recognizing how light and sound are affected by the medium through which they are passing
- recognizing characteristics of the electromagnetic spectrum
- analyzing the effects of mirrors, lenses, and prisms on the behavior of light
- demonstrating knowledge of the relationships between the properties of waves and how they are perceived by humans (e.g., color, pitch)

0005 Analyze electricity and magnetism.

For example:

- recognizing the characteristics of static electricity
- demonstrating knowledge of the components of an electric circuit and their functions
- comparing series and parallel circuits
- identifying the properties of magnets and the characteristics of magnetic fields
- demonstrating knowledge of the relationship between moving electric charges and magnetic fields
- analyzing applications of electromagnetism in everyday life (e.g., motors, generators)

EARTH AND SPACE SCIENCE

0006 Understand the composition, structure, and history of the earth.

For example:

- demonstrating knowledge of the earth's structure and composition
- demonstrating knowledge of major geologic events in the earth's history (e.g., mass extinctions, continental glaciations)
- classifying common rocks and minerals based on how they were formed and their physical characteristics
- recognizing methods for determining the relative and absolute ages of geologic features (i.e., stratigraphy and radiometric dating)
- recognizing characteristics of fossils and how these characteristics show evidence of the changing surface and climate of the earth

0007 Analyze the geologic processes, systems, and energy transformations of the earth.

For example:

- recognizing the chemical, physical, and biological processes, including energy transformations, that change the earth's surface and interior
- analyzing the processes involved in plate tectonics and the rock cycle
- analyzing constructive and destructive processes (e.g., volcanism, deposition, weathering, erosion, plate movements) that form and change major geologic features
- relating landforms (e.g., folded mountains, river valleys, deltas) to the processes that produced them
- identifying the processes involved in the formation of major geologic features in Washington State (e.g., the Cascade Range, the Channeled Scablands, the Columbia Plateau) and elsewhere
- recognizing the characteristics of soils and the processes involved in soil formation and erosion

0008 Analyze the distribution, management, and use of the earth's resources.

For example:

- demonstrating knowledge of the distribution, management, and use of the earth's geologic resources (e.g., minerals, oil, gas)
- identifying the distribution and characteristics of major reservoirs of water (i.e., glaciers, lakes, groundwater, and oceans) on the earth
- demonstrating knowledge of the composition, location, and subsurface topography of the world's oceans
- demonstrating knowledge of the management and conservation of freshwater resources in Washington State and elsewhere
- analyzing the effects of human activity on the earth's resources

0009 Analyze the hydrologic systems, atmosphere, climate, and weather.

For example:

- analyzing the water cycle and its relationship to various atmospheric conditions
- identifying the basic composition, structure, and properties of the atmosphere
- analyzing the significance of changes in weather variables (e.g., clouds, humidity, wind speed)
- recognizing the effects of large bodies of water, large land areas, and differences in elevation on weather and climate
- analyzing weather patterns, including causes and effects of local and regional weather events (e.g., thunderstorms, hurricanes) and global climate change
- identifying the causes and effects of waves, currents, and tides

0010 Analyze the characteristics of the solar system and universe.

For example:

- demonstrating knowledge of theories describing the formation of the solar system and universe
- demonstrating knowledge of the types, characteristics, and general locations of objects in the universe and solar system
- recognizing the effects of gravity on the motion of objects in the solar system
- analyzing the motion of objects in the sky in terms of relative position and the earth's motion
- recognizing the effects of the orientations, positions, and movements of the earth, sun, and moon (e.g., tides, seasons, eclipses)

LIFE SCIENCE

0011 Analyze the structure and function of cells.

For example:

- recognizing the characteristics of prokaryotic and eukaryotic cells
- identifying the basic structures and functions of plant and animal cells
- analyzing the functions of specialized cells in plants and animals
- analyzing the processes of meiosis and mitosis
- comparing the characteristics of aerobic and anaerobic respiration
- demonstrating knowledge of photosynthesis

0012 Analyze the characteristics, classification, and life processes of living organisms.

For example:

- identifying distinguishing characteristics of taxonomic groups at the domain and kingdom level
- applying the basic principles of taxonomy and classification used in biology
- demonstrating knowledge of life cycles, reproductive strategies, development, and growth in multicellular organisms
- analyzing the processes by which organisms obtain and use energy
- analyzing the relationships between specialized structures and their functions in plants and animals (e.g., thorns, bark, fur, feathers)
- analyzing the behaviors and physiological mechanisms that allow organisms to maintain homeostasis

0013 Analyze heredity and evolution.

For example:

- identifying the structures and functions of genes and chromosomes and the roles of DNA and of RNA in the transmission of genetic information
- analyzing the differences between sexual and asexual reproduction
- applying the basic principles of inheritance and Mendel's laws
- identifying applications of genetic engineering technology in various areas (e.g., agriculture, medicine)
- analyzing the roles of variation, adaptation, and natural selection in biological evolution
- recognizing evidence for the evolution of species (e.g., fossils, genetics)
- demonstrating knowledge of factors that affect the evolution of species (e.g., geographic isolation, genetic mutations)

0014 Understand human systems, physiology, and anatomy.

For example:

- recognizing the structures and functions of human body systems
- analyzing the relationships among the systems of the human body
- analyzing the regulation of human body systems, including homeostasis
- recognizing how human body systems maintain health and how diseases are transmitted within communities
- demonstrating knowledge of the basic processes involved in human reproduction
- recognizing changes in human body systems during growth, development, and aging

0015 Analyze the characteristics of populations, communities, ecosystems, and biomes.

For example:

- demonstrating knowledge of population dynamics
- identifying the roles of organisms (e.g., producers, consumers) at various trophic levels in an ecosystem
- analyzing the flow of energy and matter through a food web, food chain, or ecosystem
- recognizing the types and characteristics of relationships between organisms (e.g., competition, parasitism)
- identifying characteristics of the earth's major terrestrial biomes (e.g., tropical rain forests, deserts) and aquatic ecosystems (e.g., freshwater, marine)
- analyzing the effects of human activity on biological communities and ecosystems

SCIENTIFIC PROCESSES AND INQUIRY

0016 Understand the principles and procedures of scientific investigations.

For example:

- demonstrating knowledge of the importance of empirical data, verifiable evidence, and logical reasoning in scientific investigations
- recognizing a valid experimental design for collecting and analyzing data and testing a hypothesis
- identifying bias and strategies for reducing bias in scientific investigations
- recognizing the dynamic nature of scientific knowledge and how scientific knowledge builds and changes over time
- recognizing how physical, conceptual, and mathematical models represent and are used to investigate objects, events, systems, and processes

0017 Understand the principles and procedures for communicating scientific data and information.

For example:

- demonstrating knowledge of the procedures and criteria for formally reporting data and experimental results to the scientific community
- demonstrating knowledge of different formats (e.g., tables, graphs) for organizing and analyzing data
- applying appropriate mathematical concepts (e.g., simple descriptive statistics, proportional reasoning) and skills to describe and analyze data
- interpreting and assessing scientific information available in the media, including the Internet

0018 Demonstrate knowledge of scientific tools, instruments, materials, and safety practices.

For example:

- recognizing procedures and sources of information for the safe and proper use and storage of equipment and materials in scientific investigations
- identifying potential safety hazards associated with the use of scientific equipment, materials, and procedures
- demonstrating knowledge of appropriate protocols for maintaining safety and responding to emergencies in laboratory situations
- selecting appropriate tools, procedures, and units to collect, measure, and represent data in scientific investigations
- demonstrating knowledge of precision and accuracy in measurement
- demonstrating knowledge of procedures for the ethical use and care of living organisms in scientific research

0019 Demonstrate knowledge of the principles of science and of the historical and contemporary relationships among science, technology, and society.

For example:

- demonstrating knowledge of major unifying themes and concepts (e.g., system, model) that are common to the various scientific disciplines
- analyzing examples of the integration and interdependence of different technologies and of different scientific disciplines
- demonstrating knowledge of the historical development of major scientific ideas, including contributions from diverse cultures and individuals
- analyzing societal issues that influence and are influenced by developments in science
- identifying the potential and real benefits, risks, and ethical concerns in current areas of scientific research and developing technologies for contemporary society
- recognizing the scientific, mathematical, and technological knowledge, training, and experience needed for careers in science and technology