CERTIFICATION EXAMINATIONS FOR OKLAHOMA EDUCATORS™ (CEOE™)

OKLAHOMA SUBJECT AREA TESTS™ (OSAT™)

FIELD 051: ELEMENTARY EDUCATION SUBTEST 2

TEST FRAMEWORK

August 2014

	Subarea	Range of Competencies
I.	Social Studies	0001–0004
II.	Mathematics	0005–0012
III.	Science	0013–0017
IV.	Health/Fitness and the Arts	0018–0020

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TEST FRAMEWORK

I. Social Studies
II. Mathematics
III. Science
IV. Health/Fitness and the Arts

SUBAREA I—SOCIAL STUDIES

Competency 0001

Apply social studies process skills.

The following topics are examples of content that may be covered under this competency.

- Interpret pictures, maps, graphs, charts, diagrams, and timelines; analyze points of view; and apply criteria for evaluating research information (e.g., date, authorship, analysis, credibility).
- Identify the appropriate use of a variety of sources (e.g., primary and secondary sources, maps, statistical data, electronic technology-based information).
- Apply effective strategies for formulating well-supported oral and written arguments, policies, and positions; evaluating arguments and claims in a text; and applying knowledge in new settings.
- Identify informative resources typically available from museums, historical sites, presidential libraries, local and state historical societies, and community resources such as field studies, guest speakers, and historical museums.

Competency 0002

Analyze the basic principles of government, civics, and economics.

The following topics are examples of content that may be covered under this competency.

- Analyze the purpose of government and the differences between various forms of government (e.g., socialism, theocracy, totalitarianism, constitutional monarchy, democratic republic).
- Analyze the beliefs and ideals of a democratic republican form of government (e.g., the rule of law, equality, human dignity).
- Distinguish among the powers, duties, and roles of the judicial, legislative, and executive branches of the federal, state, local, and tribal governments.
- Analyze the influence of civic discussion, special interest groups, and citizen action on policy decisions and actions of governments in the United States.
- Apply knowledge of the rights (e.g., life, liberty, justice) and responsibilities (e.g., to vote, to respect the property of others, to pay taxes, to respect the rights of others, to be honest, to be tolerant, to work for the common good) of the individual in a democratic society.
- Identify the freedoms provided by the Bill of Rights (e.g., freedom of the press, freedom of assembly, freedom of speech) and in subsequent amendments to the U.S. Constitution.
- Apply knowledge of basic economic concepts and terminology (e.g., supply and demand, profits, scarcity, capital, tariff, opportunity cost, natural resources, trade embargo).
- Compare traditional, market, command, and mixed economies as organizing systems for the production, distribution, and consumption of goods and services.
- Analyze factors that affect standards of living in world communities (e.g., availability of natural resources, famine, labor unrest, ethnic conflict, outsourcing, technological innovation).

Competency 0003

Apply the basic principles of geography.

The following topics are examples of content that may be covered under this competency.

- Apply knowledge of different types of maps (e.g., thematic, topographical, political, relief), geographic representations (e.g., absolute location, relative location), and tools (e.g., geographic information systems [GIS], population pyramids) to acquire, process, and report information and analyze the spatial organization of people, places, and environments on Earth's surface.
- Identify the human characteristics of a place (e.g., continents, cities, buildings, roads, bridges, ports) or region (e.g., Midwest, New England, Caribbean, southern Africa), ways in which regions are connected (e.g., river systems, cultural ties, trade), and the characteristics, distribution, and migration of human populations (e.g., push-and-pull factors, population density).
- Identify characteristics of different landforms (e.g., mountains, valleys, plateaus, oceans, glaciers, islands, plains) and the physical processes and phenomena that shape the patterns of Earth's surface (e.g., floods, tornadoes, hurricanes, earthquakes, drought).
- Analyze the influence of changes to the environment from human activities (e.g., dam building, urban growth) and human migration (e.g., deforestation, desertification, Dust Bowl).
- Apply knowledge of a variety of maps and documents to identify physical and cultural features of neighborhoods, cities, states, and countries and to explain the historical migration of people, expansion and disintegration of empires, and the growth of economic systems.

Competency 0004

Analyze events and developments in the history of Oklahoma, the United States, and the world.

The following topics are examples of content that may be covered under this competency.

- Apply knowledge of the chronological organization of important events in the history of Oklahoma, the United States, and the world.
- Analyze how major events are related to one another in time and interpret timelines of key events, people, and periods of a historical era.
- Apply knowledge of key movements (e.g., abolition, woman suffrage, civil rights) and major themes (e.g., European colonization, the development of the U.S. Constitution, the creation of the U.S. political system) in the history of the United States.
- Analyze important global events (e.g., the development of democracy in Greece, the signing of the Magna Carta, the feudal system) in the development of nations, institutions, economic systems, and culture.
- Determine central ideas for themes in a text; assess how point of view shapes the content of a text; and distinguish fact from opinion, relevant from irrelevant information, essential from incidental information, and verifiable from unverifiable information in historical narratives and stories.
- Analyze connections between geography and the historical development of communities, states, and nations.
- Demonstrate knowledge of scientific and technological innovations (e.g., telescope, World Wide Web, X-ray machine) that shaped history.

SUBAREA II—MATHEMATICS

Competency 0005

Apply operations and algebraic thinking.

The following topics are examples of content that may be covered under this competency.

- Analyze prenumber concepts (e.g., one-to-one correspondence, cardinality, order of operations).
- Apply place value understanding and properties of operations to perform multi-digit arithmetic.
- Apply basic concepts of number theory (e.g., factors, prime and composite, multiples).
- Analyze customary algorithms involving basic operations with real numbers, and use number properties (e.g., identity property of addition, distributive property) and the order of operations to justify procedures and solve problems.
- Apply and extend understandings of arithmetic to algebraic expressions.

Competency 0006

Apply number and operations.

The following topics are examples of content that may be covered under this competency.

- Represent, compare, and order numbers using a variety of models (e.g., number lines, base-ten blocks, diagrams).
- Solve a variety of problems (e.g., addition, division, rates, ratios) involving fractions, percents, and decimals.
- Solve problems involving radicals and integer exponents, including the use of scientific notation.
- Solve a variety of mathematical and real-world problems involving whole numbers, integers, fractions, decimals, roots, and powers.
- Apply estimation techniques and mental math strategies to mathematical and real-world problems involving whole numbers, integers, and rational and irrational numbers.

Competency 0007

Apply proportional reasoning and expressions and equations.

The following topics are examples of content that may be covered under this competency.

- Analyze proportional relationships and use them to solve real-world and mathematical problems.
- Analyze the connections between proportional relationships, lines, and linear equations.
- Use properties of operations to generate equivalent expressions and simplify algebraic expressions (e.g., factoring, laws of exponents).
- Analyze mathematical and real-world problems and translate them into algebraic expressions and equations.
- Solve linear equations and pairs of simultaneous linear equations.
- Reason about and solve equations and inequalities.

Competency 0008

Apply concepts of functions.

The following topics are examples of content that may be covered under this competency.

- Apply properties of functions (e.g., input, output) and use functions to plot points on a coordinate plane and describe graphs.
- Analyze functions using different representations (e.g., tabular, algebraic, graphic, verbal).
- Use linear functions to model relationships between two quantities.
- Compare and interpret linear, quadratic, and exponential models and use them to solve problems.

Competency 0009

Apply concepts of measurement.

The following topics are examples of content that may be covered under this competency.

- Use the customary and metric systems appropriately and convert within and between them.
- Analyze and solve a variety of measurement problems involving angle measure, length, perimeter, and circumference.
- Solve real-world and mathematical problems involving area, surface area, and volume.
- Analyze and solve measurement problems involving composite geometric figures.

Competency 0010

Apply concepts of geometry.

The following topics are examples of content that may be covered under this competency.

- Apply rotations, reflections, translations, and dilations and relate their properties to congruence and similarity.
- Apply the Pythagorean theorem to solve problems.
- Apply concepts of Euclidean geometry (e.g., similarity, parallel lines, perpendicular lines, vertical angles) to solve real-world and mathematical problems.
- Analyze three-dimensional figures using two-dimensional representations (e.g., cross sections, perspective drawings, nets).
- Apply concepts in coordinate geometry (e.g., distance, slope) to explore the properties of geometric figures and to solve problems.

Competency 0011

Apply concepts of data analysis.

The following topics are examples of content that may be covered under this competency.

- Compare data presented in a variety of formats (e.g., frequency distribution, boxplot, circle graph, stem-and-leaf plot).
- Interpret scatter plots to investigate bivariate data.
- Apply concepts of central tendency (e.g., mean, median, mode) and dispersion (e.g., range, standard deviation, percentiles) to data sets and data distributions.
- Describe and summarize data for the purpose of making decisions or predictions.

Competency 0012

Apply concepts of probability.

The following topics are examples of content that may be covered under this competency.

- Identify the appropriate sample space in problems involving probability.
- Apply concepts of probability to solve problems involving simple and compound events.
- Demonstrate knowledge of how random sampling is used to draw inferences about a population.
- Use a variety of tools to approximate the probability of a chance event (e.g., tables, raw data, frequency diagrams, simulations).
- Represent and solve probability problems using multiple representations (e.g., tree diagrams, Venn diagrams).

SUBAREA III—SCIENCE

Competency 0013

Apply knowledge of the crosscutting concepts in the sciences and engineering.

The following topics are examples of content that may be covered under this competency.

- Analyze patterns and causal relationships.
- Apply the concepts of scale, proportion, and quantity to the analysis of natural objects and observable phenomena.
- Analyze natural and engineered systems and system models and track the transfer of matter and energy through these systems.
- Analyze the relationship between structure and function in natural and designed objects.
- Analyze the stability of natural and designed systems and the factors affecting stability.
- Apply literacy skills to the interpretation and synthesis of scientific and technical information from a range of sources.
- Analyze the historical progression of scientific knowledge.
- Analyze the role of science and engineering in contemporary society.

Competency 0014

Apply knowledge of science and engineering practices.

The following topics are examples of content that may be covered under this competency.

- Analyze processes by which new scientific knowledge is generated.
- Apply knowledge of the principles and procedures for designing and carrying out investigations.
- Apply knowledge of the methods and criteria for collecting, organizing, analyzing, presenting, and communicating scientific data.
- Analyze the design of a scientific experiment or investigation and interpret data using basic mathematical methods.
- Apply knowledge of the engineering design process to solve a problem or address a need.
- Identify methods for maintaining safety during scientific investigations and demonstrations.
- Apply knowledge of different forms of measurement, tools used in measurement (e.g., metric ruler, graduated cylinder, balance, stopwatch), the International System of Units (SI), and SI prefixes.
- Apply knowledge of the classification of objects, organisms, and events based on similarities, differences, and interrelationships.

Competency 0015

Apply knowledge of the fundamental concepts and core ideas of physical science.

The following topics are examples of content that may be covered under this competency.

- Apply knowledge of the structure and properties of matter.
- Analyze molecular-level differences in states of matter and the changes that occur during chemical bonding.
- Analyze the characteristics of different types of forces (e.g., gravity, friction, inertia) and their effects on the motion and position of objects.
- Apply knowledge of different forms of energy (e.g., kinetic, thermal, chemical, potential); the processes of energy transfers and transformations; and the conservation of energy.
- Apply knowledge of the properties of waves and electromagnetic radiation.
- Apply knowledge of the characteristics of light, heat, sound, electricity, and magnetism.

Competency 0016

Apply knowledge of the fundamental concepts and core ideas of Earth and space science.

The following topics are examples of content that may be covered under this competency.

- Apply knowledge of Earth's structure, materials, and systems.
- Analyze Earth's location in the universe, its history as a planet, and the geological processes that shaped it (e.g., plate tectonics, erosion).
- Apply knowledge of the solar system and the motion of objects in the sky to explain phenomena such as seasons, day and night, tides, and eclipses.
- Analyze basic weather phenomena (e.g., wind, rain, snow, fog), patterns, and processes (e.g., atmospheric circulation).
- Apply knowledge of the water cycle and the rock cycle.
- Analyze the relationships between human activity and Earth's systems and natural resources.

Competency 0017

Apply knowledge of the fundamental concepts and core ideas of life science.

The following topics are examples of content that may be covered under this competency.

- Apply knowledge of the characteristics and life processes of living organisms (e.g., cells, photosynthesis, respiration).
- Analyze the relationships between structure and function in living systems.
- Analyze the growth and development of organisms (e.g., life cycles, factors affecting growth).
- Apply knowledge of reproduction and heredity, including the roles of genes and chromosomes, and the ways in which organisms pass on traits to their offspring.
- Apply knowledge of the diverse nature of species, changes in species that occur through genetic variations, sources of genetic variation, and environmental adaptations of species over the course of time.
- Analyze the interrelationships of organisms with their environment and with each other (e.g., food web, predators, biotic and abiotic factors, biodiversity) and the cycling of matter and energy through ecosystems.

SUBAREA IV—HEALTH/FITNESS AND THE ARTS

Competency 0018

Demonstrate knowledge of health, fitness, and safety concepts and skills.

The following topics are examples of content that may be covered under this competency.

- Apply knowledge of the structure and function of the human body and its systems (e.g., circulatory, digestive, nervous, respiratory).
- Demonstrate knowledge of motor skills and sequences of motor development.
- Recognize the importance and benefits of sound nutrition, physical fitness, and physical activity.
- Demonstrate knowledge of various influences on health behaviors, and skills and concepts for enhancing health and safety.
- Demonstrate knowledge of benefits of a healthy lifestyle, characteristics of common illnesses and diseases, and disease prevention concepts and practices.
- Apply knowledge of how to locate and evaluate the validity and reliability of health and fitness information, products, and services.

Competency 0019

Demonstrate knowledge of basic genres, materials, tools, and historical and cultural traditions of visual art.

The following topics are examples of content that may be covered under this competency.

- Recognize the basic elements (e.g., value, color, texture, shape, volume), materials (e.g., clay, glass, charcoal, canvas), and tools (e.g., chisel, brush, easel, kiln) of visual art.
- Demonstrate knowledge of visual art processes (e.g., collage, digital imaging, etching, photography, stenciling).
- Recognize characteristics of different genres (e.g., landscape painting, still life painting, carved sculpting, relief sculpting) of visual art.
- Analyze relationships between visual art, music, dance, and theatre, and relationships between the arts and other academic disciplines.

Competency 0020

Demonstrate knowledge of basic genres, and historical and cultural traditions of the performing arts (i.e., music, dance, and theatre) and media arts.

The following topics are examples of content that may be covered under this competency.

- Recognize the basic elements of music (e.g., melody, rhythm, harmony, tempo), dance (e.g., movement, time, space, body), theatre (e.g., script, process, audience), and media arts.
- Recognize different genres of music (e.g., folk, jazz, rock, blues), dance (e.g., modern, ballet, jazz, tap), theatre (e.g., improvisational, mime, musical, puppetry), and media arts (e.g., cinema, TV, video art, animation, graphic design, Web design, virtual design, video games).
- Recognize characteristics of exemplary works of music (e.g., *1812 Overture*, *Clair de Lune*, *Rhapsody in Blue*), dance (e.g., *The Nutcracker*, *The Firebird*, *Appalachian Spring*), theatre (e.g., *Macbeth*, *The Crucible*, *Oklahoma!*), and media arts (e.g., *Citizen Kane*, *The Sopranos*) from various historical and cultural perspectives.