IOWA CITY
COMMUNITY
SCHOOL DISTRICT
Child-Centered : Future-Focused

Self Study
of
SCIENCE EDUCATION
Instructional Program

June 2016

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Table of Contents

ICCSD Science Program Mission and Belief Statements

As a result of the curriculum review process, the self-study team reviewed the mission statement and belief statements for science education and adopted the following.

MISSION STATEMENT

The mission of science education in the Iowa City Community School District is to develop citizens who will have the skills to apply the principles of science, engineering and technology in addressing humanity's current and future challenges.

*Our district's mission aligns with the *framework of the Next Generation Science Standards* in that we want to ensure that ***all students*** by the end of 12th grade:

- have some appreciation of the beauty and wonder of science;
- possess knowledge of science and engineering to effectively engage in public discussions on related issues;
- are careful consumers of scientific and technological information related to their everyday lives;
- are able to continue to learn about science outside school;
- and have the skills to enter careers of their choice, including (but not limited to) careers in science, engineering, and technology.

BELIEF STATEMENTS

We believe that:

IOWA CITY SCIENCE PROGRAM

- a high quality science program is aligned with the Iowa Core Science Standards;
- every student deserves highly competent and qualified science teachers;
- every student should have the opportunity to learn in a safe environment with quality materials;
- all stakeholders, including parents, teachers, administrators, community members and future employers should be involved in enhancing science education at the local level.

INSTRUCTION AND ASSESSMENT

- learning should incorporate the science and engineering practices outlined in the Next Generation Science Standards (*see below);
- instruction should make strong connections between science, literacy, and mathematics;
- science instruction can be enhanced with the appropriate technology;
- high-quality assessment guides the instructional process to better meet the needs of individual students.

PROFESSIONAL DEVELOPMENT

- adequate time must be provided for teachers to study and apply current research in science, learning theory, and instructional practice;
- professional development that is systemic, ongoing, differentiated, collaborative and data driven is critical to improve student learning.

Science and Engineering Practices from the Next Generation Science Standards

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

ICCSD Science Program Strengths and Limitations

The following information was generated from review and analysis of data gathered from surveys as well as academic achievement data, namely historical Iowa Assessment data. Those responding to surveys included 159 elementary and secondary teachers, 1,030 students, 26 administrators and 617 parents. Strength statements and limitation statements are listed below.

Academic Achievement

Strengths

- Parents (68%), junior high (88%) and high school (87%) students are satisfied with the science education program in the ICCSD.
- Teachers at all levels (elementary, junior high, and high school) are knowledgeable, set and communicate high expectations for students, and are available outside of school to offer additional help.
- The ICCSD science education program is activity-based.
- Students enjoy science class.
- Students are able to see connections between what they do in the classroom and the outside world.

Limitations

- Curriculum at the secondary level does not match the new Next Generation Science Standards.
- Students who elect to skip Foundations of Science III and enroll in Biology do not receive any earth science education in high school and miss out on this section of the Iowa Core/NGSS.
- 40% of parents do not believe Foundations of Science III prepared students for future science classes.
- At the elementary level, students who are removed from science class in order to receive supports in other

- Clear learning goals are evident at all levels.
- Administrators (100%) and teachers (92%) believe that the Foundations courses (I, II, III) prepare students for future science classes.
- The number of AP courses offered at the high school level meets the needs of students choosing to enroll in them.
- The K-6 curriculum has a combination of earth, physical and life sciences and is challenging to students of all ability levels.

areas do not have access to the content.

- There is a lack of communication about what is happening in the classroom. Students are not discussing what they are learning in science class outside of school and parents would like more updates about what their children are learning.
- Only 54% of high school students report receiving information about science careers in science class.
- Junior and high school course offerings may not be available to meet the needs of students of all ability levels and interests.

Instructional Methods

Strengths

- Teachers are utilizing a student-centered, activity based approach to teaching science.
- Elementary (87%), junior high (95%) and high school (91%) students participate in labs or hands-on activities.
- Junior high (90%) and high school students (86%) believe the instruction at their school meets their learning needs.
- Teachers and Administrators agree that instruction is being differentiated to meet the need to students in the classroom.
- Students at all levels are involved in inquiry investigations and collaborate with their peers.
- There is extensive use of science journals, data collection, and student reflection at the elementary level.
- Technology is being integrated and enhancing instruction at all levels.

Limitations

- While the perception is that instructional methods do not discriminate on the basis of race, gender or disability, achievement gaps show otherwise.
- 48% of teachers do not believe there is enough time reserved to appropriately teach the science kits at the elementary level.

- The perception is that instruction does not discriminate on the basis of race, gender or disability.

Instructional Materials

Strengths

- K-6 science kits provided by the VAST Center provide a consistent, activity-based science curriculum across the district that is aligned to the standards.

Limitations

- Secondary science classroom space and lab equipment is lacking due to class sizes. Safety issues in lab courses is not clearly understood and/or factored into class size limits.
- At the secondary level, textbooks and curriculum materials are outdated and need to be replaced.
- At the secondary level, instructional materials are needed to meet the learning goals of all learners (Special Education, English Language Learners, etc.)

Assessment

Strengths

- Iowa Assessment scores in science show consistent growth each year.
- ICCSD students score above the national average in every grade level tested (3-11).
- As the demographics have changed in the ICCSD, the number of students who are proficient has remained relatively consistent.
- ICCSD students score well above the state and national average on the ACT.
- 68% of students who took the ACT were labeled as being "Ready for College Level Coursework" in science.

Limitations

- While Iowa Assessment scores in science show consistent growth each year, proficiency levels across all grades need to improve.
- 51% of teachers report not having sufficient time to evaluate students in ways that clearly demonstrate their level of understanding.
- District assessments and student achievement data are not consistently being used to help teachers inform instruction.
- District-developed science assessments at the 4th grade level need to be reevaluated based on the FOSS Curriculum upgrade.

Professional Development/Support

Strengths

- Teachers feel supported by their school's administration in implementing the district science curriculum.
- The VAST Center kit trainings provide valuable information for teaching the district science kits and is effective in promoting the coordinated implementation of the curriculum across the district.
- Science advocates at the elementary level are a valuable resource to support the district science mission as well as to support new science teachers.
- Funding for travel has been available to science teachers for attendance at local, state, and national conferences.

Limitations

- Teachers (60%) and school administrators (35%) do not believe there is enough time to collaborate with colleagues about science instruction.
- Opportunities/Funding to support teachers at all levels to attend conferences, collaborate and participate in other professional development activities is lacking.
- Teachers would like more support in order to better meet the needs of students in special education.

ICCSD Science Education Program Improvement Plan

Curriculum

Limitation	**RECOMMENDATIONS and ACTION STEPS**	**CONTACT PERSON(S)**	**TIMELINE**
Curriculum at the secondary level does not match the new Next Generation Science Standards.	1. Review NGSS a) Align standards with content areas b) Form committees to look at each course, utilize TQ$, if necessary, to accomplish these tasks 2. Assign standards to existing courses and/or create new course for Earth Science 3. Develop KUD's and curriculum where needed	Secondary Teachers Science Coordinator District Administration	Summer 2016, 16-17 Academic Year
Students who elect to skip Foundations of Science III and enroll in Biology do not receive any earth science education in high school and miss out on this section of the Iowa Core/NGSS.	1. Increase communication between teachers, parents, administration and school board regarding NGSS. 2. Establish the requirement that all 9th grade students enroll in the 9th grade course without exception. In addition, add a graduation requirement. a) Accept dual enrollment in biology. 3. Discuss changes in course offerings/requirements with counselors at all schools.	Secondary Teachers Science Coordinator Guidance Counselors Building Administration District Administration Board of Education	Summer 2016, 16-17 Academic Year
40% of parents do not believe Foundations of Science III prepared students for future science classes.	1. Communicate with parents, students, and staff regarding the nature of the course. Include information on how the course is aligned to the standards in addition to its emphasis on improving the science skills (e.g. organization, lab skills, measurement) needed to be more successful in upper level courses.	Secondary Teachers Science Coordinator Building Administration	16-17 Academic Year
At the elementary level, students who are removed from science class in order to receive supports in other areas do not have access to the content.	1. Explore potential resources that would allow students access to the content at home and outside of class time. 2. Increase collaboration between Resource/ELL teachers and science teachers. Could more science content be worked into their curriculum?	Elementary Teachers Science Coordinator Elementary Principals	Summer 16 16-17 Academic Year
There is a lack of communication about what is	1. Identify what specific information parents want. 2. Identify preferred methods of communication (website, social media, etc.).	K-12 Science Teachers Science Coordinator	On-going

happening in the classroom. Students are not discussing what they are learning in science class outside of school and parents would like more updates about what their children are learning.	3. Develop online materials/resources that can be shared with parents and students.		
Only 54% of high school students report receiving information about science careers in science class.	1. Explore how other disciplines address this issue and what career information would be beneficial. 2. Provide more opportunities for guest speakers to visit science classrooms. 3. Utilize class time and potentially intervention block to promote job shadows, Workplace Learning Connection, community events related to science fields	Secondary Teachers Science Coordinator	16-17 Academic Year On-going
Junior and high school course offerings may not be available to meet the needs of students of all ability levels and interests	1. Explore potential student interest in trimester electives in addition to other factors associated with increasing course numbers (e.g. scheduling and staffing) 2. Utilize IDS to help classroom teachers better meet the needs of students (high/low ability, ELL, special ed.) through differentiation and use of MTSS. 3. Research the possibility of providing different levels within a course (e.g. Honors)	Secondary Teachers Science Coordinator	16-17 Academic Year On-going

Instructional Methods

Limitation	**RECOMMENDATIONS and ACTION STEPS**	**CONTACT PERSON(S)**	**TIMELINE**
While the perception is that instructional methods do not discriminate on the basis of race, gender or disability, achievement gaps show otherwise.	1. Identify the variables producing the achievement gap (look at achievement data to identify trends) a) Address those variables that can be managed in the classroom. b) Review best practice to guide instruction. c) Gather data to monitor progress. 2. Target professional development on addressing achievement gap. 3. Differentiation, learning styles, cultural competency, etc.	K-12 Science Teachers IDS Team Members Science Coordinator Building Administration District Administration	On-going

48% of teachers do not believe there is enough time reserved to appropriately teach the science kits at the elementary level.	1. Develop a better understanding, at the district and building level, of all the reading and writing opportunities that take place in science. a) Administrators at the elementary level need to actively support science instructional minutes. 2. Review the minutes allotted to all curricular areas and consider more science time.	Elementary Teachers Science Coordinator Elementary Principals District Administration	Summer 16 16-17 Academic Year

Instructional Materials

Limitation	**RECOMMENDATIONS and ACTION STEPS**	**CONTACT PERSON(S)**	**TIMELINE**
Secondary science classroom space and lab equipment is lacking due to class sizes. Safety issues in lab courses is not clearly understood and/or factored into class size limits.	1. Set class size limits for science based on fire code and OSHA standards. 2. Conduct a safety audit of the district's secondary classrooms/laboratories. 3. Increase support in science classes (Special Education teachers, associates, etc.)	Science Coordinator Building Administration District Administration	Summer 16 On-going
At the secondary level, textbooks and curriculum materials are outdated and need to be replaced.	1. Allocate resources toward the development of new curriculum materials and online resources (to support 1:1 rollout.) 2. Conduct a materials review to identify and select materials for adoption and purchase.	Science Coordinator District Administration	Summer 16 16-17 Academic Year
At the secondary level, instructional materials are needed to meet the learning goals of all learners (Special Education, English Language Learners, etc.)	1. Increase communication and collaboration between science teachers and ELL and special education teachers regarding instructional strategies and appropriate materials. 2. Develop and share resources (e.g. readings, websites, modules, etc.) that can be used by learners of varying ability levels. 3. **Sheltered Classes for FOSI, FOS II, FOSIII, and Bio.	Secondary Teachers Science Teachers IDS Team Members	Summer 16 On-going

Assessment

Limitaton	**RECOMMENDATIONS and ACTION STEPS**	**CONTACT PERSON(S)**	**TIMELINE**

While Iowa Assessment scores in science show consistent growth each year, proficiency levels across all grades need to improve.	1. Provide professional development opportunities for teachers to learn more about other cultures and how to engage all learners. 2. Work to identify the needs of students who are not proficient and target those areas for improvement.	Secondary Teachers Science Coordinator Building Administration District Administration Cultural Comp. Team	On-going
51% of teachers report not having sufficient time to evaluate students in ways that clearly demonstrate their level of understanding.	1. Identify clear understandings for what is being assessed a) Prioritize these understandings when developing common formative and summative assessments. 2. Reexamine how we are assessing student understanding 3. Modify assessments to increase quality and efficiency (e.g. incorporate technology)	K-12 Science Teachers Science Coordinator	16-17 Academic Year On-going
District assessments and student achievement data are not being used to help teachers inform instruction.	1. Determine if the assessments are aligned to the NGSS. a) If so, utilize district inservice time for item analysis. b) Identify trends in the data to determine if curricular/instructional changes need to be made.	K-12 Science Teachers Science Coordinator	Summer 16 16-17 Academic Year On-going
District-developed science assessments at the 4th grade level need to be reevaluated based on the FOSS Curriculum upgrade.	1. Examine the current 4th grade assessment. How much of it is aligned to the new NGSS? a) Does it need to stay at the 4th grade level? b) Determine what steps need to be taken in order to align assessment with FOSS kits and NGSS. 2. Allocate time to teachers after the assessments have been scored to analyze the items.	Elementary Teachers Science Coordinator	Summer 16 16-17 Academic Year

Professional Development/Support

Limitation	**RECOMMENDATIONS and ACTION STEPS**	**CONTACT PERSON(S)**	**TIMELINE**
Teachers (60%) and school administrators (35%) do not believe there is enough time to collaborate with colleagues about science instruction.	1. Reevaluate how we use Thursday inservice time a) Less time traveling means more collaboration b) Fewer district level days but longer periods of time 2. Encourage buildings to include common prep times for teachers who teach the same courses.	Science Coordinator Building Administration District Administration	16-17 Academic Year

Opportunities/Funding to support teachers at all levels to attend conferences, collaborate and participate in other professional development activities is lacking.	1. Consider restructuring Thursday time as a district in order to provide more extended periods of time for PD. This would require less TQ$ to be spent on substitute teachers. 2. Look into possible external sources of funding in order to attend conferences. 3. Educate the staff on all of the potential uses of TQ funds.	Science Coordinator District Administration	Summer 16 On-going
Teachers would like more support in order to better meet the needs of students in special education.	1. Increase collaboration between science and special education teachers. a) Communicate Understandings (KUD) with special education teachers 2. Provide professional development for science teachers and/or staff member (IDS) to help provide accommodations. (Modifying assignments and assessments, Differentiating Instruction.) 3. Increase number of co-taught classes with special education teachers in non-elective courses (eg. required 9th grade and 10th grade courses)	K-12 Science Teachers Science Coordinator Building Administration District Administration	Summer 16 16-17 Academic Year On-going

Equity Statement

It is the policy of the Iowa City Community School District not to discriminate on the basis of race, creed, color, religion, national origin, gender, age, marital status, sexual orientation, gender identity, veteran status, disability, or socioeconomic status in its educational programs, activities, or employment practices. If you believe you have (or your child has) been discriminated against or treated unjustly at school, please contact the Equity Director, Kingsley Botchway at 1725 North Dodge Street, Iowa City, IA, 319-688-1000.