

Readopt with amendment Ed 507.32, effective 10-16-09 (Doc #9566), to read as follows:

Ed 507.32 Chemistry Teacher For Grades 7-12.

(a) To be certified as a chemistry teacher for grades 7-12, the candidate shall:

- (1) Meet the qualifications for certification as a science teacher as provided in Ed 507.29;
- (2) Meet the qualifications for certification as a physical science teacher as provided in Ed 507.51; and
- (3) Meet the requirements of (c) below.

(b) For candidates seeking certification under an alternative 3, 4, or 5 pathway, the department of education shall assess the skills, competencies and knowledge of these candidates for certification as chemistry teachers by reviewing evidence, such as, but not limited to, college course work, documented professional experience, letters of recommendation, professional development hours or CEUs, and artifacts of professional practice.

(c) A candidate for certification as a chemistry teacher for grades 7-12 shall have skills, competencies, and knowledge in the following areas:

(1) In the area of fundamental content knowledge, the candidate shall have the ability to:

a. Explain concepts, solve problems, and perform laboratory techniques that explore and develop an understanding and application of the following fundamental areas of chemistry:

1. Structure and properties of matter, including, but not limited to:

- (i) Bonding and intermolecular forces;
- (ii) Relationship between molecular structure and the function of designed materials;
- (iii) Chemical engineering;
- (iv) Coordination complexes;
- (v) Molecular orbital theory;
- (vi) Organic chemistry and functional groups in biochemistry, biological compounds and natural products; and
- (vii) Gas laws;

2. Chemical reactions and energy, including, but not limited to:

- (i) Reaction thermodynamics including exothermic and endothermic reactions, entropy, and Gibbs free energy;

- (ii) Product prediction in chemical reactions, based on patterns of chemical properties;
 - (iii) Complex reaction dynamics, including kinetics and equilibrium;
 - (iv) Mathematics of reactions, including mole concept, stoichiometry, and laws of composition and conservation, and aqueous equilibria from acid/base systems to solubility;
 - (v) Application of electrochemistry and oxidation/reduction (REDOX) reactions;
 - (vi) Energy in chemical processes;
 - (vii) Wave-particle duality of nature, including the relationship between frequency, wavelength, and speed; and
 - (viii) Changes in matter due to the absorption of electromagnetic radiation;
3. Nuclear and environmental processes, including, but not limited to:
- (i) Environmental and atmospheric chemistry, including ground water pollution, plastics, and disposal of fuels; and
 - (ii) Applications of chemistry in community health and environmental quality; and
4. Engineering design processes, including, but not limited to:
- (i) Analyze a major global challenge to specify qualitative and quantitative criteria and constraints to solutions;
 - (ii) Design a solution to a complex real-world problem accounting for constraints, cost, safety, reliability, and social, cultural, and environmental impacts; and
 - (iii) Use a computer simulation to model the impact of proposed solutions to a complex real-world problem;
- b. Apply knowledge of chemistry and physical science concepts through full and partial inquiries, laboratory investigations, and the use of scientific models; and
- c. Understand and be able to apply mathematical concepts and techniques including, but not limited to, modeling and variable analysis at least through the level of college calculus and statistics.

Readopt with amendment Ed 612.26, effective 10-16-09 (Doc #9566), to read as follows:

Ed 612.26 Chemistry For Grades 7-12. In addition to meeting the program requirements under Ed 612.23, the chemistry program for grades 7-12 shall provide the teaching candidate

with the skills, competencies and knowledge gained through a combination of academic and supervised practical experience as outlined in Ed 507.32(c).

Appendix I

RULE	STATUTE
Ed 507.32	RSA 186:8, III- IV, RSA 186:11,X(a)
Ed 612.26	RSA 186:8, IV; RSA 186:11, X(c)