

## Crosswalk: Previous versus New BIOLOGY (6-12) Program Standards

### General Information about this Revision:

- » Revisions include alignment with recent editions of the NSTA (National Science Teacher Association) Preservice Science Standards, the InTASC (Interstate Teacher Assessment and Support Consortium) teaching standards and the Next Generation Science Standards (NGSS).
- » Whereas the previous Biology (6-12) Teacher Licensure Standards began with biology-specific content understanding (1-8) followed by science teaching knowledge and skills (9-18), the revised standards begin with science teaching knowledge and skills (1-6) aligned with the NSTA Preservice Science Standards, followed by four biology-specific content understanding standards (7-10) aligned with disciplinary core ideas in the NGSS.
- » The total number of standards was reduced to enhance standards alignment with assessment tools.

### Standard 1

PREVIOUS STANDARDS	NEW STANDARDS	WHAT CHANGED?
<p><b>9:</b> The teacher of biology demonstrates an understanding of the nature of inquiry and the ability necessary to help students do scientific inquiry.</p> <p><b>10:</b> The teacher of biology demonstrates an understanding of the basic relationships between science and technology.</p> <p><b>11:</b> The teacher of biology demonstrates an understanding of science as a human endeavor, of the nature of science, and of science from historical perspectives.</p> <p><b>12:</b> The teacher of biology demonstrates an understanding of the concepts and processes unifying science domains.</p> <p><b>13:</b> The teacher of biology demonstrates an understanding of and an ability to teach science effectively.</p> <p><b>15:</b> The teacher of biology understands how to relate science to the daily lives and interests</p>	<p><b>1: <u>Content Pedagogy:</u></b> Effective science teachers understand how students learn and develop science and engineering concepts and practices. They incorporate disciplinary core ideas, scientific and engineering practices, and crosscutting concepts into instruction.</p>	<p><b>Content pedagogy involves a variety of skills and breadth of knowledge, aligned with multiple standards in the previous draft. Key items include science inquiry, the relationships between science and technology, science as a human endeavor (the history and nature of science), and connections to students' daily lives.</b></p>

of students and to a larger framework of human endeavor and understanding.		
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## Standard 2

PREVIOUS STANDARDS	NEW STANDARDS	WHAT CHANGED?
<p><b>9:</b> The teacher of biology demonstrates an understanding of the nature of inquiry and the ability necessary to help students do scientific inquiry.</p> <p><b>10:</b> The teacher of biology demonstrates an understanding of the basic relationships between science and technology.</p> <p><b>13:</b> The teacher of biology demonstrates an understanding of and an ability to teach science effectively.</p> <p><b>17:</b> The teacher of biology designs and manages safe and supportive learning environments.</p>	<p><b>2: <u>Learning Environments</u>:</b> Teachers work with students and others to create and manage environments that support learning.</p>	<p><b>Designing effective learning environments requires understanding of science inquiry and the relationships between science and technology, and establishing a safe climate in which students can learn science.</b></p>

## Standard 3

PREVIOUS STANDARDS	NEW STANDARDS	WHAT CHANGED?
<p><b>9:</b> The teacher of biology demonstrates an understanding of the nature of inquiry and the ability necessary to help students do scientific inquiry.</p> <p><b>13:</b> The teacher of biology demonstrates an understanding of and an ability to teach science effectively.</p> <p><b>17:</b> The teacher of biology designs and manages safe and supportive learning environments.</p>	<p><b>3: <u>Safety</u>:</b> Effective teachers of science demonstrate and implement safety procedures, material safety practices, and the ethical treatment and use of living organisms (appropriate to their area of licensure).</p>	<p><b>Safety must be considered when teaching through science inquiry. A safe science learning setting includes both general classroom practices as well as science-specific laboratory protocol.</b></p>

## Standard 4

PREVIOUS STANDARDS	NEW STANDARDS	WHAT CHANGED?
<p><b>9:</b> The teacher of biology demonstrates an understanding of the nature of inquiry and the ability necessary to help students do scientific inquiry.</p> <p><b>13:</b> The teacher of biology demonstrates an understanding of and an ability to teach science effectively.</p> <p><b>15:</b> The teacher of biology understands how to relate science to the daily lives and interests of students and to a larger framework of human endeavor and understanding.</p> <p><b>16:</b> The teacher of biology assesses students' educational progress through a variety of methods.</p>	<p>4: <u>Impact on Student Learning</u>: 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.</p>	<p><b>Securing evidence of student learning arises through a variety of assessment methods, effective instruction through science inquiry as well as promotion of relationships to students' daily lives.</b></p>

## Standard 5

PREVIOUS STANDARDS	NEW STANDARDS	WHAT CHANGED?
<p><b>13:</b> The teacher of biology demonstrates an understanding of and an ability to teach science effectively.</p> <p><b>14:</b> The teacher of biology enacts a science curriculum that integrates content within the sciences and among other disciplines.</p> <p><b>18:</b> The teacher of biology improves teaching through ongoing professional practice.</p>	<p>5: <u>Professional Knowledge and Skills</u>: Effective science teachers are aware of and engage in professional development opportunities to continually improve their knowledge and understanding of science content and pedagogy. They conduct themselves as part of the science education community.</p>	<p><b>Effective teachers grow in effectiveness through ongoing review and professional development, as well as connecting science content to other disciplines.</b></p>

## Standard 6

PREVIOUS STANDARDS	NEW STANDARDS	WHAT CHANGED?
<p><b>10:</b> The teacher of biology demonstrates an understanding of the basic relationships between science and technology.</p>	<p>6: <u>Engineering, Technology, and the Applications of Science</u>: The teacher demonstrates an understanding of concepts and practices of engineering, technology, and</p>	<p><b>Integrating science with engineering practices and knowledge involves an understanding of the relationship between science and technology, integration with other</b></p>

<p><b>14:</b> The teacher of biology enacts a science curriculum that integrates content within the sciences and among other disciplines.</p> <p><b>15:</b> The teacher of biology understands how to relate science to the daily lives and interests of students and to a larger framework of human endeavor and understanding.</p>	<p>the applications of science that can be used in developing instruction for students.</p>	<p><b>disciplines, and connections to students’ daily lives and science as a human endeavor.</b></p>
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## Standard 7

PREVIOUS STANDARDS	NEW STANDARDS	WHAT CHANGED?
<p><b>1:</b> The teacher of biology demonstrates an understanding of the structure and function of cells.</p> <p><b>6:</b> The teacher of biology demonstrates an understanding of the structure, function, and diversity of organisms.</p> <p><b>7:</b> The teacher of biology demonstrates an understanding of the overall functioning of human systems and their interaction with the environment relative to specific mechanisms and processes related to health issues and human sexuality.</p>	<p><b>7: <u>From molecules to organisms: Structures and processes:</u></b> Effective biology teachers demonstrate an understanding of how organisms live and grow.</p>	<p><b>An understanding of the structures and processes in life science includes molecular, cellular, and systems structures and processes of organisms.</b></p>

## Standard 8

PREVIOUS STANDARDS	NEW STANDARDS	WHAT CHANGED?
<p><b>4:</b> The teacher of biology demonstrates an understanding of the interdependence of organisms and their interaction with the physical environment including energy flow, nutrient cycling, and population dynamics.</p>	<p><b>8: <u>Ecosystems: Interactions, energy, and dynamics:</u></b> Effective biology teachers demonstrate an understanding of how and why do organisms interact with their environment, and what are the effects of these interactions</p>	<p><b>Understanding the interactions of organisms in their environment involves the interdependence of various organisms and environmental factors, the flow of energy and nutrient cycling, behaviors, and population dynamics.</b></p>

<p><b>5:</b> The teacher of biology demonstrates an understanding of the basic behavior of animals.</p> <p><b>8:</b> The teacher of biology demonstrates an understanding of population growth.</p>		
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## Standard 9

PREVIOUS STANDARDS	NEW STANDARDS	WHAT CHANGED?
<p><b>2:</b> The teacher of biology demonstrates an understanding of chromosomes, genes, and the molecular basis of heredity.</p> <p><b>7:</b> The teacher of biology demonstrates an understanding of the overall functioning of human systems and their interaction with the environment relative to specific mechanisms and processes related to health issues and human sexuality.</p>	<p><b>9: <u>Genetics and Heredity:</u></b> Effective biology teachers demonstrate an understanding of how characteristics of one generation passed to the next and how individuals of the same species and even siblings have different characteristics.</p>	<p><b>Understanding genetics and heredity includes molecular structures and processes and other reproductive systems.</b></p>

## Standard 10

PREVIOUS STANDARDS	NEW STANDARDS	WHAT CHANGED?
<p><b>3:</b> The teacher of biology demonstrates an understanding of major concepts of biological evolution.</p> <p><b>6:</b> The teacher of biology demonstrates an understanding of the structure, function, and diversity of organisms.</p>	<p><b>10: <u>Biological Evolution: Unity and diversity:</u></b> Effective biology teachers demonstrate an understanding of evolution and evidence shows that different species are related.</p>	<p><b>An evolutionary model provides a framework from which teachers and students can investigate unifying principles of living things as well as diverse features and functions.</b></p>

\* **References and Resources:**

Achieve, Inc. (2015). The next generation science standards (NGSS). Available at <http://www.nextgenscience.org/next-generation-science-standards>.

Council of Chief State School Officers. (2015). The interstate teacher assessment and support consortium (InTASC). Available at [http://www.ccsso.org/resources/programs/interstate\\_teacher\\_assessment\\_consortium\\_\(intasc\).html](http://www.ccsso.org/resources/programs/interstate_teacher_assessment_consortium_(intasc).html).

National Research Council (2011). A framework for K-12 science education: Practices, crosscutting concepts, and core ideas. Available at [http://sites.nationalacademies.org/dbasse/bose/framework\\_k12\\_science/index.htm](http://sites.nationalacademies.org/dbasse/bose/framework_k12_science/index.htm).

National Science Teachers Association. (2012). Preservice science standards. Available at <http://www.nsta.org/preservice/docs/2012NSTAPreserviceScienceStandards.pdf>.