

# Iowa Science Standards

## Implementation Plan

In order to ensure our current K-12 students are scientifically-literate, global citizens who are prepared for college and career success, Iowa adopted new science standards that reflect what students in grades K-12 should know and be able to do as a result of instruction. Recognizing science is not just a body of knowledge that reflects current understanding of the world; it is also a set of practices used to establish, extend, and refine that knowledge, Iowa's Science Standards are written as three-dimensional performance expectations. All three dimensions – science and engineering practices, disciplinary core ideas, and crosscutting concepts – are included in each Iowa Science Standard.

Science & Engineering Practices (SEP)	Disciplinary Core Ideas (DCI)	Crosscutting Concepts (CCC)
Asking questions and defining problems	Physical Science	Patterns
Developing and using models	Life Science	Cause and Effect
Planning and carrying out investigations	Earth and Space Science	Scale, proportion, and quantity
Analyzing and interpreting data	Engineering, Technology, and Application of science	Systems and system models
Using mathematics and computational thinking		Energy and Matter (flows, cycles, and conservation)
Constructing explanations and designing solutions		Structure and Function
Engaging in argument from evidence		Stability and Change
Obtaining, evaluating, and communicating information		

As districts move forward with planning and implementation, there are several important factors to consider:

- The science standards are grade-level specific and use an integrated science approach K-8. Districts have two additional years to fully implement the middle school standards.
- Educators have the flexibility to arrange the standards in any order within a grade level to suit the needs of students and science programs.
- All standards are intended for all students so districts need to consider how this expectation might impact course scope and sequence and teacher endorsements.
- Each performance expectation includes a practice, a cross-cutting concept and a disciplinary core idea. The partnering of a Science and Engineering Practice with a particular Disciplinary Core Idea and Crosscutting Concept does not predetermine how the three are linked in curriculum, instruction, or classroom assessment. However, all three dimensions of the standard are equally important; therefore, to be considered aligned, units of instruction should provide opportunities for students to



develop a deep understanding of science content by engaging in multiple science and engineering practices throughout units of instruction and by using various crosscutting concepts as lenses through which to consider scientific phenomena.

- Educators will need to use both the Iowa Science Standards and their foundational boxes to make curricular and instructional decisions.
- Full implementation of the Iowa Science Standards involves several innovations for teaching and learning:
  - The standards are performance expectations that include three-equally important, distinct dimensions to learning science – science and engineering practices, crosscutting concepts, and disciplinary core ideas.
  - K–12 science education reflects real-world interconnections by having students engage with scientific phenomena and design solutions to problems. Science and engineering practices and crosscutting concepts are used to teach core ideas all year. This is often referred to as three-dimensional (or 3D) learning.
  - The standards focus on deeper understanding of content and build coherently from kindergarten through grade 12.
  - Engineering and the Nature of Science are integrated into science education from kindergarten through grade 12.
  - Science is connected to literacy and mathematics.
- When taken together, the innovations in teaching and learning, conceptual shifts of the standards, and the standards themselves articulate a new vision of science education. This new vision represents substantial changes in how teachers engage in the practices of science teaching. Therefore, piecemeal changes to curriculum or learning new isolated techniques will not be enough to precipitate the lasting change described in the new vision for science education. Teachers will need support, not just in learning about the new science standards and the associated conceptual shifts, but in learning, trying out, and getting feedback on what it means to teach with this vision. To support the new science standards and the new vision of teaching and learning, districts will need to develop and enact a detailed professional learning plan to ensure all science educators have access to the necessary professional development to support implementation.

The following document is provided to districts as an implementation guide describing available supports and suggested goals for [Year 1](#), [Year 2](#), [Year 3](#), and [Year 4](#). Districts might find it helpful to reference the document “[How to Read the NGSS](#)” (Next Generation Science Standards) and [commonly used abbreviations](#) while reading the guide. This guide and any updates will be posted on the [Iowa Core Science website](#).

Questions about the standards or the implementation plan should be directed to Dr. Kris Kilibarda, Iowa Department of Education State Science Consultant at [Kris.Kilibarda@iowa.gov](mailto:Kris.Kilibarda@iowa.gov).



Year 1  
2015-16  
Exploration, Awareness,  
Statewide Capacity Building

Year 2  
2017-18  
Classroom Transitions,  
Shifts, and Practice

Year 3  
2017-18  
Leveraging Partnerships,  
Analysis and Development

Year 4  
2018-19  
Assuring Access for All  
and Implementation

<b>Communications</b>			
Develop messages for key stakeholder groups	General outreach on shifts and stories from individual teachers	Ongoing messaging	
<b>Network Building</b>			
Develop Iowa Science Standards support networks	Identify existing expertise and build expert groups to support implementation	Ongoing support of leadership network	
<b>Professional Learning</b>			
Statewide professional learning provides an overview of the Iowa Science Standards	Statewide professional learning focused on developing students' science and engineering practices, and evaluating lessons/units and instructional resources	Statewide professional learning focused on equity and three-dimensional instruction	Specialized professional learning provided by teachers for teachers
	Identify specific professional learning needs for all grade levels and stakeholder groups	Identify specific professional learning needs for all grade levels and stakeholder groups	Identify specific professional learning needs for all grade levels and stakeholder groups.
Districts develop a professional development (PD) plan to ensure all educators receive the appropriate PD to effectively implement the standards	Districts enact the PD plan to ensure all educators receive the appropriate PD to effectively implement the standards	Districts continue to follow their PD plan, ensuring all educators receive the appropriate PD to effectively implement the standards	Districts provide ongoing professional development to support science standards implementation

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<b>Instructional Resources</b>			
Examine existing materials	Adapt existing materials and explore innovations	Evaluate and leverage materials and curriculum	Develop/evaluate new materials
<b>Instructional Shifts</b>			
Focus on integrating science and engineering practices (SEPs)	Focus on integrating SEPs and crosscutting concepts  Focus on coherent, sequential instruction that builds toward the standards	Focus on integrating all dimensions in coherent instruction that is congruent with the standards  Focus on all standards for all students	Instructional shifts in place  Continued focus on all standards for all students and equity issues
<b>Data Collection</b>			
Determine metrics to be tracked (e.g. course selection, student achievement, STEM engagement)	Develop data collection plan	Track and report science/STEM related data	
<b>Standardized Assessment and Data Collection</b>			
Assessment Task force recommends the standardized test that will be used and at what grade levels	Study assessment opportunities – collaborative groups, state-created, etc.	Develop new assessments and resources	Field test new assessment Implement new assessment (2019-2020)
<b>Policy Shifts</b>			
Identify policy changes necessary to implement the Iowa Science Standards (e.g. teacher certification, secondary pathways, RAI, assessment)			

**Year 1 - Exploration and Capacity Building  
2015-16**

In The Classroom	Behind The Scenes
<p><b>Students:</b></p> <ul style="list-style-type: none"> <li>• Begin to use appropriate science and engineering practices to learn the current district science curriculum using existing materials and resources in all K-12 Iowa classrooms.</li> </ul> <p><b>Teachers:</b></p> <ul style="list-style-type: none"> <li>• Are able to identify the three-dimensional components in a given science lesson.</li> <li>• Begin incorporating science and engineering practices into current course content. Teachers may find it helpful to record which science and engineering practices are being modeled by teachers and used by students.</li> <li>• Begin using prompts that encourage students to identify crosscutting concepts. Teachers may find it helpful to post the crosscutting concepts in the room.</li> </ul> <p><b>Administrator/Instructional Coaches:</b></p> <ul style="list-style-type: none"> <li>• Begin to familiarize themselves with the new Iowa Science Standards and available resources.</li> <li>• Be able to recognize the three-dimensional components in a given science lesson.</li> </ul>	<p><b>Individual Teachers or Teacher Teams:</b></p> <ul style="list-style-type: none"> <li>• Attend the area education agency (AEA)-led science standards <a href="#">overview professional development</a> and reference the <a href="#">Framework for Science Education</a> and the <a href="#">How to Read the NGSS document</a> to develop an understanding of the <a href="#">conceptual shifts</a>, <a href="#">vision</a> and structure of the new Iowa Science Standards.</li> <li>• Use the learning from attending the overview PD to study the Iowa Science Standards and the corresponding foundation and connection boxes and the evidence statements and to explore the resources on the <a href="#">NGSS resources site</a> to continue learning about the standards, to reflect on curricular and instructional practices, and to locate, evaluate, and share resources to support implementation.</li> <li>• Based on individual professional learning needs, watch webinars on the <a href="#">NSTA website</a>.</li> <li>• Reflect on her/his existing instructional practices and materials with particular attention given to the level of integration of science and engineering practices and disciplinary core ideas.</li> <li>• Begin adapting or augmenting current practices and resources to intentionally engage students in various aspects of three-dimensional learning.</li> </ul> <p><b>Districts:</b></p> <ul style="list-style-type: none"> <li>• Identify members of the district’s strategic implementation team, engage in discussions regarding current and past initiatives, district data, and community expectations to identify the district’s aspirations for science education; identify the district’s strengths and targeted areas for growth in realizing the district’s vision for science education.</li> <li>• Review all of the K-12 Iowa Science Standards and their foundation/connection boxes and additional resources. Determine your capacity for implementation and create a preliminary implementation timeline.</li> <li>• Develop a district plan to ensure all teachers of science at all levels K-12 receive the appropriate professional learning necessary for effective implementation of the new standards (i.e. if a team is attending the AEA overview PD, develop a plan for those teachers to facilitate the professional learning of their colleagues).</li> </ul>



- Determine if the implementation process will impact normal adoption cycles and make any necessary adjustments to the cycles.
- Begin to identify district-level policies, initiatives, and schedules that support or impede implementation. Develop action steps to eliminate barriers and build on strengths.
- Identify and engage key stakeholders for implementation and communicate regularly with those stakeholders.
- Identify a cadre of teacher-leaders or model teachers at the elementary, middle level, and high school level who will pilot lessons and who will locate, modify and share instructional strategies and resources. Make plans to send this cadre of teachers to the Summer Science Symposium June 15-17, 2016.
- Consider creating a collaborative of local/regional districts to share model lessons/units, evaluate resources, and coordinate professional learning.

**AEAs:**

- Work as an AEA system to develop professional learning related to an overview of three-dimensional learning, conceptual shifts in the standards and the structure and foundations of the standards.
- Provide the overview professional learning sessions across the AEA with a goal of at least one team from all districts participating.
- Develop metrics and assess the effectiveness of the PD.
- Consider developing a science teacher-leader network or continue working with current science networks to prepare facilitators of the professional learning workshops developed by the AEA system and to have a cadre of teachers who will pilot, modify, and share lessons, units, strategies and resources.
- Locate and share resources with AEA constituents and with other AEAs using a variety of mechanisms (social media, newsletters, websites, etc.).
- Share vetted resources as a network.
- Conduct a needs assessment within the AEA to determine content and pedagogy-related professional development needs.

**State and Statewide Science Leadership Team:**

- Identify key stakeholders across the state and use a variety of mechanisms to engage and communicate with the stakeholder groups; Coordinate the efforts of various stakeholder groups.
- Partner with the NGSS Network States to identify and share resources for the implementations of the new Iowa Science Standards.



	<ul style="list-style-type: none"><li>• Share national and other state’s resources with the field as they become available.</li><li>• Regularly convene and communicate with the state science leadership team, science/STEM teacher leaders, and science standards champions.</li><li>• Work with the science leadership network to conduct overview of the Iowa Science Standards professional learning sessions for various stakeholder groups (i.e. higher education, non-formal/informal science education, business and industry).</li><li>• Identify “early-implementer” districts and convene a representative group to explore lessons learned and best practices.</li><li>• Provide information about what statewide science assessment will be used and what grade levels will be reported.</li><li>• Start identifying barriers at the state level to science standards implementation (i.e. teacher endorsements, Basic Educational Data Survey (BEDS) codes, Regent Admission Index (RAI) scores, graduation requirements).</li><li>• Create a Board of Educational Examiners fact sheet related to science teaching endorsements.</li><li>• Host Educators Evaluating the Quality of Instructional Products (EQulP) rubric sessions for science leadership team members.</li><li>• Develop the Summer Science Symposium for Educators with a focus on glimpses inside aligned classrooms, content workshops, and practices workshops June 15-17, 2016.</li></ul>
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**Year 2- Classroom Transitions, Shifts, and Practices  
2016-17**

In The Classroom	Behind The Scenes
<p><b>Students</b></p> <ul style="list-style-type: none"> <li>• Are engaging in science and engineering practices and identifying cross cutting concepts when learning previous science standards.</li> <li>• Are using three-dimensional learning to construct their understanding of science content when learning the new science standards in field test units.</li> </ul> <p><b>Teachers:</b></p> <ul style="list-style-type: none"> <li>• Focus on deliberate, guided integration of science and engineering practices into lessons/units. It may be helpful to record which science and engineering practices are being used by students and modeled by teachers.</li> <li>• Use prompts that encourage students to identify and use appropriate crosscutting concepts. It may be helpful to post the crosscutting concepts in the room help focus conversations and connections.</li> <li>• Field test lessons/unit and classroom assessments that are intentionally focused on building students' learning toward each of the dimensions (SEPs, CCCs, and DCIs) of the new standards.</li> <li>• Begin to intentionally teach content that was not previously taught and begin to pare down content that is no longer included or no longer emphasized in the standards.</li> <li>• Begin evaluating instructional resources and begin modifying existing materials to more</li> </ul>	<p><b>All elementary teachers and 6-12 science teachers:</b></p> <ul style="list-style-type: none"> <li>• Attend the AEA-developed PD sessions to continue deeper learning that will support implementation of the standards.</li> <li>• Carefully study/unpack their standards and select at least one unit per grade level or content area to field test using the new standards (remember, the standards are performance expectations as a result of instruction not curriculum).</li> <li>• Identify and intentionally include grade-appropriate disciplinary content, science and engineering practices, and crosscutting concepts from the standards into lessons and units.</li> <li>• Begin using the <a href="#">EQuIP</a> rubric to evaluate the lessons/units that were field-tested, including artifacts of student learning, within professional learning community (PLCs)/data teams and revise as appropriate.</li> <li>• Continue using the resources on the <a href="#">Iowa Core Science website</a> and <a href="#">NGSS</a> resources site to inform instructional decisions and curricular design.</li> <li>• Begin using resources such as the NGSS evidence statements to design classroom assessments.</li> <li>• Review the English language arts (ELA) and mathematics standards connection boxes that are associated with science standards and consider ways to intentionally integrate standards. Teachers consider ways they can teach the ELA and/or mathematics through the science standards. It might be practically helpful to study the interconnections between the practices of mathematics, ELA, science, and engineering and consider ways to capitalize on the connections.</li> <li>• Use professional learning about the science and engineering practices to review and revise current practices related to the 6-12 Literacy in Science and Technological subject components of the Iowa ELA standards.</li> </ul> <p><b>Science Teacher Leadership and Compensation Mentor/Model Teachers:</b></p> <ul style="list-style-type: none"> <li>• Pilot lessons/units/strategies/resources.</li> <li>• Provide workshops within districts/local collaborative.</li> <li>• Share effective lessons/units/resources/PD at professional venues (Iowa Science Teachers Section (ISTS), National Science Teachers Association (NSTA), Science, Technology, Engineering, and Mathematics (STEM) annual conference, etc.).</li> </ul>





completely align with the standards.

### Science Teacher Leaders/Model Teachers

- Begin to intentionally bundle all components of the standards/performance expectations into classroom experiences.
- Pilot lessons/units and strategies/resources that have been evaluated using the EQuIP rubric.

### Administrators/Instructional Coaches

- Continue to expand their understanding of the Iowa Science Standards and available resources and ensure they are able to recognize the three-dimensional components in a given science lesson.
- Help teachers identify opportunities for students to engage in the science and engineering practices and to use cross cutting concepts to construct understanding of science content.

### Districts:

- Ensure teachers, administrators, and instructional coaches have access to the necessary professional development to support implementation. (i.e. if a team is attending the AEA PD, develop a plan for those teachers to facilitate the professional learning of their colleagues).
- Review the K-5 science standards and create a timeline/plan for ensuring the standards will be addressed at the appropriate level.
- Review the 6-8 science standards and create a timeline/plan for developing the integrated science curriculum.
- Review possible high school course sequences and establish a projected district course sequence.
- Horizontal and vertical curriculum teams work together to bundle standards and to create course maps.
- Teams use the [EQuIP](#) and [PEEC](#) (Primary Evaluation of Essential Criteria) rubrics to identify resources that build toward each component of three-dimensional learning.
- Communicate curricular changes to stakeholders and ensure course changes can be approved by the school board for implementation in 2018-19. Ensure teachers are properly [endorsed for courses they will be teaching](#).
- Based on the district team's study of the standards and how the teams bundled the standards and arranged courses, identify content-related and pedagogy-related professional development needs at the elementary, middle school, and high school levels and work with AEAs, higher education, informal educators and other stakeholder groups to identify sources of research-based professional learning opportunities.
- Identify and support examples of exemplary science instruction and assessment. Encourage these teachers to serve as model teachers for the district.
- Establish baseline and measures your district will use to determine implementation success. Develop a mechanism for collecting and analyzing data across the district.
- Analyze district/grade level/personal progress on addressing the conceptual shifts and making instructional decisions aligned with the vision of the standards. Identify strengths and gaps and develop action steps to move closer to making the vision a reality in every classroom.
- Continue identifying district-level policies, initiatives, and schedules that support or impede implementation. Develop action steps to eliminate barriers and build on strengths



**AEAs:**

- Work with the state science leadership writing teams to develop professional learning related to 1) use of the [EQuIP](#) rubric to evaluate lessons/units/instructional resources/classroom assessment, 2) bundling the standards to develop and sequence courses and to develop instructional units and 3) identifying and promoting best practices in students' use of science and engineering practices and crosscutting concepts to construct knowledge of science content.
- Facilitate the collaboratively-designed professional development workshops and use the developed metrics to assess the effectiveness of the PD experiences.
- Identify and support examples of exemplary instruction and assessment. Encourage these teachers to serve as model teachers in the district/region.
- Work with the identified model teachers to implement new learning and to prepare materials to share with other teachers.
- Share effective lessons/units/resources/PD in professional venues (ISTS, NSTA, STEM annual conference, etc.).
- Create collaborative groups to use the [EQuIP](#) and [PEEC](#) rubrics to identify resources that build toward each component of three-dimensional learning.
- Locate and share resources with AEA constituents and with other AEAs using a variety of mechanisms (social media, newsletters, websites, etc.).
- Conduct a needs assessment within the AEA to determine content and pedagogy-related professional development needs and work with the state, higher education, informal educators and other stakeholder groups to identify sources of research-based professional learning opportunities.

**State and Statewide Science Leadership Team:**

- Develop a network of science champions in each building/district to receive communications related to the science standards and initiatives.
- Encourage science champions to share exemplary lessons/units and resources at professional venues.
- Communicate regularly with the field via e-mail, newsletters, science leadership team meetings, AEA curriculum and administrator network meetings.
- Conduct webinars for special populations (English language learners, gifted learners, special education) and topics (scope and sequence, teacher endorsements, etc.).
- Collaborate with higher education and AEA curriculum networks to administer a statewide needs assessment; based on the data, work with the science leadership team to engage all stakeholders



	<p>in identifying and/or designing professional learning opportunities (i.e. developing student’s skills in the science and engineering practices at all grade levels, enhancing content knowledge for elementary teachers, integrated middle school curriculum, high school earth science)</p> <ul style="list-style-type: none"><li>• Provide professional development for science teacher leaders in recognizing and promoting the guidelines for “in the classroom” components of the standards implementation.</li><li>• Develop a rubric to evaluate professional development opportunities and develop a list of PD opportunities specific to teacher needs.</li><li>• Develop Math-Science Partnership guidelines to provide focused PD.</li><li>• Develop and convene collaborative networks (rural, urban, early implementers) to support each group’s unique needs.</li><li>• Establish a science leadership work team to study the <a href="#">BOTA (Board on Testing and Assessment) Report</a> and develop assessment guidelines for Iowa.</li><li>• Based on feedback from the field and on the availability of resources, revise the implementation plan as necessary and provide updated information regarding implementation and state science assessment decisions.</li></ul>
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**Year 3-Leveraging Partnerships, Analysis and Development  
2017-18**

In The Classroom	Behind The Scenes
<p><b>Students</b></p> <ul style="list-style-type: none"> <li>Frequently use science and engineering practices and crosscutting concepts to make sense of scientific phenomena, to make deep connections, and to solve relevant problems.</li> </ul> <p><b>Teachers</b></p> <ul style="list-style-type: none"> <li>Make instructional decisions that are congruent with the standards and with the conceptual shifts and new vision.</li> <li>Use individual and/or bundled standards to focus on the disciplinary core ideas included in the Iowa Science Standards.</li> <li>Continue to pare back on teaching topics that are not included in the standards.</li> <li>Instruction is focused on building all students' learning toward the standards.</li> <li>Units are sequenced to help build all students' skills in using the science and engineering practices and crosscutting concepts over the course of the year.</li> <li>Use the standards and related evidence statements to identify appropriate evidence that all students are learning the standards.</li> <li>Use formative assessment data to guide instructional practices and student learning.</li> </ul>	<p><b>All elementary teachers and 6-12 science teachers:</b></p> <ul style="list-style-type: none"> <li>Attend professional development (AEA-led modules, etc.) focused on deepening your learning about the standards and on supporting implementation.</li> <li>Review field-tested lessons and units, including artifacts of student learning, from year two. Individual teachers and teams continue to develop lessons/units that build toward the standards.</li> <li>Regularly use resources such the <a href="#">EQuIP</a> and <a href="#">PEEC</a> rubrics to evaluate lessons, units of instruction and instructional resources and modify lessons/materials to more completely align with all dimensions of the standards.</li> <li>Work in vertical and horizontal teams to review the grade-band progression (K-2, 3-5, 6-8, 9-12) of the science and engineering practices and crosscutting concepts to carefully consider how instruction is sequenced to provide all students opportunities to grow in each of the science and engineering practices and to provide students with opportunities to use the crosscutting concepts to explore the interconnections of science.</li> <li>Share effective lessons/units/resources/PD at professional venues (ISTS, NSTA, STEM conference, etc.).</li> </ul> <p><b>TLC Science Mentor/Model Teachers:</b></p> <ul style="list-style-type: none"> <li>Pilot lessons/units/strategies/resources.</li> <li>Provide workshops within districts/local collaborative.</li> <li>Share effective lessons/units/resources/PD at professional venues (ISTS, NSTA, STEM annual conference, etc.).</li> </ul> <p><b>Districts:</b></p> <ul style="list-style-type: none"> <li>Ensure teachers, administrators, and instructional coaches have access to the necessary professional development to support implementation (i.e. if a team is attending the AEA PD, develop a plan for those teachers to facilitate the professional learning of their colleagues).</li> <li>Use the district-developed mechanism for data collection/analysis to support the district implementation team, teacher teams, and individual teachers in making decisions that are congruent with both the vision and content of the standards.</li> <li>Analyze district/grade level/teacher-level progress on addressing the conceptual shifts and making instructional decisions aligned with the vision of the standards. Identify strengths and gaps and</li> </ul>



<p><b>Science Teacher Leaders/Model Teachers</b></p> <ul style="list-style-type: none"> <li>• Pilot lessons/units and strategies/resources that have been evaluated using the EQulP rubric.</li> <li>• Share with/model for other teachers.</li> </ul> <p><b>Administrators/Instructional Coaches</b></p> <ul style="list-style-type: none"> <li>• Focus walk-throughs on students' use of science and engineering practices and crosscutting concepts to construct understanding of science content.</li> </ul>	<p>develop action steps to move closer to making the vision a reality in every classroom.</p> <ul style="list-style-type: none"> <li>• Use the <a href="#">PEEC-Alignment</a> rubric to evaluate current and potential instructional materials and resources. Teams determine the needed materials, review available materials and select the resources that will support the district curriculum.</li> <li>• Identify content-related and pedagogy-related professional development needs at the elementary, middle school, and high school levels and work with AEAs, higher education, informal educators and other stakeholder groups to identify sources of research-based professional learning opportunities.</li> <li>• Examine the current professional literature and research related to instructional practices and resources in science and determine the instructional strategies to be implemented to execute the effective delivery of the curriculum.</li> <li>• Identify and support examples of exemplary science instruction and assessment. Encourage these teachers to serve as model teachers for the district.</li> <li>• Study phenomenon-based instruction and use the expertise of the local community to help identify authentic experiences to provide context for the standards.</li> <li>• Consider offering a “Parent University” or exhibiting at a STEM festival in your area to model what students are learning using the new Iowa Science Standards.</li> </ul> <p><b>AEAs:</b></p> <ul style="list-style-type: none"> <li>• Develop and provide professional learning for administrators on what classrooms look like, feel like, and sound like when students are engaged in learning through the new standards.</li> <li>• Facilitate professional development workshops focused on authentic context, best practices in three-dimensional learning, spiraling/building learning across a year and across grade spans, and designing classroom-based assessments.</li> <li>• Facilitate exploration of the case studies in the NGSS appendices related to “all standards for all students.”</li> <li>• Identify and support examples of exemplary instruction and assessment. Encourage these teachers to serve as model teachers in the district/region.</li> <li>• Work with the identified model teachers to implement new learning and to prepare materials to share with other teachers.</li> <li>• Share effective lessons/units/resources/PD in professional venues (ISTS, NSTA, STEM annual conference, etc.).</li> </ul>
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**State and Statewide Science Leadership Team:**

- Explore opportunities to collaborate with higher education to monitor the delivery and effectiveness of state-developed professional development modules/experiences and to determine additional needs.
- Use the cadre of science teacher leaders/model teachers with expertise in particular areas of the standards to design and deliver specialized PD and to provide focused support for districts/teachers.
- Establish a state science leadership work team to develop example exemplar/anchor performance tasks.
- Develop math/science grant guidelines to provide focused PD.
- Based on feedback from the field and on the availability of resources, revise the implementation plan as necessary and provide updated information regarding implementation and state science assessment decisions.
- Host the summer best practices institute on June 14, 2018.



**Year 4- Continued Development and Assuring Access for All Students  
2018-2019**

**Full Implementation  
2019 and beyond**

In The Classroom	Behind The Scenes
<p><b>Students</b></p> <ul style="list-style-type: none"> <li>• Use science and engineering practices and crosscutting concepts to construct their understanding of important scientific phenomena, to make deep connections, and to solve relevant problems.</li> </ul> <p><b>Teachers</b></p> <ul style="list-style-type: none"> <li>• Are actively evaluating lessons/units for alignment and are revising instruction based on the evaluation.</li> <li>• Are comfortable locating, modifying, and using instructional materials that are aligned to the standards.</li> <li>• Focus on engaging their students in three-dimensional learning at the appropriate level of rigor as identified in NGSS foundation boxes and Appendices E, F, and G.</li> <li>• Are differentiating instruction and providing appropriate scaffolding to ensure the standards are accessible for all students.</li> <li>• Use student performance on classroom assessments that are aligned to the standards to guide instruction.</li> </ul>	<p><b>All elementary teachers and 6-12 science teachers:</b></p> <ul style="list-style-type: none"> <li>• Continue to engage in professional development that is focused on deepening their understanding and implementation of standards-aligned instructional practices.</li> <li>• Work individually and in teams to continue developing lessons/units that build toward the standards.</li> <li>• Consistently use resources such the <a href="#">EQuIP</a> and <a href="#">PEEC</a> rubrics to evaluate lessons, units of instruction and instructional resources and modify lessons/materials to more completely align with all dimensions of the standards.</li> <li>• Use student artifacts as evidence of learning and make instructional decisions based on that evidence.</li> <li>• Continue to work in vertical and horizontal teams to consider how instruction is sequenced to provide all students opportunities to grow in each of the science and engineering practices and to provide students with opportunities to use the cross cutting concepts to explore the interconnections of science.</li> <li>• Work individually and in teams to appropriately differentiate the standards to ensure they are accessible for all students.</li> <li>• Share effective lessons/units/resources/PD at professional venues (ISTS, NSTA, STEM conference, etc.)</li> </ul> <p><b>Districts:</b></p> <ul style="list-style-type: none"> <li>• By the end of the 2018-19 school year, 100 percent of curriculum and instruction will be standards-aligned in elementary and high school and the district is enacting the plan for full middle school implementation.</li> <li>• Ensure teachers, administrators, and instructional coaches have access to the necessary professional development to support implementation.</li> <li>• Analyze district/grade level/teacher level progress on addressing the conceptual shifts and making instructional decisions aligned with the vision of the standards. Identify strengths and gaps and develop action steps to move closer to making the vision a reality in every classroom.</li> <li>• Select or have a plan for selecting curricular and instructional resources and materials to fully implement the Iowa Science Standards.</li> </ul>





**Full Implementation  
2019-2020 and beyond:**

**Students:**

- Have the opportunity to learn the important scientific concepts and skills in all standards.
- Engage in learning phenomena that are grounded in an authentic context and use their scientific understanding to design solutions to local problems.
- Demonstrate their understandings and skills in their performance on classroom assessments that are aligned to the standards
- Are prepared for success on state assessments.

**Teachers**

- Use resources like the EQUiP rubric to evaluate, revise, and modify curriculum and instruction.
- Ensure all instructional, curricular, and assessment decisions are congruent with the standards.

- Collect information from teachers on their instructional needs and enact a functioning professional development plan to ensure all teachers are comfortable with and prepared to use any new curriculum pieces and resources using instructional strategies that are aligned with the standards.
- Conduct on-going PD related to integration of all aspects of the standards and to ensuring the standards are accessible for all students. PD is assessed and feedback is used to inform programmatic changes.
- Assess student progress through district-developed formative and summative assessments.
- Analyze and evaluate benchmark data and summative and formative assessment data. Make recommendations for instructional resources and professional development based on the data.
- Support the district implementation team, PLCs and individual teachers in making decisions that are congruent with both the vision and content of the standards.

**AEAs:**

- Facilitate professional development workshops focused on authentic context and ensuring the standards are accessible for all students.
- Identify and support examples of exemplary instruction and assessment. Encourage these teachers to serve as model teachers in the district/region.
- Work with districts to address specific needs.
- Share effective lessons/units/resources/PD in professional venues (ISTS, NSTA, STEM annual conference, etc.)

**State and Statewide Science Leadership Team:**

- Collaborate with each AEA to host the summer best practices institutes in each AEAs. This will highlight Iowa teachers implementing the standards.
- Collaborate with higher education to conduct a survey of implementation and to assess continued need.
- Collaborate with the AEAs and the science leadership team to address pockets of need.

