

## Chemistry for Grades 7-12 (Ed 612.26) Self-Assessment Worksheet

### Ed 612.26 Chemistry for Grades 7-12.

**Directions:** This matrix worksheet should be completed by the program. It should contain information that serves as an index or guide for the reviewers as they review all evidence provided. Evidence referenced on this worksheet should be clearly marked according to the standards. The same piece of evidence may meet more than one standard. Please reference specific parts of evidence whenever possible, particularly for large pieces of evidence.

Ed 612.26 <u>Chemistry for Grades 7-12</u>  INSTITUTION NAME: _____ _____	DESCRIPTION OF HOW THE PROGRAM ADDRESSSES THE STANDARD. INDICATE THE RELATIONSHIP TO ED 610.02 PROFESSIONAL EDUCATION STANDARDS, IF ANY.	DESCRIPTION OF THE ASSESSMENT SYSTEM USED TO PROVIDE EVIDENCE AND DATA AND TO INFORM CONTINUOUS IMPROVEMENT.	COMPLETED BY: INITIALS AND DATE]
(a) A teacher preparation program in chemistry for grades 7-12 shall meet the science program general requirements of Ed 507.29(c).			
(b) A teacher preparation program in chemistry for grades 7-12 shall meet the physical science program requirements of Ed 507.51(c).			
(c) 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 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;			

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(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			

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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;			

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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.			