

8710.3200 TEACHERS OF ELEMENTARY EDUCATION

FORM I-C MATRIX

Professional Education Program Evaluation Report (PEPER II)	MATRIX Form I-C												
8710.3200 Teachers of Elementary Education	Identify coding used to indicate placement or assignment of standards here: (example: K=knowledge, A= assessed, A=final assessment)												
	Insert COURSE NUMBER & ID below												
	MATH 1011	MATH 1013	ED 3221	ED 3201	ED 3202	ED 3203	ED 3222	ED 3240	ED 3301	VSAR 3600	MUS 3405	HLTH 4100	PE 4200
Subp. 3. Subject matter standards, elementary education. A candidate must complete a preparation program for licensure under subpart 2, item C, that must include the candidate's demonstration of the knowledge and skills in items A to G and in at least one of subpart 4, items A to F.													
A. A teacher of children in kindergarten through grade 6 and either preprimary children age three and above, young adolescents in grades 5 through 8, or a world language and culture in kindergarten through grade 8 must:													
(1) understand and apply the research base for and the best practices of kindergarten, elementary, and preprimary or middle level education;			A	A			A			K			
(2) understand and apply educational principles relevant to physical, social, emotional, moral, and cognitive development of young children through young adolescents;			A	K			A			K			
(3) understand and apply the concepts of "belonging" and "family connectedness" as crucial to the development of young children through young adolescents;				K				A					
(4) understand and apply the process and necessity of collaboration with families and other adults in support of the learning of young children through young adolescents;				K				A					
(5) understand how to integrate curriculum across subject areas in developmentally appropriate ways; and				A		A	K	A		K A	K A		
(6) apply the standards of effective practice in teaching students in kindergarten through grade 6 and in either preprimary or middle level through a variety of early and ongoing clinical experiences with kindergarten or primary and intermediate students and either preprimary or middle level students within a range of educational programming models.			A				K						

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B. A teacher of children in kindergarten through grade 6 must demonstrate the knowledge of fundamental concepts of communication arts and literature and the connections between them. The teacher must:													
(1) develop the skills and understanding to teach reading, writing, speaking, listening, media literacy, and literature;				K A	K A	A							
(2) understand and apply teaching methods related to the developmental stages of language;				A									
(3) use a variety of strategies to develop a student's ability to read with fluency and comprehension;				K A	K A								
(4) use a variety of developmentally appropriate techniques for augmenting the listening, speaking, reading, and writing vocabularies of children;				A		A							
(5) use a variety of appropriate strategies, techniques, and skills for developing comprehension;				K	K A								
(6) know how to integrate the communication arts;				K		A							
(7) develop children's use of a process to write competently with confidence, accuracy, and imagination appropriate to the purpose and audience;				K		A							
(8) develop children's ability to use written, spoken, and visual language to communicate effectively with a variety of audiences and for different purposes;						A							
(9) know children's and young adolescents' literature representing a variety of genre;					K A								
(10) know how to use books and other printed sources to develop children's and young adolescents' personal growth and lifelong learning;					K A								
(11) integrate the instruction of reading into all content areas; and						A							
(12) use a variety of developmentally appropriate techniques for the application of textual and technological learning experiences.				K	K A	A							
C. A teacher of children in kindergarten through grade 6 must demonstrate knowledge of fundamental concepts of mathematics and the connections between them. The teacher must know and apply:													
(1) concepts of mathematical patterns, relations, and functions, including the importance of number and geometric patterns in mathematics and the importance of the educational link between primary school activities with patterns and the later conceptual development of important ideas related to functions and be able to:													
(a) identify and justify observed patterns;	K A		K										
(b) generate patterns to demonstrate a variety of relationships; and	K A		K										
(c) relate patterns in one strand of mathematics to patterns across the discipline;	K A												

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(2) concepts and techniques of discrete mathematics and how to use them to solve problems from areas including graph theory, combinatorics, and recursion and know how to:													
(a) help students investigate situations that involve counting finite sets, calculating probabilities, tracing paths in network graphs, and analyzing iterative procedures; and	K A	K A	K										
(b) apply these ideas and methods in settings as diverse as the mathematics of finance, population dynamics, and optimal planning;	K	K A											
(3) concepts of numerical literacy:													
(a) possess number sense and be able to use numbers to quantify concepts in the students' world;	K A		K										
(b) understand a variety of computational procedures and how to use them in examining the reasonableness of the students' answers;	K A		K										
(c) understand the concepts of number theory including divisibility, factors, multiples, and prime numbers, and know how to provide a basis for exploring number relationships; and	K A		K										
(d) understand the relationships of integers and their properties that can be explored and generalized to other mathematical domains;		K A											
(4) concepts of space and shape:													
(a) understand the properties and relationships of geometric figures;		K A	K										
(b) understand geometry and measurement from both abstract and concrete perspectives and identify real world applications; and		K A	K										
(c) know how to use geometric learning tools such as geoboards, compass and straight edge, ruler and protractor, patty paper, reflection tools, spheres, and platonic solids;		K A	K										
(5) data investigations:													
(a) use a variety of conceptual and procedural tools for collecting, organizing, and reasoning about data;		K A	K										
(b) apply numerical and graphical techniques for representing and summarizing data;		K A	K										
(c) interpret and draw inferences from data and make decisions in a wide range of applied problem situations; and		K A	K										
(d) help students understand quantitative and qualitative approaches to answering questions and develop students' abilities to communicate mathematically;		K A	K										
(6) concepts of randomness and uncertainty:													
(a) probability as a way of describing chance in simple and compound events; and		K A	K										

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(b) the role of randomness and sampling in experimental studies;		K A	K										
(7) mathematical processes:													
(a) know how to reason mathematically, solve problems, and communicate mathematics effectively at different levels of formality;	K	K A	K										
(b) understand the connections among mathematical concepts and procedures, as well as their application to the real world;	K	K A	K										
(c) understand the relationship between mathematics and other fields; and		K A	K										
(d) understand and apply problem solving, reasoning, communication, and connections; and	K A		K										
(8) mathematical perspectives:													
(a) understand the history of mathematics and the interaction between different cultures and mathematics; and	K A	KA											
(b) know how to integrate technological and nontechnological tools with mathematics.	KA	K A	K										
D. A teacher of children in kindergarten through grade 6 must demonstrate knowledge of fundamental social studies concepts and the connections among them. The teacher must know and apply:													
(1) tools of inquiry and problem solving;								A					
(2) concepts of:													
(a) culture and cultural diversity;								A					
(b) the ways human beings view themselves in and over time;								A					
(c) the interaction between people, places, and environments;								A					
(d) individual development and identity;								A					
(e) interactions among individuals, groups, and institutions;								A					
(f) how people create and change structures of power and authority and of governance;								A					
(g) how people organize for the production, distribution, and consumption of goods and services and how those choices impact the environment;								A					
(h) the relationships among science, technology, and society;								A					
(i) global connections and independence; and								A					
(j) the ideals, principles, and practices that promote productive community involvement;								A					
(3) history, government, and culture of Minnesota-based American Indian tribes as integrating concepts throughout the elementary curriculum; and								A					
(4) the environment as an integrating concept through understanding of how to use the sciences, social sciences, mathematics, arts, and communications in the exploration of environmental issues and topics.								A					

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E. A teacher of children in kindergarten through grade 6 must demonstrate a fundamental knowledge of scientific perspectives, scientific connections, science in personal and social perspectives, the domains of science, and the methods and materials for teaching science and scientific inquiry. The teacher must:													
(1) understand science as a human endeavor, the nature of scientific knowledge, and the historical perspective of science;							see I-D						
(2) know and apply the understandings and abilities of scientific inquiry including the ability to:													
(a) identify questions and concepts that can be explored through scientific inquiry;							A						
(b) design and conduct scientific investigations;							A						
(c) use appropriate scientific instrumentation and equipment and mathematics as tools to improve scientific investigations and communications;							A						
(d) compare the use of multiple types of inquiry for answering questions;							A						
(e) evaluate alternative explanations and models based on evidence, current scientific understanding, and logic; and							A						
(f) communicate and defend a scientific argument;							A						
(3) know how to make connections across the domains of science, between science and technology, and between science and other school subjects;							A						
(4) use scientific understandings and abilities when making decisions about personal and societal issues;							A						
(5) know and apply the fundamental concepts and principles of physical science concerning properties of and changes in matter; position, motion, and force; light, heat, electricity, and magnetism; and kinds of and ways to transfer energy;							K						
(6) know and apply the fundamental concepts and principles of life science concerning the characteristics of organisms, the life cycle of organisms, the interrelationships of organisms and environments, structure and function in living systems, reproduction and heredity, regulation and behavior, populations and ecosystems and their interrelationships, and diversity and adaptations of organisms;							K						
(7) know and apply the fundamental concepts and principles of earth and space science concerning properties of earth materials; objects in the sky; changes in earth and sky; structure of the earth system, including hydrosphere, biosphere, atmosphere, and lithosphere; history of the earth; and earth in the solar system; and							K						

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(8) know and apply pedagogy and classroom management in science and scientific inquiry including understanding:													
(a) content standards under chapter 3501 for recommendations regarding curriculum, instruction, assessment, professional development, and program development;							A						
(b) how to teach scientific inquiry in a developmentally appropriate manner;							A						
(c) common student misconceptions in science and developmentally appropriate strategies to elicit students' misconceptions and help them move to accepted scientific understandings; and							A						
(d) how to implement safe environments for learning science through knowing:													
i. state and national legal responsibilities and safety guidelines for teaching science;							A						
ii. how to establish and enforce recognized safety procedures during the science learning experience;							A						
iii. how to use required safety equipment for classroom, field, and laboratory settings including goggles, fire extinguisher, fire blanket, eye wash, and chemical shower;							A						
iv. how to manage, maintain, and utilize science supplies and equipment;							A						
v. state and national guidelines and plan for the care, storage, use, and disposal of chemicals and equipment used to teach science;							A						
vi. the ethics of and restrictions on making and maintaining collections of scientific specimens and data; and							A						
vii. the ethics of and restrictions on the use of live organisms, and how to acquire, care, handle, and dispose of organisms.							A						
F. A teacher of children in kindergarten through grade 6 must demonstrate knowledge of fundamental physical education and health concepts and the connections among them. The teacher must:													
(1) understand the knowledge needed for providing learning experiences that encourage personal and community health promotion, disease prevention and safety, and proper nutritional choices;												A	
(2) understand strategies for reducing and preventing accidents; drug, alcohol, and tobacco use; and high-risk situations and relationships;												A	
(3) understand and apply movement concepts and principles to the learning and development of motor skills; and													A
(4) understand the knowledge needed for providing learning experiences that develop a health-enhancing level of physical fitness.													A

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G. A teacher of children in kindergarten through grade 6 must demonstrate knowledge of fundamental visual and performing arts, including music, dance, and theater, concepts and the connections among them. The teacher must:													
(1) understand the basic structural elements, principles, and vocabulary of the visual and performing arts;									A		K A		
(2) be able to perform and create using the basic elements and processes of visual and performing arts;									A	A	K A		
(3) know and apply within the elementary curriculum strategies for nurturing artistic modes of expression and thinking;									A	A	K A		
(4) understand the role of visual and performing arts in culture; and									A	A	K A		
(5) know the characteristics of children's developmental stages in the visual and performing arts.									A	A	K A		
	ED 3208	ED 4737	ENG 3540										
Subp. 4. Subject matter standards for specialty in preprimary education or middle level academic field. A candidate must complete a preparation program under subpart 2, item C, for licensure in elementary education to teach students in kindergarten through grade 6 that must include the understandings and skills in subpart 3 and a specialty in at least one area in items A to F.													
A. A teacher with a specialty for teaching communication arts and literature in grades 5 through 8 must demonstrate knowledge of fundamental concepts of the communication arts and literature and the connections among them. The teacher must:													
(1) understand the literacy needs of young adolescents encompassing the need to comprehend narrative and technical writing, the need to successfully access available databases, the need to write at an interactive level including a variety of personal formats, and the ability to interact on all cognitive levels through writing;	A		A										
(2) understand the importance of building student schema and metacognition in comprehending new information at higher levels of thinking;	A	A											
(3) possess the strategies and skills necessary to teach young adolescents how to use content area text structure as an aid to their comprehension;		A											
(4) possess the ability to use authentic assessment practices for the evaluation of young adolescents' development in literacy skills;	A												
(5) possess the strategies and skills necessary to expand the vocabulary acquisition strategies of young adolescents as they grow in their literacy behaviors; and	A	K	A										

	ED 3208	ED 4737	ENG 3540										
(6) possess the strategies and skills necessary to develop the reading and writing behaviors of young adolescents across a breadth of content areas.		A	A										
	MATH 3064	MATH 3065	MATH 3066	MATH 1013									
B. A teacher with a specialty for teaching mathematics in grades 5 through 8 must demonstrate knowledge of fundamental concepts of mathematics and the connections among them. The teacher must know and apply:													
(1) concepts of patterns, relations, and functions:													
(a) recognize, describe, and generalize patterns and build mathematical models to describe situations, solve problems, and make predictions;	K A												
(b) analyze the interaction within and among quantities and variables to model patterns of change and use appropriate representations including tables, graphs, matrices, words, algebraic expressions, and equations;		K A											
(c) represent and solve problem situations that involve variable quantities and be able to use appropriate technology;	K	K	K A										
(d) understand patterns present in number systems and apply these patterns to further investigations;	K A												
(e) apply properties of boundedness and limits to investigate problems involving sequences and series; and			K A										
(f) apply concepts of derivatives to investigate problems involving rates of change;			K A										
(2) concepts of discrete mathematics:													
(a) application of discrete models to problem situations using appropriate representations including sequences, finite graphs and trees, matrices, and arrays;		K A											
(b) application of systematic counting techniques in problem situations to include determining the existence of a solution, the number of possible solutions, and the optimal solution;		K A											
(c) application of discrete mathematics strategies including pattern searching; organization of information; sorting; case-by-case analysis; iteration and recursion; and mathematical induction to investigate, solve, and extend problems; and		K A											
(d) exploration, development, analysis, and comparison of algorithms designed to accomplish a task or solve a problem;	K A												
(3) concepts of number sense:													
(a) understand number systems; their properties; and relations including whole numbers, integers, rational numbers, real numbers, and complex numbers;	K A												
(b) possess an intuitive sense of numbers including a sense of magnitude, mental mathematics, estimation, place value, and a sense of reasonableness of results;	K A												

	MATH 3064	MATH 3065	MATH 3066	MATH 1013										
(c) possess a sense for operations, application of properties of operations, and the estimation of results;	K A													
(d) be able to translate among equivalent forms of numbers to facilitate problem solving; and	K A													
(e) be able to estimate quantities and evaluate the reasonableness of estimates;	K A													
(4) concepts of shape and space:														
(a) shapes and the ways in which shape and space can be derived and described in terms of dimension, direction, orientation, perspective, and relationships among these properties;			K A											
(b) spatial sense and the ways in which shapes can be visualized, combined, subdivided, and changed to illustrate concepts, properties, and relationships;			K A											
(c) spatial reasoning and the use of geometric models to represent, visualize, and solve problems;			K A											
(d) motion and the ways in which rotation, reflection, and translation of shapes can illustrate concepts, properties, and relationships;			K A											
(e) formal and informal argument, including the processes of making assumptions; formulating, testing, and reformulating conjectures; justifying arguments based on geometric figures; and evaluating the arguments of others;			K A											
(f) plane, solid, and coordinate geometry systems including relations between coordinate and synthetic geometry, and generalizing geometric principles from a two-dimensional system to a three-dimensional system;			K A											
(g) attributes of shapes and objects that can be measured, including length, area, volume, capacity, size of angles, weight, and mass;				K A										
(h) the structure of systems of measurement, including the development and use of measurement systems and the relationships among different systems; and				K A										
(i) measuring, estimating, and using measurements to describe and compare geometric phenomena;			K A											
(5) concepts of data investigations:														
(a) data and its power as a way to explore questions and issues;			K A											
(b) investigation through data, including formulating a problem; devising a plan to collect data; and systematically collecting, recording, and organizing data;			K A											
(c) data representation to describe data distributions, central tendency, and variance through appropriate use of graphs, tables, and summary statistics; and				K A										
(d) analysis and interpretation of data, including summarizing data; and making or evaluating arguments, predictions, recommendations, or decisions based on an analysis of the data; and			K A											
(6) concepts of randomness and uncertainty:														
(a) inference and the role of randomness and sampling in statistical claims about populations;		K A												

	MATH 3064	MATH 3065	MATH 3066	MATH 1013											
(b) probability as a way to describe chance or risk in simple and compound events;		K A													
(c) predicting outcomes based on exploration of probability through data collection, experiments, and simulations; and		K A													
(d) predicting outcomes based on theoretical probabilities and comparing mathematical expectations with experimental results.		K A													
	GEOG 2200	ECON 2000	GEOG 2100	HIST 1115	POL 1200										
C. A teacher with a specialty for teaching social studies in grades 5 through 8 must demonstrate knowledge of fundamental concepts of the social studies disciplines and the connections among them. The teacher must know and apply:															
(1) concepts of the ways human beings view themselves in and over time:															
(a) that different historians may describe the same event or situation in different ways;				A											
(b) key concepts including chronology, causality, change, conflict, and complexity to explain, analyze, and show connections among patterns of historical change and continuity;				A											
(c) processes important to reconstructing and reinterpreting the past;				A											
(d) that historical perspectives are influenced by individual experiences, societal values, and critical traditions; and				A											
(e) how to use knowledge of facts and concepts drawn from history, along with methods of historical inquiry, to inform and evaluate actions concerning public policy issues;				A											
(2) concepts of people, places, and environments:															
(a) how to map information in a spatial context and interpret the maps;			A												
(b) land forms and geographic features;			A												
(c) physical system changes, including seasons, climate and weather, and the water cycle, and identify geographic patterns associated with them;			A												
(d) physical and cultural patterns and their interactions, including land use, settlement patterns, cultural transmission of customs and ideas, and ecosystem changes; and			A												
(e) how historical events have been influenced by, and have influenced, physical and human geographic factors in local, regional, national, and global settings;			A												
(3) concepts of how people organize for the production, distribution, and consumption of goods and services:															
(a) how economic systems structure the production and distribution of goods and services;		A													
(b) the costs and benefits to society of allocating goods and services through private and public sectors;		A													

(c) a range of various institutions that make up economic systems, for example households, business firms, banks, and corporations;		A												
(d) how values and beliefs influence different economic decisions; and		A												
(e) how to use economic reasoning to compare different proposals for dealing with contemporary social issues;		A												
(4) concepts of ideals, principles, and practices of citizenship in a democratic republic:														
(a) the purpose of government and how its powers are acquired, used, and justified;						A								
(b) the basic features of the political system in the United States;						A								
(c) the key ideals of the democratic republican form of government;						A								
(d) the process for becoming a citizen and the rights and responsibilities of citizenship;						A								
(e) how to locate, access, analyze, organize, and apply information about selected public issues;						A								
(f) diverse forms of public opinion and the influence that various forms of citizen action have on public policy development and decision making; and						A								
(g) how various forms of citizen action can strengthen the common good; and						A								
(5) relationships among science, technology, and society:														
(a) how science and technology have changed people's perceptions of the social and natural world;	A													
(b) ways in which values, beliefs, and attitudes are influenced by new scientific and technological knowledge;						A								
(c) the need for laws and policies to govern scientific and technological applications; and						A								
(d) the need to seek reasonable and ethical solutions to problems that arise when scientific advancements and social norms or values come into conflict.						A								
D. A teacher of elementary education with a specialty in science for grades 5 through 8 must meet the standards in part 8710.4750, subpart 3. (You may use the General Science I-C Matrix 8710.4750 subpart 3 only)														
E. A teacher of elementary education with a specialty for teaching a world language and culture in kindergarten through grade 8 must meet the standards for licensure of Teachers of World Languages and Cultures in part 8710.4950, subpart 2, item A. You may use the Language Matrix I-C 8710.4850 subpart 2 item A)														
F. A teacher of elementary education selecting a specialty in preprimary education valid for teaching preprimary students age three and above must meet the standards in part 8710.3000, subpart 3, items A, C, E, F, and G. (You may use the ECE Matrix I-C 8710.3000 subparts A, C, E, F, and G.)														