

8710.4850 TEACHERS OF TECHNOLOGY.

Subpart 1. **Scope of practice.** A teacher of technology is authorized to provide to students in grades 5 through 12 instruction that is designed to provide an understanding of the continually developing technological world using as its context the areas of transportation, construction, power and energy, communications, manufacturing, biotechnology, and other contemporary and emerging technologies to include orienting students to careers in these and other technological areas. The instruction focuses on teaching students how to extend human capability with products or processes using the technological method through providing them with experiences for creating a system that integrates equipment, machines, tools, software, hardware, and other technological devices to complete a task; how to adapt to technological changes in all aspects of their lives including home, leisure, and work; and how to assess the impact of technology from an environmental, social, economic, cultural, historical, and ethical perspective.

Subp. 2. **Licensure requirements.** A candidate for licensure to teach technology to students in grades 5 through 12 shall:

A. hold a baccalaureate degree from a college or university that is regionally accredited by the association for the accreditation of colleges and secondary schools;

B. demonstrate the standards for effective practice for licensing of beginning teachers in part 8710.2000; and

C. show verification of completing a Board of Teaching preparation program approved under part 8700.7600 leading to the licensure of teachers of technology in subpart 3.

Subp. 3. **Subject matter standard.** A candidate for licensure as a teacher of technology must complete a preparation program under subpart 2, item C, that must include the candidate's demonstration of the knowledge and skills in items A to D.

A. A teacher of technology understands central concepts common to technology content. The teacher must understand:

(1) the technological method including defining the problem, researching, identifying possible solutions, analysis, implementation, and evaluation and how to apply it;

(2) how to identify, classify, and organize content within the following technological bodies of knowledge:

(a) communications technology including:

i. graphic and electronic forms of communications;

- ii. the processes of designing, drafting, photographing, printing, technical writing, and computer-based communication; and
 - iii. communication systems such as data processing, programming, recording and playing, and transmitting and receiving information;
- (b) construction technology including:
- i. the fields of residential, commercial, and civil construction; and
 - ii. construction systems, including wood, concrete, steel, composites, electrical, mechanical, and site development;
- (c) manufacturing technology including:
- i. custom, intermittent, and continuous types of manufacturing;
 - ii. manufacturing processes relating to materials used and the processes of forming, separating, combining, measuring, and finishing; and
 - iii. manufacturing systems such as research and development, automation, material handling, and quality control;
- (d) energy and power technology including:
- i. radiant, chemical, thermal, mechanical, electrical, and nuclear forms of energy;
 - ii. methods of extracting, conserving, measuring, controlling, converting, transmitting, and storing energy;
 - iii. fossil fuel, solar, nuclear, electrical, fluid, and renewable energy resources; and
 - iv. converting, measuring, altering and controlling mechanical power systems;
- (e) transportation technology including:
- i. terrestrial, marine, atmospheric, and space modes of transportation; and
 - ii. propulsion, suspension, guidance, control, support, and structural systems of transportation;
- (f) biotechnology including:
- i. plant, animal, and machine applications of biotechnology and biotechnology processes for propagating, growing, maintaining, harvesting, adapting, treating, and converting; and

ii. human factors, engineering, health care, cultivation of plants and animals, fuel and chemical production, waste management and treatment, and biomaterials; and

(g) management of technologically related resources including the resources of time, capital, energy, tools, materials, information, and people needed to use biotechnology, communication, construction, manufacturing, energy and power, and transportation technology;

(3) how technological elements, components, and devices function in micro and macro systems including input, process, output, and feedback, and why systems interact or behave as they do;

(4) historical, sociological, ethical, environmental, and economic impacts of technology; and

(5) current and emerging technological careers, the importance of possessing lifelong learning values, workplace skills, and an understanding of the developmental career process as gained through employment, internship, mentorship, job shadowing, or apprenticeship.

B. A teacher of technology understands central concepts common to the teaching and learning of technology education content. The teacher must understand:

(1) the definition, philosophy, and rationale of technology education;

(2) technological issues and problems for teaching decision-making, critical thinking, and problem-solving skills;

(3) how to use tools, equipment, materials, and processes in technology education learning environments safely; and

(4) laboratory oriented instructional skills necessary for modeling technological expertise including craftsmanship, visualization skills, spatial relationships, mechanical aptitude, and design principles.

C. A teacher of technology must demonstrate an understanding of the teaching of technology that integrates understanding of technology with the understanding of pedagogy, students, learning, classroom management, and professional development. The teacher of technology to preadolescent and adolescent students must:

(1) understand and apply educational principles relevant to the physical, social, emotional, moral, and cognitive development of preadolescents and adolescents;

(2) understand and apply the research base for and the best practices of middle and high school education;

(3) develop curriculum goals and purposes based on the central concepts of technology and know how to apply instructional strategies and materials for achieving student understanding of technology;

(4) understand the role and alignment of district, school, and department mission and goals in program planning;

(5) understand the need for and how to connect students' schooling experiences with everyday life, the workplace, and further educational opportunities;

(6) know how to involve representatives of business, industry, and community organizations as active partners in creating educational opportunities;

(7) understand the role and purpose of cocurricular and extracurricular activities in the teaching and learning process; and

(8) apply the standards of effective practice in teaching students through a variety of early and ongoing clinical experiences with middle level and high school students within a range of educational programming models.

D. A teacher of technology must understand the content and methods for teaching reading including:

(1) knowledge of reading processes and instruction including:

(a) the relationship between word recognition and vocabulary knowledge, fluency, and comprehension in understanding text and content materials;

(b) the importance of direct and indirect vocabulary instruction that leads to enhanced general and domain-specific word knowledge;

(c) the relationships between and among comprehension processes related to print processing abilities, motivation, reader's interest, background knowledge, cognitive abilities, knowledge of academic discourse, and print and digital text; and

(d) the development of academic language and its impact on learning and school success;

(2) the ability to use a wide range of instructional practices, approaches, methods, and curriculum materials to support reading instruction including:

(a) the appropriate applications of a variety of instructional frameworks that are effective in meeting the needs of readers of varying proficiency levels and linguistic backgrounds;

(b) the ability to scaffold instruction for students who experience comprehension difficulties;

(c) the ability to develop and implement effective vocabulary strategies that help students understand words including domain-specific content words;

(d) the ability to identify instructional practices, approaches, and methods and match materials, print and digital, to the cognitive levels of all readers, guided by an evidence-based rationale, which support the developmental, cultural, and linguistic differences of readers; and

(3) the ability to use technology for ongoing assessment, both of learning and for learning, and the evaluation of the use of information and communication technologies and digital resources.

Subp. 4. **Continuing license.** A continuing license shall be issued and renewed according to the rules of the Board of Teaching governing continuing licensure.

Subp. 5. **Effective date.** Requirements in this part for licensure as a teacher of technology are effective on September 1, 2010, and thereafter.

Statutory Authority: *MS s 122A.09; 122A.18*

History: *23 SR 1928; 34 SR 595*

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