

- Young people and children are born investigators—As a result of interaction with their surroundings, children and young people learn about the world, develop ideas, engage in inquiry, and continue to build their conceptions and refine their (mis)conceptions to make sense of the phenomena around them.
- Learning must connect to students' interests and experiences—Research suggests that young people's personal interest, experience, and enthusiasm is linked to later educational and career choices; "in order for students to develop a sustained attraction to science and for them to appreciate the many ways in which it is pertinent to their daily lives, classroom learning experiences in science need to connect with their own interests and experiences" (National Research Council 2012, 28).
- Embrace diversity as a means to enhance learning science—In the United States there is increased awareness that the nation is becoming more diverse and that broadening participation in science is crucial. It is expected that these diverse communities can bring diverse customs and orientations to science learning environments; as a result, the learning process and the community within which students are situated will be enriched.
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students to take information in the context of the global learning ~~commitment~~ and to consider their actions in terms of what is ethically correct. The dispositions are learner actions that show their understanding of the standards. Appendix A contains a complete list of standards, skills, dispositions, responsibilities, and self-assessment strategies stipulated in the Standards

We observe clear links between the Standards (including the dispositions, responsibilities, and skills that are found within them), and the principles found in the

The research team began data analysis by practicing open coding on one of the transcripts of interviews with librarians. Each team member developed a personal codebook based on the research questions. By triangulating and applying these individual codebooks, the research team identified themes, enabling the formation of a group codebook. Researchers coded another set of transcripts using this group codebook, discussed, made further revisions to the codes and created a final version of the codebook. The codebook was entered into Dedoose.com, a qualitative data analysis software system. The findings discussed below were drawn from the themes and passages that emerged during the coding process.

Findings and Discussion

School Librarians as Information Specialists, Instructional Partners, Teachers, Program Administrators, and Leaders in Science Learning Environments

In Sci-Identity's first semester, the participating school librarians found ways to show multiple examples of being information specialists, instructional partners, teachers, program administrators, and leaders in facilitating science learning. Below we discuss how the librarians function in each of the five roles while leading Sci-Identity in their respective schools.

Information Specialist—While students participated in Sci-Identity, they increased their use of librarians as guides to finding science resources; this reliance on school librarians highlights the role of librarian as information specialist. For example, Nancy, a Sci-Identity participant, increased interest in scientific subjects, resulting in her students' showing more interest in the science books in the catalog. One student was particularly interested in dinosaurs, which were featured in his story, so Nancy was able to identify relevant books in the collection. Another librarian, Grant, sensing his students' interest in science fiction books, but lacking a robust collection in his library, supplemented his collection with materials from the public library.

Through the interviews with librarians and the observation notes, we discovered that the librarians went beyond assisting students in finding, assessing, and using information; we identified instances of librarians introducing and modeling the use of technology in science learning. This use of technology included identifying Web and electronic resources that are appealing to young people. Examples of these resources include BrainPOP and iPad apps for finding science facts or problems that connect to learners' personal interests and experiences. Through close examination of the challenges that some of these students face in writing their stories,



The entire premise of SEDentify and the collaborative approach—between researchers and librarians and among the students themselves—built on the idea that learning is predicated on an open and respectful exchange of information and ideas across cultures and customs. This stance is reflected in numerous responsibilities and dispositions in the Standards. For the purposes of this section, we will focus on “Maintain openness to new ideas by considering divergent opinions, changing opinions or conclusions when evidence supports the change, and seeking information about new ideas encountered through academic or personal experiences” (disposition 4.2.3 in Appendix A).

While this thread ran through the entire program, some lessons in particular elicited discussion about diverse experiences and points of view. For example, as a result of brainstorming with the school librarians, one session was dedicated to the concept of utopia and dystopia. Students were asked to consider different conceptions of the future: the shiny optimism of the 1950s exemplified, for example, by the Jetsons; in contrast to the dystopian lens popular in young adult fiction today, such as in *The Hunger Games*. Each librarian facilitated a discussion of how students envisioned the future: happy time with their favorite foods available at the touch of a button or a dark time in which humanity is imperiled. Also discussed were the cultural connotations associated with each view and the technology that created or is present in that

Crosswalk between the

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Crosswalk between the

1.2.7 Display persistence by continuing to pursue information to a broad perspective.

1.3 Responsibilities

1.3.1 Respect copyright/intellectual property rights of creators and producers.

1.3.2 Seek divergent perspectives during information gathering and assessment.

1.3.3 Follow ethical and legal guidelines in gathering and using information.

1.3.4 Contribute to the exchange of ideas within the learning community.

1.3.5 Use information technology responsibly.

1.4 Self-Assessment Strategies

1.4.1 Monitor own information-seeking processes for effectiveness and gaps, and adapt as necessary.

1.4.2 Use interaction with and feedback from teachers and peers to guide own inquiry process.

1.4.3 Monitor gathered information, and assess for gaps or weaknesses.

1.4.4 Seek appropriate help when it is needed.

Standard Two—Draw conclusions, make informed decisions, apply knowledge to new situations, and create new knowledge.

2.1 Skills

2.1.1 Continue an inquiry-based research process by applying critical thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge.

2.1.2 Organize knowledge so that it is useful.

2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations.

2.1.4

2.2.4 Demonstrate personal productivity by completing products to express learning.

2.3 Responsibilities

2.3.1 Connect understanding to the real world.

2.3.2 Consider diverse and global perspectives in drawing conclusions.

2.3.3 Use valid information and reasoned conclusions to make ethical decisions.

2.4 Self-Assessment Strategies

2.4.1 Determine how to act on information (accept, reject, modify).

2.4.2 Reflect on systematic process, and assess for completeness of investigation.

2.4.3 Recognize new knowledge and understanding.

2.4.4 Develop directions for future investigations.

Standard Three—Share knowledge and participate ethically and productively as members of our democratic society.

3.1 Skills

3.1.1 Conclude an inquiry-based research process by sharing new understandings and reflecting on the learning.

3.1.2 Participate and collaborate as members of a social and intellectual network of learners.

3.1.3 Use writing and speaking skills to communicate new understandings effectively.

3.1.4 Use technology and other information tools to organize and display knowledge and understanding in ways that others can view, use, and assess.

3.1.5 Connect learning to community issues.

3.1.6 Use information and technology ethically and responsibly.

3.2 Dispositions in Action

3.2.1 Demonstrate leadership and confidence by presenting ideas to others in both formal and informal situations.

3.2.2 Show social responsibility by participating actively with others in learning situations and by contributing questions and ideas during group discussions.

3.2.3 Demonstrate teamwork by working productively with others.

3.3 Responsibilities

3.3.1 Solicit and respect diverse perspectives while searching for information, collaborating with others, and participating as a member of the community.

3.3.2 Respect the differing interests and experiences of others, and seek a variety of viewpoints.

3.3.3 Use knowledge and information skills and dispositions to engage in public conversation and debate around issues of common concern.

3.3.4 Create products that apply to authentic, real-world contexts.

3.3.5 Contribute to the exchange of ideas within and beyond the learning community.

3.3.6

4.3.4 Practice safe and ethical behaviors in personal electronic communication and interaction.

4.4 Self-Assessment Strategies

4.4.1 Identify own areas of interest.

4.4.2 Recognize the limits of own personal knowledge.

4.4.3 Recognize how to focus efforts in personal learning.

4.4.4 Interpret new information based on cultural and social context.

4.4.5 Develop personal criteria for gauging how effectively own ideas are expressed.

4.4.6 Evaluate own ability to select resources that are engaging and appropriate for personal interests and needs.

Appendix B: Crosswalk between Framework and Standards

Framework Principle One: Children are born investigators.				
	Standard One	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life.	1.1.3 Develop and refine a range of questions to frame the search for new understanding.	1.1.7 Make sense of information gathered from diverse sources by identifying misconceptions, main and supporting ideas, conflicting information, and point of view or bias.

AASL Skills

Standard Two

2.1.1 Continue an inquiry-based research process by applying critical thinking skills gathered from -16(i)ion

	Standard Three	3.3.1 Solicit and respect diverse perspectives while searching for information, collaborating with others, and participating as a member of the community.	3.3.2 Respect the differing interests and experiences of others, and seek a variety of viewpoints.
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Framework Principle Two: Learning must connect to students' interests and experiences.

AASL Skills	Standard One	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life.		1.1.2 Use prior and background knowledge as context for new learning.	
	Standard Two	2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations.			
	Standard Three	3.1.5 Connect learning to community issues.			
	Standard Four	4.1.1 Read, view, and listen for pleasure and personal growth.	4.1.2 Read widely and fluently to make connections with self, the world, and previous reading.	4.1.4 Seek information for personal learning in a variety of formats and genres.	4.1.5 Connect ideas to own interests and previous knowledge and experience.

AASL Dispositions in Action	Standard Four	4.2.2 Demonstrate motivation by seeking information to answer personal questions and interests, trying a variety of formats and genres, and displaying a willingness to go beyond academic requirements.	4.2.4 Show an appreciation for literature by electing to read for pleasure and expressing an interest in various literary genres.
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AASL Responsibilities	Standard Two	2.3.1 Connect understanding to the real world.			
	Standard Three	3.3.4 Create products that apply to authentic, real-world contexts.			
	Standard Four	4.3.3 Seek opportunities for pursuing personal and aesthetic growth.			

Crosswalk

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