Introduction to Indiana's Academic Standards for Science – 2016

Indiana's Academic Standards for Science were last revised in 2010. This new document, Indiana's Academic Standards for Science – 2016, reflects the ever-changing science content and the underlying premise that science education should be an inquiry-based, hands-on experience. These standards were adopted by the Indiana State Board of Education in April, 2016. Implementation of the 2016 standards will be blended with the 2010 standards for the 2016-2017 school year with full implementation of the 2016 standards in the 2017-2018 school year.
The Indiana Academic Standards for Science focus on the following topics; physical science; earth and space science; life science; and content-area literacy. For K-8, there are computer science and engineering standards.

Evaluation Process

The Evaluation Committees were composed of K-12 educators who represented a wide variety of Indiana's school corporations. The committees also included representatives from businesses and higher education subject matter experts representing Indiana's higher education public and private institutions. The standards drafts were posted for public feedback in the fall of 2015 and spring of 2016. The standards are a product of the Evaluation Committees' hard work and expertise.

What are Indiana Academic Standards for Science - 2016?

The Indiana Academic Standards for Science - 2016 are designed to help educators, parents, students, and community members understand what students need to know and be able to do at each grade level within each content strand. The Indiana Academic Standards for Content Area Literacy (Science/Technical Subjects) that were adopted in 2014 demonstrate Indiana's commitment to content area literacy within science at the 6-12 grade levels.

What are the Indiana Academic Standards for Science- 2016 NOT?

1). *The standards are not curriculum.*

While the standards may be used as the basis for curriculum, **the *Indiana Academic Standards for Science are not a curriculum.*** Therefore, identifying the sequence of instruction at each grade—what will be taught and for how long—requires concerted effort and attention at the corporation and school levels. While the standards may have examples/strategies embedded, and resource materials may include guidelines and suggestions, the standards do not prescribe any particular curriculum and it is encouraged to seek out strategies that best meet the needs of the individual educator's classroom. Curriculum is locally determined by a corporation or school and is a prescribed learning plan toward educational goals. Curriculum encompasses tools and instructional materials, including textbooks which are selected by the corporation or school and adopted through the local school board.

2). *The standards are not instructional practices.*

While the standards demonstrate what Hoosier students should know and be able to do, the standards are not instructional practices. The educators and subject matter experts who worked on

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the standards have taken care to ensure that the standards are free from embedded pedagogy. ***The standards do not define how teachers should teach.*** The standards must be complemented by well-developed, aligned, and appropriate curricular materials, as well as robust and effective instructional best practices.

3). *The standards may not address students who are far below or far above grade-level.*

The standards are designed to show what an on grade level Hoosier student should know and be able to do. However, some students may be far below grade level or in need of special education, and other students may be far above grade level. The standards do not provide differentiation or intervention methods necessary to support and meet the needs of these students. It is up to the district, school, and educators to determine the best and most effective mechanisms of standards delivery for these students.

Science and Engineering Process Standards (SEPS)

The Science and Engineering Process Standards are the processes and skills that students are expected to learn and be able to do within the context of the science content. The separation of the Science and Engineering Process Standards from the Content Standards is intentional; the separation of the standards explicitly shows that what students are doing while learning science is extremely important. The Process Standards reflect the way in which students are learning and doing science and are designed to work in tandem with the science content, resulting in robust instructional practice. These Science and Engineering Process Standards are intended to develop scientific thinking and experimentation through all grade levels. The Science and Engineering Process Standards are designed to service students in grades K-12. Teachers will provide ability level, age appropriate, developmentally appropriate activities, labs, and experiences. The implementation of Science and Engineering Process Standards should be integrated with the Content Standards and Science/Technical Studies Content Area Literacy Standards (6-12).

Science/Technical Studies Content Area Literacy Standards (LST)

In grades 6 through 12, Reading for Literacy in Science and Writing for Literacy in Science have been added to emphasize these processes in science. It is important to note that these Content Area Literacy Standards emerged with the adoption of the 2014 College and Career Standards in the area of Reading and Writing for Literacy in Science. The Literacy Standards establish that instruction in reading, writing, speaking, listening, and language is a shared responsibility among all content areas. The Literacy Standards are predicated on teachers in the content areas using their unique disciplinary expertise to help students meet the particular challenges of reading, writing, speaking, listening, and language in their respective fields. It is important to note that the Literacy Standards are meant to complement rather than supplant Content Standards in the disciplines.

Part of the motivation behind the disciplinary approach to literacy disseminated by the Literacy Standards is the extensive research establishing the need for college- and career-ready students to be proficient in reading complex informational text independently in a variety of content areas. Most of the required readings in college and workforce training programs are informational in structure and challenging in content. Postsecondary education programs typically provide students with both a

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higher volume of such reading than is generally required in K-12 schools and with comparatively little scaffolding.

The Literacy Standards make clear that for students to be ready for college and careers, a significant amount of informational text reading should take place outside of the ELA classroom. Future assessments will apply the sum of all the reading students do in a grade, not just their reading in the ELA context. The Literacy Standards demand that a great deal of reading should occur in all disciplines.

The Literacy Standards also cultivate the development of three mutually reinforcing writing capacities: writing to persuade, to explain, and to convey real or imagined experience. College and Career Readiness requires that writing focus significantly on writing to argue and to inform or explain.

The Literacy Standards use grade level bands to present the standards. Teachers teaching at the beginning of the grade band may need to provide scaffolding for students to be successful, where teachers teaching at the end of the grade band should expect students to demonstrate the standards independently.

Content Standards

In grades K through 8, the Content Standards are organized in five distinct areas: 1) physical science; 2) earth science; 3) life science; 4) engineering; and 5) computer science.

For the high school science courses, the content standards are organized around the core ideas in each particular course. Within each core idea are indicators which serve as the more detailed expectations within each of the content areas.

Finally, in the development of the Indiana Academic Standards for Science - 2016, careful attention was paid to how ideas were articulated across the grade levels. The goal being that the content and skills that students will need to succeed in a particular sub-discipline are introduced in an appropriate manner in the early elementary grades and then progress as students move towards high school.

Computer Science K-8

Indiana's Academic Standards for Computer Science allow students to be prepared in the ever-changing computer science areas and provide inquiry-based, hands-on experiences based on two components: Concepts and Practices. These standards are to be implemented in the 2016-2017 school year. The expectation is for students to work through the standards in multi-subject areas and not to be formally assessed by the State of Indiana. As students move through grade levels, they will work with and experience the standards at those grade bands (K-2, 3-5, and 6-8). The standards are based on the five core concepts: Computing Devices and Systems, Networking and Communication, Data and Information, Programs and Algorithms, Impact and Culture.

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