



TEST SUMMARY AND FRAMEWORK

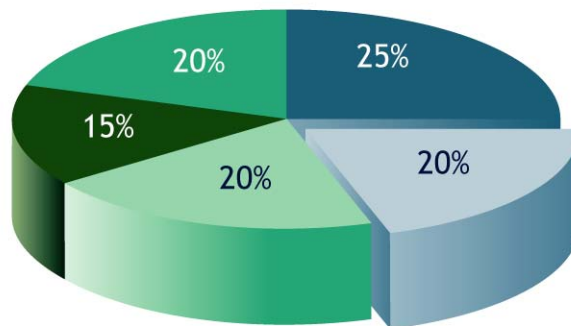
TEST SUMMARY

EARTH AND SPACE 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 | 024 |



| Key | Approximate Percentage of Test | Content Domain | Range of Objectives |
|--------------|--------------------------------|--------------------------------------|---------------------|
| Dark Blue | 25% | Physical and Historical Geology | 0001-0005 |
| Light Blue | 20% | Oceanography and Freshwater Systems | 0006-0009 |
| Light Green | 20% | The Atmosphere, Climate, and Weather | 0010-0013 |
| Dark Green | 15% | The Universe and Solar System | 0014-0016 |
| Medium Green | 20% | Scientific Processes and Inquiry | 0017-0020 |



TEST FRAMEWORK

EARTH AND SPACE SCIENCE

PHYSICAL AND HISTORICAL GEOLOGY

0001 Understand the processes of mineral and rock formation, geochemical systems, and the characteristics of different types of minerals and rocks.

For example:

- analyzing geochemical cycles
- demonstrating knowledge of classification schemes used to identify rocks and minerals
- recognizing the characteristics of common sedimentary, igneous, and metamorphic rocks
- analyzing the processes involved in the formation of sedimentary, igneous, and metamorphic rocks
- demonstrating knowledge of the conditions under which fossils form

0002 Analyze the structure of the earth and the tectonic forces that shape its surface.

For example:

- demonstrating knowledge of the characteristics of the earth's crust, mantle, and core and the techniques used to study the earth's interior
- recognizing the evidence supporting the theory of plate tectonics
- analyzing the properties and mechanisms that produce tectonic plate movements and crustal deformation
- demonstrating knowledge of features and structures of the continental and oceanic crust that result from the movement of tectonic plates
- demonstrating knowledge of the causes and consequences of volcanism and earthquakes in Washington State and elsewhere



0003 Analyze the processes and consequences of weathering, erosion, and deposition.

For example:

- demonstrating knowledge of the interconnected processes of weathering, erosion, and deposition
- analyzing how the processes of weathering, erosion, and deposition shape the earth's surface
- recognizing the landforms and deposits produced by weathering, erosion, and deposition, including glacial deposits
- analyzing soil formation processes under different conditions

0004 Understand the geologic time scale and methods of relative and absolute dating.

For example:

- demonstrating knowledge of the principles of stratigraphy
- demonstrating knowledge of the principles, applications, and limitations of radiometric dating
- analyzing stratigraphic and paleontological information
- recognizing the major divisions of the geologic time scale and major events in geologic history
- demonstrating knowledge of the evolution of life on the earth

0005 Analyze the formation and use of geologic resources.

For example:

- recognizing the types and characteristics of renewable and nonrenewable geologic resources
- analyzing the physical and chemical processes involved in the formation of geologic resources
- analyzing factors that affect the distribution, availability, and use of geologic resources
- demonstrating knowledge of the extraction and use of geologic resources and the strategies employed to manage associated environmental problems



OCEANOGRAPHY AND FRESHWATER SYSTEMS

0006 Analyze the processes involved in the hydrologic cycle and the distribution of freshwater on the earth.

For example:

- demonstrating knowledge of the physical and chemical properties of water
- analyzing the movement of water through the hydrologic cycle, including energy changes that occur as water changes phase
- recognizing factors that affect the distribution of freshwater resources
- analyzing changes in the distribution of water over time (e.g., sea-level change, fossil aquifers, change in glacial size and distribution)

0007 Understand the components and processes of marine systems.

For example:

- demonstrating knowledge of the physical characteristics of oceans and the structure of ocean basins
- recognizing the types and interrelationships of ocean currents and the forces that control them
- demonstrating knowledge of the causes and effects of waves in coastal erosion and deposition
- demonstrating knowledge of ocean tides and the forces that produce them
- recognizing the causes and consequences of tsunamis

0008 Understand the movement and use of groundwater resources.

For example:

- demonstrating knowledge of the movement and renewal of groundwater in different types of aquifers
- analyzing how the characteristics of aquifers and watersheds affect the infiltration of surface water into aquifers
- recognizing factors that affect the quality and quantity of water removed from aquifers
- demonstrating knowledge of strategies for managing groundwater resources and the effects of human activities on groundwater resources



0009 Analyze the physical and chemical characteristics of freshwater systems and their roles in geologic processes.

For example:

- demonstrating knowledge of the physical characteristics of river systems and how they evolve over time
- recognizing the physical and chemical characteristics of lakes, ponds, estuaries, and wetlands
- analyzing how human activities can alter freshwater systems
- recognizing the causes of river flooding and the associated hazards

THE ATMOSPHERE, CLIMATE, AND WEATHER

0010 Understand the structure and characteristics of the atmosphere.

For example:

- demonstrating knowledge of the characteristics of the different layers of the atmosphere
- analyzing the processes of radiation, conduction, and convection in the atmosphere in relation to weather
- demonstrating knowledge of the formation and characteristics of air masses
- recognizing factors that influence global wind patterns

0011 Analyze the earth's climate and the factors that control climate conditions in different regions of the world.

For example:

- analyzing the characteristics and distribution of different climates
- recognizing the underlying factors that control climate conditions in different parts of the world, including Washington State
- demonstrating knowledge of climate changes that have occurred during the earth's history and the causes of these changes
- demonstrating knowledge of hemispheric-scale climate phenomena and their effects on global weather patterns (e.g., El Niño/Southern Oscillation [ENSO])



0012 Analyze the atmospheric conditions that lead to weather phenomena.

For example:

- recognizing how geographic factors interact with atmospheric conditions to produce different types of weather
- demonstrating knowledge of weather maps and the characteristics of low- and high-pressure systems, air masses, and fronts and how they affect weather
- analyzing the causes of severe weather, including tornadoes, hurricanes, and blizzards
- demonstrating knowledge of the atmospheric conditions that produce different types of clouds and precipitation
- analyzing how regional weather is affected by large-scale patterns in the atmosphere (e.g., monsoons, the Pacific high, the intertropical convergence zone)

0013 Understand the effects that weather and climate have on human society and how human activity can affect climate and the atmosphere.

For example:

- interpreting the evidence used in the study of climate change
- recognizing the causes and effects of human-induced changes in local and global climate systems
- evaluating the possible risks associated with global climate change
- recognizing types, sources, and effects of atmospheric pollution
- demonstrating knowledge of techniques and procedures for reducing atmospheric pollution



THE UNIVERSE AND SOLAR SYSTEM

0014 Analyze the apparent motions of the sun, moon, and stars as seen from the earth.

For example:

- analyzing the change in the sun's path across the sky over the course of the day and year
- recognizing what causes the appearance and position of the moon to change over time
- demonstrating knowledge of how the planets and stars change position in the sky over time
- demonstrating knowledge of the appearance and origin of comets, asteroids, and meteorites
- relating changes in the positions of the earth and moon to solar and lunar eclipses

0015 Analyze the characteristics of and interactions among objects in the solar system.

For example:

- analyzing how the change in the earth's position relative to the sun causes seasons and long-term changes in climate
- demonstrating knowledge of how planetary motions relate to gravitational forces
- demonstrating knowledge of the origin of the components of the solar system, including the earth's moon
- relating the characteristics of the rocky and gaseous planets to their origin
- demonstrating knowledge of the sun and its effects on the earth

0016 Understand stellar evolution and the formation of the universe.

For example:

- demonstrating knowledge of stellar evolution and the formation of the solar system
- analyzing the life cycle of stars (e.g., H-R diagrams) and the role of fusion in forming elements
- recognizing the evidence supporting the big bang theory of the formation of the universe
- demonstrating knowledge of how the properties of stars can be used to analyze their composition, age, location, and relative motion



SCIENTIFIC PROCESSES AND INQUIRY

0017 Understand the principles and procedures of scientific investigation.

For example:

- formulating questions and testable hypotheses
- using empirical data and verifiable evidence to draw logical conclusions in a scientific investigation
- evaluating an experimental design for its validity in collecting data and testing a hypothesis
- identifying sources of bias and strategies for avoiding bias in scientific investigations
- recognizing the dynamic nature of scientific knowledge and how scientific knowledge builds and changes over time

0018 Understand the principles and procedures for analyzing and 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 for organizing and analyzing data
- applying appropriate mathematical concepts and skills (e.g., simple descriptive statistics, proportional reasoning, scientific notation) to describe and analyze data
- interpreting and assessing scientific information available in the media, including the Internet

0019 Demonstrate knowledge of scientific tools, instruments, materials, and safety practices.

For example:

- recognizing procedures for the proper use and storage of scientific equipment and materials and potential safety hazards associated with the use of scientific equipment and materials
- 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 technology used in earth and space science



0020 Understand the unifying principles of science and the historical and contemporary relationships among science, technology, society, and culture.

For example:

- demonstrating knowledge of major unifying themes and concepts that are common to the various scientific disciplines (e.g., modeling, conservation of energy, systems)
- 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 factors that influence developments in science
- assessing the societal implications of developments in science
- identifying the potential and real benefits, risks, and ethical concerns in current areas of scientific research and in developing technologies for contemporary society
- recognizing the background required for different careers in the sciences