Crosswalk: Previous versus New Chemistry 6-12 Standards

General Information about this Revision:

» The structure has changed to include Professional Skills indicators rather than the previous Performance indicators
» The previous standards only had indicators in each standard while the new standards are broken down by Functions and then have the two types of indicators within each Function
» Overall focus of standards on teaching and learning strategies in addition to overall content knowledge

Standard [1] Content Pedagogy

PREVIOUS STANDARDS	NEW STANDARDS	WHAT CHANGED?
Standard #4: The teacher of chemistry demonstrates an understanding of the nature of inquiry and the ability necessary to help students do scientific inquiry. **Standard #7: The teacher of chemistry demonstrates an understanding of the concepts and processes unifying science domains.** **Standard #9: The teacher of chemistry enacts a science curriculum that integrates content within the sciences and among other disciplines.**	**Effective science teachers understand how students learn and develop science concepts and practices. They incorporate disciplinary core ideas, scientific and engineering practices, and crosscutting concepts into instruction.**	**Additions to:** Content Knowledge indicators: ● Designing and conducting inquiry-based open-ended science investigations ● Learning is influenced by cultural and environmental differences ● Understanding of the age-appropriate needs and practices of students and diverse learning styles ● Understanding of formative and summative assessment strategies Professional Skills indicators: ● Lessons demonstrate knowledge of the practices of science and engineering ● Lessons involve student collection and interpretation of data, communication of concepts, and applications of science-specific technology ● Information about student's culture is used to understand development and learning ● Able to identify common misconceptions and naïve understandings; designs appropriate instruction to address these

Standard [2] Learning Environment

PREVIOUS STANDARDS	NEW STANDARDS	WHAT CHANGED?
Standard #6 The teacher of chemistry demonstrates an understanding of science as a human endeavor, of the nature of science, and of science from historical perspectives. **Standard #8 The teacher of chemistry demonstrates an understanding of and an ability to teach science effectively.** **Standard #10: The teacher of chemistry understands how to relate science to the daily lives and interests of students and to a larger framework of human endeavor and understanding.**	**Teachers work with students and others to create and manage environments that support learning.**	**Additions to:** <u>Content Knowledge indicators</u>: ● Understands rigor, respect, and responsibility ● Understands the influence of teacher feedback ● Understands how learner diversity can affect communication ● Understands how learning occurs and how to use instructional strategies that promote learning ● Understands relationships among motivation, engagement, and self-efficacy <u>Professional Skills indicators</u>: ● Sets and articulates appropriate goals ● Manages environment to make learning experiences appropriately challenging ● Plans fair and equitable assessment strategies ● Promotes celebration of learning ● Communicates verbally and nonverbally in ways that demonstrate respect for and responsiveness to multiple perspectives ● Helps learners work productively and cooperatively ● Develops plans that reflect the nature and social context of science and inquiry ● Uses a variety of strategies and selects appropriate teaching and learning activities

Standard [3] Safety

PREVIOUS STANDARDS	NEW STANDARDS	WHAT CHANGED?
Standard #12: The teacher of chemistry designs and manages safe and supportive learning environments.	**Effective teachers of science demonstrate and implement safety procedures, material safety practices, and the ethical treatment**	**Additions to:** <u>Content Knowledge indicators</u>: ● Understands safety considerations affecting the purchase, storage, maintenance, and disposal of material

	and use of living organisms (appropriate to their area of licensure).	• Understands proper techniques and precautions for controlling access to materials • Understands how developmental levels affect safety in classroom, laboratory, and field environments Professional Skills indicators: • Designs and implements activities that demonstrate ethical decision-making with respect to the treatment of living organisms in and out of the classroom

Standard [4] Impact on Student Learning

PREVIOUS STANDARDS	NEW STANDARDS	WHAT CHANGED?
Standard #7: The teacher of chemistry demonstrates an understanding of the concepts and processes unifying science domains. **Standard #8 The teacher of chemistry demonstrates an understanding of and an ability to teach science effectively.** **Standard #10: The teacher of chemistry understands how to relate science to the daily lives and interests of students and to a larger framework of human endeavor and understanding.**	**Science teachers provide evidence that students' understanding of disciplinary core ideas, science and engineering practices, and crosscutting concepts have increased in sophistication as a result of instruction. Candidates provide evidence representative of the entire population they teach.**	**Additions to:** Content Knowledge indicators: • Critically analyzes the quality of evidence supporting scientific claims Professional Skills indicators: • Demonstrates that students are able to critically analyze the quality of evidence supporting scientific claims • Demonstrates that students are able to understand the distinction between science and nonscience • Reflects on formative and summative assessments, and adjusts instruction appropriately

Standard [5] Professional Knowledge and Skills

PREVIOUS STANDARDS	NEW STANDARDS	WHAT CHANGED?
Standard #13: The teacher of chemistry improves teaching through ongoing professional practice.	**Effective science teachers are aware of and engage in professional development opportunities to continually improve their knowledge and understanding of science**	**Additions to:** Professional Skills indicators:

	content and pedagogy. They conduct themselves as part of the science education community.	● Engages in professional development opportunities such as conferences, research opportunities, projects within the community, and/or social media

Standard [6] Engineering, Technology, and the Applications of Science

PREVIOUS STANDARDS	NEW STANDARDS	WHAT CHANGED?
Standard #5: The teacher of chemistry demonstrates an understanding of the basic relationships between science and technology. **Standard #11: The teacher of chemistry assesses students' educational progress through a variety of methods.**	**The teacher demonstrates an understanding of concepts and practices of engineering, technology, and the applications of science in developing instruction for students.**	**Additions to:** Content Knowledge indicators: ● Understands the interdependence and influence of science, engineering, and technology ● Defines and delimits engineering problems with precision, and specifies intended goals Professional Skills indicators: ● Develops and implements lessons in which students use engineering design principles in applications appropriate to their content area ● Incorporates into instructions examples of the interdependence and influences of science, engineering, and technology on society and the environment

Standard [7] Structure and Properties of Matter

PREVIOUS STANDARDS	NEW STANDARDS	WHAT CHANGED?
Standard #1 The teacher of chemistry demonstrates an understanding of the core theories, laws, principles, and concepts concerning the structure of matter. **Standard #2 The teacher of chemistry demonstrates an understanding of the core theories, laws, principles, and concepts concerning the states and properties of matter.**	**Effective teachers understand the structure of matter on the atomic and macroscopic levels, and the relationship between structure and properties of matter, engaging students in using the periodic table as a model to predict the properties of elements based on the patterns of valence electrons as well as facilitating student investigations to gather evidence to compare trends in the periodic table and knowledge of the patterns of chemical properties.**	**Additions to:** Content Knowledge indicators: ● Understands the core concepts of organic molecules but decreases focus on the structure, properties, and characteristic reactions as well as stereoisomerism and its applications to organic molecules Professional Skills indicators: ● Engages students in investigating the structure of matter, demonstrating atomic theory and periodic trends ● Engages students in constructing and describing models using VSEPR theory

Standard [8] Matter and Its Interactions		
PREVIOUS STANDARDS	**NEW STANDARDS**	**WHAT CHANGED?**
Standard #2 The teacher of chemistry demonstrates an understanding of the core theories, laws, principles, and concepts concerning the states and properties of matter. **Standard #3 The teacher of chemistry demonstrates an understanding of the theories, laws, principles, and concepts concerning chemical reactions.**	**Effective teachers will engage students in developing models that illustrate the release or absorption of energy from a chemical reaction system as well as investigating reaction rates and equilibrium states.**	**Additions to:** Professional Skills indicators: ● Engages students in investigating colligative properties and applying kinetic theory in laboratory situations ● Engages students in identifying different chemical reactions based on experimentation (including acid-base, combustion, precipitation, and oxidation-reduction) ● Engages students in writing balanced molecular, ionic and net ionic equations