
ILLINOIS CERTIFICATION TESTING SYSTEM

FIELD 110: ELEMENTARY/MIDDLE GRADES TEST FRAMEWORK

November 2003

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November 2003

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Language Arts and Literacy
Mathematics
Science
Social Sciences
The Arts, Health, and Physical Education

SUBAREA I—LANGUAGE ARTS AND LITERACY

0001 Understand word analysis strategies and vocabulary development and how to use effective, developmentally appropriate approaches to promote students' word analysis and vocabulary skills.

For example:

- Demonstrate knowledge of phonics and its role in decoding; of ways to assess students' phonic skills; and of effective instructional strategies, activities, and materials for promoting students' phonetic analysis skills.
- Demonstrate knowledge of word analysis strategies, including syllabication, morphology (e.g., use of affixes and roots), and context clues; of ways to assess students' use of word analysis strategies; and of effective instructional strategies, activities, and materials for promoting students' word analysis and contextual analysis skills.
- Demonstrate knowledge of the role of vocabulary development in reading; of ways to assess students' vocabulary development; and of effective instructional strategies, activities, and materials for promoting students' vocabulary development.

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0002 Understand strategies for reading for different purposes and constructing meaning from a variety of reading materials.

For example:

- Demonstrate knowledge of various reading comprehension strategies and study skills (e.g., previewing, rereading) for different purposes (e.g., to review facts for a test, to analyze literature, to conduct research, to respond to social or business correspondence).
- Apply knowledge of strategies for promoting the reading comprehension skills of students who are at different stages of reading and for facilitating comprehension before, during, and after reading (e.g., prompting students to make predictions).
- Demonstrate knowledge of literal comprehension skills (e.g., recognizing facts and opinions, sequence of events, main ideas, or supporting details in a text).
- Demonstrate knowledge of inferential comprehension skills (e.g., summarizing, drawing conclusions, or making generalizations from given information; drawing inferences about character, setting, or cause and effect relationships in an excerpt).
- Demonstrate understanding of interpretive and evaluative comprehension skills (e.g., analyzing an author's purpose or point of view; evaluating the use of language or illustration to portray characters, develop plot, or create an emotional impact).
- Demonstrate knowledge of the diverse body of works, authors, and movements of U.S. and world literature, children's and young adult literature, and other resources that promote students' literary response and analysis skills (e.g., promoting cultural awareness or addressing student issues with young adult literature).
- Analyze major characteristics of classic and contemporary literature from the United States and throughout the world, key features of various literary genres (e.g., folk tale, myth, poetry, fiction), and the use of literary elements (e.g., figurative language, dialogue, setting, mood) in various texts.

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0003 Understand the process of writing and writing strategies for a variety of purposes and audiences.

For example:

- Recognize characteristics of children's development of writing skills, factors that influence development of writing skills, signs that a student may be experiencing difficulties in written language, and strategies for addressing written language needs.
- Demonstrate knowledge of factors to consider when conducting research and writing for various audiences and purposes (e.g., expressive, informative, persuasive).
- Apply knowledge of techniques for generating topics and developing ideas (e.g., brainstorming, outlining, semantic mapping); methods of organizing written presentations; and strategies for drafting, revising, editing, proofreading, and publishing materials (e.g., peer conferences).
- Analyze and revise written work in relation to English grammar and mechanics (i.e., usage, sentence structure, punctuation, capitalization, spelling).
- Analyze and revise written work in relation to organization, unity, clarity, and style (e.g., adding topic sentences, reordering sentences, deleting unnecessary information).
- Demonstrate knowledge of activities, instructional resources, and technologies for promoting students' writing competence and for integrating writing with the other language arts.

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0004 Understand effective communication through the use of listening and speaking skills.

For example:

- Demonstrate understanding of concepts related to communication theory, language development, language diversity, and the role of language in learning (e.g., the cultural dimensions of communication, the significance of nonverbal cues in communication).
- Apply knowledge of listening strategies for various purposes and contexts (e.g., acquiring or analyzing information, appreciating literature read aloud, social interaction, personal response).
- Recognize factors that affect children's development of listening skills and their ability to listen effectively and construct meaning in various situations, and strategies for addressing listening needs.
- Recognize strategies for organizing and presenting ideas and information for different audiences and purposes (e.g., to inform, persuade, entertain; to participate in group discussions).
- Recognize factors that affect children's development of speaking skills, signs that a child may be experiencing difficulties in language development, and strategies for addressing oral language needs.

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0005 Understand literacy development and how to use effective, developmentally appropriate strategies to promote students' literacy skills.

For example:

- Demonstrate knowledge of children's literacy development, factors that influence development of reading skills, signs that a child may be experiencing difficulties in reading, and strategies for addressing reading needs.
- Recognize factors that affect a reader's construction of meaning through interactions with text (e.g., prior knowledge and experiences, reading rate, characteristics of the text).
- Demonstrate knowledge of print concepts (e.g., letter, word, and sentence representation; directionality; tracking); of ways to assess students' understanding of print; and of instructional strategies, activities, and materials for promoting students' interaction with print in varied and meaningful contexts.
- Demonstrate knowledge of spelling development and its significance for reading; of ways to assess students' spelling skills; and of effective instructional strategies, activities, and materials for promoting students' spelling skills.
- Relate reading development to the development of skills in oral and written language.
- Demonstrate knowledge of the importance of independent reading and effective approaches for guiding students to select independent reading materials and for motivating students to read independently.

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SUBAREA II—MATHEMATICS

0006 Apply a variety of approaches (e.g., estimation, mental mathematics, formal and informal reasoning, modeling, pattern recognition, technology) to solve problems; investigate real-world situations; and analyze, interpret, and communicate mathematical ideas and information.

For example:

- Apply knowledge of appropriate mathematical strategies (e.g., mental computation; working backwards; numerical, geometric, and algebraic pattern recognition) to analyze mathematical ideas, solve problems, and investigate real-world situations.
- Apply knowledge of formal and informal mathematical reasoning processes (e.g., evaluating solutions to problems, judging the validity of arguments, using logical reasoning to draw and justify conclusions from given information).
- Apply knowledge of how to interpret mathematical terminology, symbols, and representations and how to convert among graphic, numeric, symbolic, oral, and written representations of mathematical ideas and relationships.
- Apply knowledge of how to use graphic, numeric, symbolic, oral, and written representations to interpret and communicate mathematical information, reasoning, concepts, applications, and procedures.
- Recognize common uses, benefits, and limitations of calculators and computers as tools for learning, exploration, and problem solving.

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0007 Understand concepts and skills related to numbers, number sense, and numeration (including fractions, decimals, ratios, and percents) to support the learning of mathematics.

For example:

- Apply knowledge of strategies for promoting the development of number sense in children and factors that can affect development.
- Recognize and compare properties of whole numbers and the whole number system (e.g., commutative, distributive).
- Apply concepts of the number and numeration systems to compare, order, and round numbers.
- Recognize concepts and skills related to using integers, fractions, decimals, ratios, and percents to solve problems (e.g., finding equivalent forms of fractions, decimals, and percents).
- Demonstrate knowledge of how to select and use a wide range of manipulatives, instructional resources, and technologies to explore concepts and solve real-world problems involving number, number sense, and numeration.

0008 Understand and apply concepts and methods related to algebra and geometry to support the learning of mathematics.

For example:

- Recognize patterns in numbers, shapes, and data and how to use variables, expressions, equations, and inequalities to describe patterns and express relationships algebraically.
- Identify different types of functions (e.g., linear, nonlinear) and uses of patterns and functions to model real-world situations and make predictions.
- Recognize types of geometric figures in one, two, and three dimensions and their properties (e.g., symmetry).
- Solve problems involving perimeter, area, volume, geometric transformations (e.g., reflections, translations), and coordinate systems (e.g., using coordinate systems on lines and planes to solve problems).
- Apply knowledge of how to use various geometric and algebraic concepts (e.g., similarity, congruence, spatial relationships, patterns, functions, variables), models, materials, methods, and technologies to represent and solve real-world problems involving algebra and geometry.

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0009 Understand and apply principles, concepts, and procedures related to measurement, statistics, and probability to support the learning of mathematics.

For example:

- Recognize appropriate measurement instruments, units, and procedures for various measurement problems (e.g., involving length, area, angles, volume, mass, temperature).
- Apply knowledge of procedures for estimating and converting measurements within the customary and metric systems and for using measurements to describe and compare phenomena.
- Apply knowledge of basic concepts and principles of statistics and probability (e.g., mean, median, mode, range).
- Identify various methods (e.g., surveys, tables, graphs) of systematically collecting, organizing, describing, and analyzing data.
- Apply knowledge of how to interpret graphic and nongraphic representations of statistical data (e.g., frequency distributions, percentiles).
- Recognize how to use a variety of materials, models, and methods (e.g., combinations, theoretical probability) to represent and solve problems involving probability and mathematical expectations.
- Demonstrate knowledge of how to select and use various age-appropriate simulations, manipulatives, materials, and technologies to explore concepts and solve real-world problems involving measurement, data analysis, statistics, and probability.

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SUBAREA III—SCIENCE

0010 Understand and apply fundamental concepts and principles of life and environmental science to interpret, analyze, and explain phenomena.

For example:

- Recognize basic processes and concepts related to cells and the characteristics, needs, and organization of living things.
- Recognize the basic structures and functions of the human body in comparison to those of other organisms.
- Recognize the processes by which energy and nutrients cycle through ecosystems and are used by organisms (e.g., photosynthesis, respiration).
- Analyze how organisms interact with one another and with their environment.
- Apply knowledge of the principles of genetics and evolutionary theory to understand how organisms change over time.
- Apply knowledge of how to use major concepts, processes, and themes of life science (e.g., those related to heredity, flow of energy, systems, interactions) and the interconnections of life, physical, environmental, earth, and space sciences to interpret, analyze, and explain everyday phenomena.
- Recognize relationships among life and environmental science, technology, and society in historical and contemporary contexts.
- Identify a wide range of instructional resources and technologies to support the learning of life and environmental science.

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0011 Understand and apply fundamental concepts and principles of physical science to interpret, analyze, and explain phenomena.

For example:

- Apply knowledge of basic concepts related to matter and energy (e.g., composition and structure of matter, conservation of energy).
- Recognize the physical and chemical properties of matter (e.g., mass, boiling point, pH).
- Apply knowledge of characteristics of different forms of energy (e.g., sound, heat).
- Analyze the interactions of matter and energy in a system, including transfers and transformations of energy and changes in matter.
- Apply knowledge of how to use major concepts, processes, and themes of physical science (e.g., those related to motion of objects, waves and vibrations, changes in matter), as well as the interconnections of physical, life, environmental, earth, and space sciences to interpret, analyze, and explain everyday phenomena.
- Recognize relationships among physical science, technology, and society in historical and contemporary contexts.
- Identify a wide range of instructional resources and technologies to support the learning of physical science.

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0012 Understand and apply fundamental concepts and principles of Earth and space science to interpret, analyze, and explain phenomena.

For example:

- Apply knowledge of the geological composition and history of the earth.
- Analyze the major features of the earth in terms of the natural processes that shape them (e.g., plate tectonics, erosion, volcanic activity).
- Demonstrate understanding of the water cycle.
- Recognize fundamental weather processes and phenomena (e.g., storms, atmospheric circulation) and factors that influence them.
- Apply knowledge of the basic components and structure of the solar system.
- Apply principles and concepts of Earth and space science to describe the composition, motions, and interactions of objects in the universe.
- Apply knowledge of how to use major processes and themes of Earth and space science (e.g., those related to weather, the water cycle, patterns of change), as well as the interconnections of Earth, space, physical, life, and environmental sciences to interpret, analyze, and explain everyday phenomena.
- Recognize interrelationships among Earth and space science, technology, and society in historical and contemporary contexts.
- Identify a wide range of instructional resources and technologies to support the learning of physical science.

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0013 Understand the principles and processes of scientific investigation and how to promote students' development of scientific knowledge and skills, including their use of scientific thinking, inquiry, reasoning, and investigation.

For example:

- Determine the type of scientific investigation (e.g., experimentation, systematic observation) that best addresses a given question or hypothesis.
- Demonstrate knowledge of considerations and procedures, including safety practices, related to designing and conducting experiments (e.g., formulation of hypothesis; use of control and experimental groups; recognition of variables being held constant, those being manipulated, and those responding in an experiment).
- Recognize how to use methods, tools, technologies, and measurement units to gather and organize data, compare and evaluate data, and describe and communicate the results of investigations in various formats.
- Recognize the values inherent in science (e.g., reliance on verifiable evidence, reasoning, logic, avoidance of bias) and strategies for helping students discover new knowledge through the use of scientific thinking and reasoning.
- Demonstrate knowledge of strategies to engage students in discovering new knowledge through the use of scientific thinking and reasoning (e.g., exploration labs, learning cycle approach).

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SUBAREA IV—SOCIAL SCIENCES

0014 Understand the structures and functions of government; the rights and responsibilities of citizenship in the United States; and the skills, knowledge, and attitudes necessary for successful participation in civic life.

For example:

- Recognize basic purposes and concepts of government, including the constitutional principles and democratic foundations of U.S. government.
- Demonstrate knowledge of the basic structures and functions of federal, state, and local government in the United States (e.g., the branches of federal government and their roles, key aspects of government in Illinois).
- Demonstrate knowledge of basic democratic principles and rights (e.g., due process, equal protection) and fundamental democratic values and beliefs (e.g., majority rule, individual participation) and their significance for individuals, groups, and society.
- Apply knowledge of the responsibilities of U.S. citizens, including classroom, school, and community applications (e.g., respecting others' rights, obeying laws and rules, voting in class elections) and the skills, knowledge, and attitudes necessary for successful participation in civic life (e.g., compromise, consensus building, cooperation).
- Recognize the role of law in the Illinois and U.S. constitutional systems.
- Identify a wide range of instructional resources and technologies to support the learning of the structures and functions of government.

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0015 Understand the interrelationships of economic and political principles, concepts, and systems and their relationship to historical and contemporary developments in Illinois, the United States, and the world.

For example:

- Demonstrate understanding of fundamental concepts and principles of economics (e.g., supply and demand) and key features of different economic systems (e.g., command, market, mixed).
- Recognize major features of the U.S. economic system, including the roles of consumers and producers and types of economic resources and activities in various regions, including Illinois.
- Recognize key features and historical developments associated with different types of political systems; the interrelationships of economic and political systems; and their relationship to historical and contemporary developments in Illinois, the United States, and the world.
- Demonstrate knowledge of the political processes and the role of political parties in the United States.
- Analyze political relationships between the United States and other nations; the role of the United States in world affairs; and global patterns of trade, exchange, and interdependence among individuals, businesses, and governments.
- Identify a wide range of instructional resources and technologies to support learning about economic and political systems.

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0016 Understand from multiple perspectives the significant eras, themes, events, and cultural developments in the history of Illinois, the United States, and the world.

For example:

- Demonstrate knowledge of significant eras, themes, events, and people in the history of Illinois, the United States, and the world.
- Analyze ways in which cultural groups have affected and been affected by U.S. society and ways in which cultural heritage and diversity have influenced historical developments in the United States.
- Analyze the influence of science, technology, economic activity, and religious and philosophical ideas on contemporary societies and societies throughout history.
- Recognize how economic, political, cultural, geographic, and social processes interact to shape patterns of human population, cooperation, and conflict.
- Demonstrate knowledge of how to use historical concepts and themes to analyze events, patterns, and relationships in Illinois, the United States, and the world.
- Identify a wide range of instructional resources and technologies to support the learning of history.

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0017 Understand major principles, concepts, and phenomena of geography and the interrelationships between people and their environment.

For example:

- Demonstrate understanding of major geographic features of Illinois, the United States, and the world and their historical and contemporary significance.
- Recognize how to use maps, globes, and other geographic tools to locate and derive information about people, places, and environments.
- Apply concepts of geography (e.g., location, movement, population, migration) to analyze contemporary and historical issues and trends.
- Recognize the connections among and common concerns of world societies (e.g., food production and distribution, human rights) and analyze the influence of these global connections and concerns on people, places, and events.
- Recognize basic concepts related to the structure and organization of human societies and processes of socialization and social interaction.
- Analyze the nature and implications of various types of interactions between people and the environment and the effects of human activities (e.g., consumption of natural resources, pollution) on the environment.
- Identify a wide range of instructional resources and technologies to support the learning of geography.

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0018 Understand concepts, skills, and processes of inquiry in the social sciences (e.g., locating, gathering, organizing, formulating hypotheses) and how to promote students' development of knowledge and skills in this area.

For example:

- Demonstrate knowledge of common themes and concepts in the social sciences (e.g., continuity, change, culture) and how to apply them in understanding people, places, and events.
- Demonstrate understanding of the basic principles and procedures of inquiry in the social sciences (e.g., modes of inquiry, formulation of research questions and hypotheses, use of historical analysis to make informed decisions).
- Apply principles and procedures for gathering, organizing, comparing, interpreting, analyzing, and summarizing social science information presented in various forms (e.g., tables, maps, graphs, narratives).
- Recognize how to use children's and young adult literature to support learning in the social sciences.
- Demonstrate knowledge of a wide range of instructional resources and technologies to support learning in the social sciences.

SUBAREA V—THE ARTS, HEALTH, AND PHYSICAL EDUCATION

0019 Understand historical, cultural, and societal contexts for the arts (visual arts, music, drama, dance) and the interrelationships among the arts.

For example:

- Demonstrate knowledge of characteristic features of various artistic traditions and the role of art in various contexts.
- Recognize the role and functions of the arts in various cultures and historical periods and ways in which the arts can be used to explore various cultures and historical periods.
- Demonstrate understanding of how music, visual art, creative drama, and dance can be used as forms of communication, self-expression, and social expression (e.g., to express ideas and values, share life experiences, explore feelings).
- Recognize and evaluate strategies and activities intended to foster skills in creating, producing, viewing, responding to, analyzing, and appreciating music, visual art, drama, and dance.
- Demonstrate knowledge of the interrelationships among the arts and the connections between the arts and other subject areas.

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0020 Understand concepts, techniques, and materials related to visual art, music, and dramatic activities and how to provide students with learning opportunities that encourage them to express themselves through the arts.

For example:

- Demonstrate knowledge of basic terms and concepts of visual art (e.g., elements of art and principles of design) and types and characteristics of materials, tools (including technology), techniques, and processes (e.g., drawing, painting, printmaking, desktop publishing) used to create and evaluate works of visual art.
- Demonstrate knowledge of common musical terms and concepts (e.g., harmony, melody, rhythm); types and characteristics of instrumental and vocal music; and techniques, activities, technology, and materials for producing, listening to, analyzing, and responding to music.
- Demonstrate knowledge of basic types of dramatic activities (e.g., creative drama, puppet theater, pantomime, improvisation); of ways in which creative drama can be used across the curriculum; and of techniques, activities, technology, and materials for creating, producing, viewing, evaluating, and responding to drama.
- Demonstrate knowledge of basic types of creative movement and dance; of ways in which creative movement and dance can be used across the curriculum; and of techniques, activities, technology, and materials for performing, viewing, evaluating, and responding to creative movement and dance.

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0021 Understand principles, concepts, and practices related to movement and physical fitness and the role of physical activity in promoting students' personal and social development.

For example:

- Demonstrate understanding of fundamental motor, body control, and perceptual awareness skills and appropriate movement activities to promote the physical development of all students.
- Apply knowledge of basic principles and concepts of physical fitness (e.g., frequency, intensity, duration of training), the components of fitness (e.g., cardiovascular endurance, flexibility, muscular strength, body composition), and practices and activities that promote lifelong fitness and stress reduction.
- Recognize skill progressions, safety practices, equipment, strategies, rules, and appropriate behaviors for individual, group, and team activities and sports.
- Analyze how physical education activities can promote the development of personal, social, and workplace skills (e.g., responsibility, leadership, team building, perseverance, confidence, cooperation, fairness).
- Demonstrate knowledge of the interactions between physical, emotional, and social well-being and the importance of movement and fitness experiences in establishing productive, lifelong habits and behaviors.
- Apply knowledge of considerations and procedures in selecting and using various activities, instructional resources, and technologies to promote students' physical development and wellness.

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0022 Understand principles and practices related to personal, family, and community health and safety and ways to provide students with knowledge and skills that will help them make sound health-related decisions.

For example:

- Apply knowledge of basic principles of nutrition and the effects of food choices on health, and the benefits of good hygiene, adequate sleep and rest, and regular physical activity.
- Demonstrate knowledge of principles and techniques of conflict resolution and its relationship to health and well being.
- Apply knowledge of principles and strategies for accident prevention and risk reduction (e.g., making healthy choices by applying communication, self-monitoring, self-control, decision-making, and safety skills).
- Demonstrate understanding of factors that affect personal, interpersonal, family, and community health (e.g., pollution, cost of health care), and the implications and consequences of health risks for individuals and society.
- Recognize the roles of various health care providers, agencies, and organizations; sources of information about children's and family services; and techniques and criteria for evaluating the reliability and validity of health information and resources.
- Apply knowledge of how to select and use various activities, instructional resources, and technologies to promote students' development of skills that contribute to health and safety.