

The STEM Stories Project:

**Challenging stereotypes and inspiring young girls through
online explorations of the lives and work of women in STEM fields**

Summative Evaluation Report

Inverness Research

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Introduction

In an effort to increase and diversify the domestic science and engineering workforce, the National Science Foundation's Human Resource Development division supports projects through their Research on Gender in Science and Engineering program. One of the aims of this program is to address gender-based differences in science, technology, engineering, and mathematics (STEM) and to support projects and educational experiences that affect student interest, performance, and choice of careers.

In 2008, Lois McLean and Richard Tessman of McLean Media¹ received a two-year NSF grant (#HRD-0734004) through the Research on Gender in Science and Engineering program to develop the "*Telling STEM Stories through Content Clips*" project. Building on previous work, they developed a free, online collection of multimedia resources aimed at young girls which highlight STEM careers through the personal stories of women in STEM fields (and a few men), both past and present. The resulting website, *STEM Stories*, can be found at www.stemstories.org.

As stated in their proposal:

This Outreach and Communication project will assemble and disseminate a digital collection of multimedia clips and online activities to highlight careers, challenge stereotypes, and introduce strong role models. The *STEM Stories* collection will let children explore the lives and work of a diverse group of women through a combination of career-related content and personal stories. This project will build on the outcomes and insights of two prior NSF-funded research projects that resulted in the *Telling Our Stories: Women in Science* CD-ROM and the *Content Clips* web system environment, which was developed through the National Science Digital Library (NSDL) program. The primary audience is girls in Grades 4 - 8 and the educators that interact with them, in both formal and informal settings where computers with Internet access are available.

In addition to drawing upon an Advisory Board and conducting some of their own formative assessment, McLean Media contracted with Inverness Research² to be external evaluators for the *STEM Stories* project. Inverness Research provided formative and summative evaluation services including observing website usage, surveying website users, gathering outside expert feedback, and assessing the project's overall success, audience benefits and impacts, and implications for future work.

This summative evaluation report consists of the following sections:

¹ For more about McLean Media and their work, see www.storyline.com and www.contentclips.com.

² Inverness Research is a private evaluation firm: www.inverness-research.org.

- **Project Description** (including its theory of action, original goals, and major features)
- **Evaluation** (goals, questions, and methods)
- **Findings and Discussion** (of interviews, observations, surveys, and expert reviews)
- **Conclusions**
- **Appendices** (with protocols and survey instruments)

Project Description

Theory of Action/Goals

Proposed as an Outreach and Communication project, *STEM Stories* sought to provide learners (primarily 4th through 8th grade girls) with an online space to explore the personal and professional lives of a group of diverse women in STEM fields, and ultimately to challenge stereotypes, highlight alternative career options, and introduce powerful female role models. The web-based collection of resources was designed so that learners and educators could use it together in both informal and formal educational settings, and includes multimedia clips and activities, online interviews, virtual field trips, personal photos, text biographies, and interactive investigations. Project leaders updated content from their successful previous *Telling Our Stories: Women in Science* CD-ROM project (developed through the NSF-Small Business Innovation Research program) by integrating it with new multimedia materials in a unique and dynamic online environment, available to anyone with a computer and an internet connection.

Officially, as stated in the project's proposal, the goals were to:

1. Assemble an online collection that blends repurposed and new content to highlight STEM careers, challenge stereotypes and introduce children to strong role models.
2. Bring scientists, engineers, and STEM careers to life through personal stories.
3. Expand the scope, quality, and impact of a research-based product and design model.
4. Produce and acquire new multimedia content that capitalizes on current technology.
5. Design a collection that is easy to integrate into diverse educational settings.
6. Widely promote and disseminate *STEM Stories* to appropriate target audiences.

These goals were addressed explicitly in a management plan that involved: 1) planning and designing, 2) producing, 3) evaluating, and 4) promoting. An important aspect of the project's Theory of Action included involving members of the target audience (4th-8th grade girls) and experts in the areas of curriculum development, database design, digital libraries and media production in the actual development, in order to develop a useful product. Furthermore, the leaders capitalized on their Advisory Board members' experience with gender equity programs, women's studies, science education, and at-risk youth to disseminate knowledge of the program to relevant audiences. The project had a long list of advisors including Catherine Didion, Dale McCreedy, Marion Rice, Lyn Reese, Joy Wallace, and the members and staff of the after-school Friendship Club, Nevada City, CA (www.friendshipclub.org) for middle and high school girls. The *STEM Stories* collection

was also promoted through press releases, articles, web links, conferences, workshops, web seminars, and publications, including NSDL events and activities.

Organizations that contributed clips to the STEM Stories website include: the American Physiological Society (<http://www.the-aps.org/>); Beyond Penguins and Polar Bears e-zine (<http://beyondpenguins.nsd.org/>); The Ohio State University; The Lemelson Center for Invention and Innovation (<http://invention.smithsonian.org/home/>); Smithsonian Institution; McLean Media (<http://www.storyline.com>); Teachers' Domain (<http://www.teachersdomain.org>); WGBH Foundation; and Scientists and Engineers in the Spotlight: Betty Harris, Elma Gonzalez, Millie Hughes-Fulford, Heather Knight, Antoninette (Nette) Martinez, Diana Reiss, Lauret Savoy, Susan Solomon, Jill Tarter, and Nai-Chang Yeh.

Features

STEM Stories is open to anyone with a computer and Internet access, and is free for any non-commercial, educational, or personal use. Project leaders and developers add new content and clips on a continuing basis – often every week – so there is almost always something new to investigate. On the *STEM Stories* homepage, a visitor is greeted with a colorful, dynamic set of images of women scientists and engineers, and is faced with several choices of where to go next:

- The “In the spotlight” feature allows visitors to “meet inspiring women scientists and engineers, and learn about their lives and their interesting work”
- One tab titled “Clips” allows one to “search for multimedia clips about individuals and careers”
- A second tab titled “Profiles” allows one to “find biographies of STEM pioneers past and present”
- A visitor can also click directly on a number of photos and activities to learn more about them

See a snapshot of the *STEM Stories* homepage below.

STEMstories

home clips profiles

STEM = Science + Technology + Engineering + Mathematics

SEARCH for multimedia clips about individuals and careers

FIND biographies of STEM pioneers past and present

Discover the people behind the ideas

Learn how Francheska Ruiz-Canino tracks coqui frogs in Puerto Rico

Meet La'ona DeWilde Environmental Biologist

- In the Spotlight -

Meet inspiring women scientists and engineers. Learn about their lives and their interesting work.

click portrait to view

Requires Flash Player 9 or greater
CLICK HERE to see your version

STEMstories™ is powered by Content Clips © McLean Media, all rights are reserved

Clicking on the “Clips” tab, a user may search for clips in the following *categories*: albums; interactives; video; web; e-book; sound; or text. Or one may browse by *fields*, which here include: Animal Behavior (8); Archaeology (3); Astronomy (8); Biology (26); Chemistry (13); Ecology (4); Engineering (16); Geology (6); Physics (8); Polar Research (18); Space (12); General (5); and History of Science (17), the numbers representing how many items were in that particular category during summer 2010.

Following the “Profiles” tab, a user may again browse for profiles by *fields*, which here include: Archaeology (6); Astronomy (13); Bacteriology (8); Biology (44); Botany (8); Chemistry (31); Ecology (7); Engineering (4); Geology (5); Mathematics (6); Medicine (33); Natural History (11); Paleontology (2); Physics (17); Psychology (5); and Technology (2). One may also browse by *topics* such as: Animals (26); Bacteria, Fungi, and Viruses (10); Cells & Genetics (12); Crystals and X-Rays (8); Earth and Space (18); Ecosystems (7); Fossils (3); Human Beings (46); Machines and Structures (3); Matter, Light, and Energy (16); Past Civilizations (6); Plants (14); Rocks and Minerals (4); and Water and Weather (5). Finally, a user can also browse the profiles section by the birthdates of the scientists profiled, covering a range from 350 AD to the present.

On each relevant page throughout the website, there are “search tips” to guide users and an update about what has been added to the site recently. Users can also print screens from the *STEM Stories* website and download clips for later use offline (as long as their use is not restricted by copyright).

Evaluation

Evaluation Plan and Approach

In 2008, McLean Media contracted with Inverness Research to serve as the external evaluators for the *STEM Stories* project. Inverness Research, Inc. is a private education research and evaluation firm based in Inverness, CA. The evaluation team consisted of Anita Smith and Michelle Phillips, primarily, with occasional input and oversight from founder and president of Inverness Research, Mark St. John. Inverness conducted minor formative, but mostly summative evaluation for this project. Due to limited resources, the evaluation could neither be particularly deep nor wide, but did provide the project with outside expert feedback, ground-truthing, and assessment of the project’s overall success, audience benefits and impacts, and implications for future work.

Early on in the work of the project, Inverness researchers met with McLean Media leaders in person and on the phone, in addition to consistent email exchange, in their role as “critical friends.” Inverness listened to the thinking and planning of the development team and provided feedback on the development, as well as some of McLean Media’s own formative evaluation plans and instruments.

Inverness’ primary role was that of external summative evaluator, through which we document the return on NSF’s investment in the work, including the extent to which the intended goals of the project were met. Here, one obvious outcome would be the tangible benefit of the online resources available through *STEM Stories* that are now assets for science education across the United States. In addition, the project might develop additional capacity and expertise to further future work. These capacities might include: the working relationships created through the work; the development of leadership and expertise that emerges out of the work of the project; and knowledge that is distilled from the experience of the project. Our summative work also focused on assessing the effectiveness of this project’s outreach and dissemination efforts in reaching the target audiences, with a view to inform future work and the field.

Evaluation Questions

Inverness’ evaluation was guided by the following questions:

- How successful was the project in meeting its intended goals?
- How are the *STEM Stories* website and resources used in the classroom and informal settings?
- What are the apparent primary benefits and impacts on students?

- Are there secondary benefits to teachers and other adults?
- What, if any, are the barriers to use facing students?
- From the point of view of classroom teachers, what are the barriers to use?
- Do students and teachers share resources from the STEM Stories website with others and if so, how?
- How are the accompanying materials used? How effective are they? Which are more effective than others, and why?

Evaluation Methods

Although the evaluation will collect and analyze some quantitative data, most of the evaluation will be based on qualitative data. Evaluation activities have included:

- Planning and update calls with project staff (McLean Media)
- Review of project documents and preliminary website resources
- Revision of evaluation plan and scope of work
- Face-to-face planning and feedback meeting in Novato, CA
- Feedback on field-testing protocols
- Review of field-testing data from Friendship Club and Advisory board
- Participation in Advisors' conference call
- Face-to-face planning and feedback meeting in Larkspur, CA
- Field testing and dissemination activity at the Expanding Your Horizons (EYH) conference at Sonoma State University
- Development and implementation of online survey instrument
- Recruitment and use of a team of expert external reviewers
- Review of statistics collected on website

Findings and Discussion

Development of the *STEM Stories* website

Process

The *STEM Stories* project leaders faced the challenge of updating content from the *Telling Our Stories* CD ROM and translating for the Internet – working with old technology, which had legacy issues, and putting the content on the web. The team has already begun to develop a framework for distributing digital assets using a database over the web, and they were ultimately able to build onto that system (the Content Clips system). Substantial effort was put into taking content whose quality had been reduced to fit on a CD-ROM and improving the quality for the Internet. The developers used a database tracking system to organize and archive all of their assets – slides, audio recordings, interviews, etc. To inform what assets were of interest and how they should be presented to the target audience, the developers met with the Friendship Club in Nevada City. In addition to translating some existing content, the project leaders also developed many new components, including

adding images to individual scientists' albums, along with curating entire new profiles. More effort was needed to manage the rights to various materials.

Evaluation and outreach activities have worked in a cyclical pattern, to inform development throughout the project. The developers themselves conducted formative evaluation work with the Friendship Club in their area and attended several relevant conferences and meetings – such as the California Science Teachers' Association (CSTA), National Science Teachers' Association (NSTA), National Science Digital Library (NSDL), and Expanding Your Horizons (EYH) – to disseminate knowledge of the website and to gather feedback on it, which they would then use to guide their work.

Lessons learned by the developers

The project evaluators conducted a thorough interview with the project PIs in October 2010 to reflect on big-picture lessons learned from the project. Questions included:

- How well do you feel you met your goals and objectives for the project?
- What went well?
- What were the challenges? (anticipated and unanticipated)
- How did you deal with those challenges?
- What lessons did you learn?
 - For yourselves, NSF, the field.
 - What kinds of things need to be taken into account when doing this kind of project?
 - Did you learn anything about designing for this age-range of students?
 - What would you do differently?
- What would you like to improve about the website?
 - Outline of your next steps with the project
 - Marketing and dissemination progress and plan

Over the life of this project, the leaders and developers learned several lessons worth sharing. One was determining just when to let the website go public, since development and improvement were an ongoing part of an iterative process. The project needed to simultaneously build the infrastructure of the website before they could put all the resources in, but they also had to put some resources in, in order to test the infrastructure and to disseminate it. These simultaneous processes, along with the sheer volume of materials to be posted, made it less than clear when the website was ready for review. Adding new scientists also proved more labor-intensive for the project leaders than they expected. In particular, engineers and mathematicians were less responsive to the project's requests than life scientists and natural historians.

For both the project PIs and evaluators, recruiting teachers to participate in the testing of the website was a continual challenge, as some teachers felt too constrained by the school's curricula and schedule to allow for testing. In addition, the timing during the academic year was critical, since standardized testing is so widespread and is the focus of many schools from March through May. To facilitate the integration of the *STEM Stories* website

into classroom practice, the project leaders learned they need to develop resources and materials to allow teachers to integrate the *STEM Stories* website into their language arts instruction, in addition to their science and mathematics lessons. As an example, in a local social studies class, 4th graders are paired with 7th graders and use the *STEM Stories* site to research a particular individual's professional journey, and then write a report on what they've learned. The developers hope to design additional similar opportunities and integrate the science standards wherever possible.

Interestingly, the developers have heard reviewers request the addition of male scientists to the site (and they are considering this). However, no one has ever asked explicitly why there are mostly women scientists featured so far. In fact, one teacher reported that none of her students seemed to notice the scientists they learned about were all women until she pointed it out.

Developers also reported that an important lesson learned was that it helps to have scientists produce their own clips, using Flip video cameras. Having the scientists create the clips themselves, providing the content, and then simply sending it to McLean Media allows the developers to leverage the initial investment into future opportunities. The website will continue to grow, and with scientists creating their own content, it can grow at a minimal cost. Eventually, project leaders hope to have a self-sustaining website where sponsors make a minimal investment to get a lot of exposure, and thereby support the ongoing maintenance of the site.

Related to this is the very important lesson the project leaders learned, which is that it is a challenge to continue to keep a website like this fresh and to continue to draw young people to it. They've worked with teachers to figure out how to bring young people to the site but they've learned it is also a learning curve for teachers to understand all of the content that is available there. They are considering various ways to prepare different audiences for what they might find on the site. In terms of designing a website that should appeal to middle school students, the developers reported learning that they need to keep content short, inviting, and colorful. They also found that this audience might care less about the interface than an adult might. What is more important to this audience is the personally and emotionally compelling content (particularly using personal images such as the photo albums). Ultimately, the developers plan to bring in another designer to review the graphics and the interface, to take a fresh look.

Perspectives on the Website

Developers' perspective

The developers stated that they feel they accomplished "less in some areas but more in others" but that overall, they've "really been pleased by the student and teacher feedback." The project was successful in meeting its large, overarching goal to move the content from a well-received but outdated technology (the *Telling Our Stories* CD Rom) to the Internet. Fortunately, the older material, which serves as the historical piece in the Profiles section,

still stands up in terms of accuracy and interest. And the format of the new website and the materials allows a user to search all of the individual resources located in the database.

While there are several projects that deliver content through databases, the project leaders feel their *STEM Stories* website is serving a more diverse audience than many other efforts, since it is aimed not just at 4th through 8th grade girls, but also boys and the adults who work with them. The project leaders said:

We're trying to keep it interesting but allow different people to do different things with it. There are three different audience approaches here. You can do an activity and jump right in through a 'causal browser' type experience. But then if there's someone doing something special, for example, during this upcoming women's history month, we might see a spike in usage of people going to the women's Profiles tab, for more historical research usage. Then another tab could be used by someone to teach searching skills. Maybe this is another way of doing that.

In order to use the site in a formal school context, the developers argue that it can't be attractive *only* to girls (relying on the use of the color pink, for example).

To date, the one compromise that developers concede is that they needed to aim for breadth rather than depth, in these initial phases, at least. Therefore, they have had to make decisions to limit some of the content; however, they also acknowledge that the website will continue to evolve and grow, and allow for more depth.

Public perspective

The evaluators from Inverness Research and the project leaders attended an Expanding Your Horizons conference in Rohnert Park, CA in March 2010 at Sonoma State University (<http://eyh-soco.org/AboutEYH.htm>). These conferences are designed to nurture middle school girls' interest in STEM courses and to encourage them to consider science- and mathematics-based careers. Attending the conference were hundreds of sixth through twelfth grade students, mostly girls, and their parents. The project PIs set up a table in a common area with STEM Stories information and computers for conference attendees to learn about the website in-between sessions and workshops. They also distributed information about the website to all conference attendees. Simultaneously, the evaluators set up computers in another area to test the use of the website with students and parents and solicit feedback. Twenty students and six adults were observed using the website and interviewed afterwards. Five of those participants (four students and one adult) filled out the online survey.

Inverness also designed an online survey (through Survey Monkey) for website users, a link to which was placed on the homepage of the *STEM Stories* website. Although the survey was up for several months in the spring of 2010, a total of only 22 surveys were collected. However, the data and comments collected were reviewed and proved to be informative.

External expert reviewer perspective

External expert review introduction

As part of Inverness' *STEM Stories* evaluation, we enlisted the help of four adults and six students in reviewing the website and giving us detailed feedback. These ten "expert reviews" took place in spring 2010, and each reviewer spent 3-5 hours completing the reviews. The focus of these expert reviews was on the **value and possible impacts** of the website. We wanted to steer away from getting a lot of specific input on what people thought should be added or changed and focus more on, given what's there, what is the **overall value**, what are the **potential uses**, etc.

The following four adult reviewers (all women, 40-55 years old) were chosen for their expertise with STEM education, evaluation, and online educational resources:

- Sonoma State University resource librarian with 25 years experience evaluating educational media
- Science educator and researcher/evaluator for 18 years with science education website review experience
- Senior digital media specialist at Columbia University with 15 years specific experience evaluating digital and online media
- Senior researcher/evaluator for 20 years with experience working with middle school STEM programs and evaluating NSF-funded online resources.

Adult reviewers were given a protocol to follow (see Appendix A) which included an initial self-directed free-flow exploration of the website and a set of tasks designed to ensure their exposure to various aspects of the website. They filled out the online survey (utilizing a special code so we could identify those responses) and completed an additional set of questions. Upon completion of their reviews, we paid each of the adult reviewers \$100.

The six student reviewers were chosen as a representative sample of potential student users: two 11-year olds (one girl and one boy), one 12 year old girl, two 14 year old girls, and one 15 year old girl. Student reviewers were also given a protocol to follow (see Appendix B) with step-by-step instructions, a pre and post set of questions and rating scales, a set of tasks (including an initial self-directed free-flow exploration of the website) and they too filled out the online survey. Upon completion of their reviews, we paid each of the student reviewers \$75. We also talked with the reviewers (mainly by phone, a few in-person) after they'd submitted their reviews and we asked them clarifying and summative questions.

The following summary of results draws upon the adult and student reviews, their online surveys, and follow-up interviews. Illustrative quotes are included which in some cases have been lightly edited for clarity and to maintain the reviewers' anonymity.

External expert review result summary

Most of the adult reviewers and all of the student reviewers were generally positive about the *STEM Stories* website and found it to be interesting, informative, and could imagine it being useful especially as a resource for classroom assignments. One of the adult reviewers was critical of the website overall and pointed out specific aspects she felt needed improvement. Many of the reviewers wondered how people would find out about the website, and most felt that the website could be more visually appealing and interactive.

In general, reviewers felt that the website is a unique and valuable resource, that it offers a much-needed focus on women scientists, helps challenge stereotypes, and that it helps personalize STEM professions by highlighting scientists' personal stories. The idea that scientists are real people—with lives, families, hobbies, etc.—came through well. Reviewers overall felt that one of the potential impacts of the website would be to help inspire young women into considering STEM studies and careers.

Student Reviews

When we compare student reviewers' responses to questions before and after their having spent time on the website, they show signs of becoming a bit more sophisticated in their thinking about what science is in general and what scientists do. This was not as much the case with technology, engineering, and mathematics (students were able to recall fewer details about those particular fields). Students' perceptions about scientists became more specific and included aspects of the passion some scientists have for their profession, as seen in the following examples:

	When you think about scientists, what comes to mind?
Before	People who test things and find things out about those things, and I imagine that they wear white lab suites.
After	Someone who tests ideas.
Before	People who discover new things in science and study them.
After	People who study and observe things.
Before	What comes to my mind is discovering our world.
After	I think of scientists as talented people who just love discovering our world.
Before	When I think about scientists, I have a tendency to generalize, or make stereotypes. I think of them as all studying certain areas of scientific research, but I know that science is very broad and that there are so many different facets of the crystal.
After	Scientists study factors in our world to make new discoveries, learn more about things, etc. Biologists study life, and Archaeologists study prehistoric humans.
Before	I think of the people who make the mysteries in our world clear.

After	The people who study or observe unanswered questions.
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Who do you think of as scientists? Can you give an example or two?	
Before	Hippocrates.
After	Susan Steward.
Before	Scientists I often think of as brainy people in a lab, looking through a microscope. When I think of scientists, Darwin and Mendel come to mind, but I don't know of many scientists in the modern era.
After	Scientists are people who work to answer the questions we find in our world.

What kinds of things do scientists do?	
Before	Find things out and test things. They come up with technology and breed animals to make different kinds of animals. They also figure out how to make a thing better for the planet, etc.
After	They experiment and they develop new knowledge.
Before	They discover our world as in they explore our world and they wonder if there's life somewhere on different planets and beyond our galaxy.
After	Besides being a scientist (discovering our world) they like to do other things such as dancing.
Before	Scientists study the old, the new, the sick, the healthy, and everything in between. They are constantly looking for new discoveries to add to knowledge, medicine, or other aspects of our culture and our world.
After	Scientists ask questions, form hypotheses, form experiments or observations, collect information, analyze the information, and conclude by proving a hypothesis to be true or false.

While student reviewers did show signs of slightly more awareness and sophistication in their thinking about technology, engineering, and mathematics, they were not able to remember specific names or details related to those fields from the STEM Stories website.

When you think about engineers, what comes to mind?	
Before	People who build things.
After	They apply science to develop new machines and buildings.
Before	The Golden Gate Bridge
After	People who design and build things.

When you think about mathematicians, what comes to mind?	
Before	I think of my current and previous math teachers. I think of intelligent, sometimes nerdy, and ambitious people.
After	Mathematicians are people who use math, and even science and technology in their work.
Before	Mathematicians are scientists who never touch the thing they are calculating, they find the answers through numbers rather than experimentation.
After	People who figure out their problems through equations rather than experiments or observation.

The majority of student reviewers rated their level of interest in science, and to some extent engineering, higher after having spent time on the website, but less so with technology and mathematics.

How would you rate your level of interest in: (1 low, 10 high)	Science	Technology	Engineering	Mathematics
Before	8	3	5	5
After	9	7	6	5
Before	7	7	3	6
After	8	7	3	6
Before	6	7	4	5
After	6	4	7	5
Before	8	6	7	8
After	9	6	8	8
Before	8	7	9	7
After	9	8	10	8

Overall, with a couple of exceptions, students felt that the website is a terrific resource for learning, and it helped them think about scientists in new ways.

What do you think about the website overall?
It is a great resource for schools and people who don't know much about scientists.
I think the website is very good and definitely is a place you can learn. It is set up nicely and easy to find things you're looking for.
It was okay but it got a little confusing on where to find answers.
I think the website is very interesting and thought provoking. I have enjoyed spending time on it.

I appreciate that it gives a better understanding of science to children.

When asked to rate overall aspects of the website, students responded with “average” to “very good” ratings (numbers of student reviewers shown in each column):

	Very bad	Bad	Average	Good	Very good
Quality of information	0	0	2	1	3
How it looks (visual appeal, attractiveness)	0	1	2	2	1
Balance of pictures and words (graphics and text)	0	1	2	1	2
Ability to get you interested and excited (generate interest and enthusiasm)	0	0	3	1	2
Ability to catch your attention and keep it	0	0	3	2	1
Value as a source of information (value as a resource)	0	0	2	2	2

Student reviewers rated certain aspects of the website highly, such as providing positive role models for young people and highlighting scientific careers:

	Not at all	Somewhat	Very much
Highlight scientific careers	0	1	5
Challenge stereotypes about scientists	0	3	3
Provide positive role models for young people	0	0	6
Increase your interest in science	0	2	4
Increase your interest in technology	0	3	3
Increase your interest in engineering	1	2	3
Increase your interest in mathematics	0	6	0

When asked what they liked best and why, students responded:

I liked watching the videos because you can see what the people look like what they have to say and what they are doing.
I like best that there are also clips, not just articles on the person because it is interesting to actually see and hear them and to hear an interview with them.
Being able to interview the different scientists, because you can learn about that scientist, how they lead their lives, and what subject they are researching.
I love animals so all the science in relation to animal activity was interesting.
I liked the interviews the best. They outlined the careers, and gave a basic understanding of jobs. They also showed that scientists have families, lives, hobbies, etc.

The most interesting things they found on the website were:

Heather Knight designing things for Ok Go. It really creates an inspiration for me.
I thought that it was interesting that there are records of woman scientists and their work in such early times.
The videos of different people.
The marking of the coqui frogs.
The frog observation.
The most interesting thing I found was a video on coqui frogs, and a group that kept track of the population.

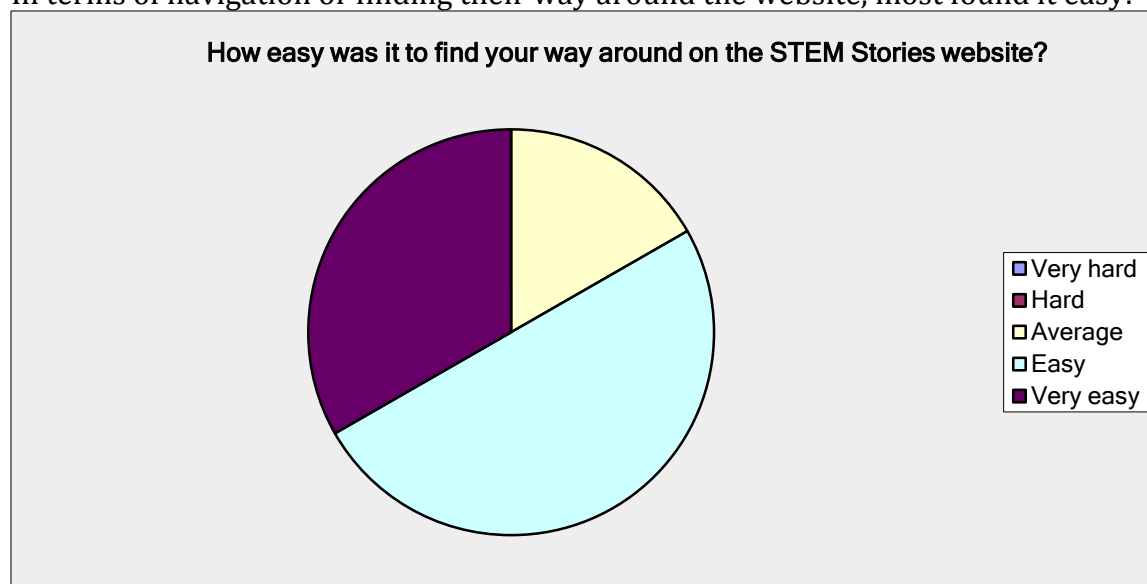
All of the students felt that the website was useful to them, and they mentioned the following specific ways in which it is useful:

If you are doing a school project on a person you can learn lots of things about them. I am saying this because this website has so many choices of people such as scientists.
I can use this website for my science homework because every month I have to write about a scientist and their work.
If I had to do a report on some kinds of science you can use the website to learn about how the scientists does their work and why.
It can be a resource for school work, an inspiration or a research tool.
I have been considering taking up a career involved in science, and now I am even more excited about it. I will use this website to explore possibilities for my future. I will also tell my friends about it. I am sure that at least some of them would be interested.

When asked what they liked least, students mentioned:

I did not like that all the people had a little experiment. I am only saying this because more kids would like it better.
What I liked least was that the homepage did not look too interesting.
I didn't really like looking around for the answers for my project.
I didn't like that it was basically just video because my computer loads video very slowly.
I did not like the clips as much as I had hoped. I was looking for a little more information about them.

In terms of navigation or finding their way around the website, most found it easy:



All of the students described the website as “kid-friendly” and commented:

All of the attachments to the home site are in big, bold lettering. One thing you could add would be a more colorful homepage.
Yes because it is easy to find what you are looking for and is easy to understand. Also, if younger kids can't read, they can watch the clips. It's also very colorful!
Because it helps show kids what they can learn and it's not inappropriate. It is kid friendly.
The explanations were said well and easy to understand.
It is not just focused on text. The videos, interviews, etc made it very different and interesting. It was great to hear about scientists' lives, work, and how they achieved their goals.
Because it gives specific examples of working environments for people in very specific areas.

To make it even more kid-friendly, a few students recommended:

Add kids that are doing amazing things also.
I would put an interesting background on the homepage, like a scientist doing their work.
I would give them more games to do with science so that it doesn't have a documentary feel.

When asked what they'd do to improve the site overall, students commented:

I would add more color to the home page and where it says stem stories on the top I would put a collage of all the people.
I would put an interesting background on the homepage like a scientist doing their work or working with kids.
I would make more definition of basic science for the younger kids to understand what is going on.
I would make it so that there weren't so many pop-out pages. I don't like having a bunch of web pages up at once, because it gets messy.

Did it help you think about scientists (and technologists, engineers, and mathematicians) in new ways? How? Give an example or two.
Yes it did. I learned that if there weren't any scientists on this earth we wouldn't be able to hold it together. I bet most people don't think about it very much.
Yes it did. I learned how there are so many different kinds of science and that even in just one group people do things differently.
No, it did not.
Not really because I got confused.
Yes, it helped a lot. It got me thinking about how science can be applied, what it takes to be a successful scientist, and the fun that can be had in each specific field.
Yes, it made me think of those fields as less of a simple subject and more as a way of life.

Five out of the six student reviewers said that they learned something new about scientists, and shared these following discoveries:

Scientists in Alaska are trying to help prevent oils and waste from getting into the ocean, lakes, and rivers. The amazing thing is that people in such far away lands are trying to help the world also.
I learned about new people and that a while ago there were not many woman scientists.
I learned about how technology and astronomy work together to find out about life on other planets. I learned about communication with dolphins. I learned about how to tag frogs for researching them. I learned that scientists have good lives and have a lot of fun, and that they find their work important.
I learned that whatever you're interested in, it may not be easy but there is usually some job opportunity.
I learned that engineering can be very playful. Also, I learned that science comes in so many forms. It is not limited to the typical careers.

In terms of helping to challenge stereotypes, students had mixed responses.

Did it help challenge stereotypes? If so, what kind of stereotypes and how?
Yes, if changes are made I think this would be a major website.
For me it didn't change anything because I already knew about the lies of stereotypes. But, for other kids who watch TV a lot and do not know the difference, it would show them that TV lies. They would know this because this website explains everything.
Yes, because some people think that women cannot be scientists.
No.

It definitely challenged stereotypes about nerdy scientists, and that science is boring. Science (and related fields) can be as interesting or uninteresting as you perceive. Science can be very fun! Scientists are people, too, not walking brains. They have families, friends, and hobbies. Women also can be interested in science. It is not only socially correct for men to work in science, these days. Women can use their intelligence in any way they choose, just as men can.

It challenged the stereotype that all science is done in a lab; it showed many interesting sciences done studying outside.

What kinds of things did you learn, in general, about the careers and personal stories of scientists (and technologists, engineers, and mathematicians)?

Most scientists really love their job.

I learned that many of the scientist parents didn't do science, and that you don't have to be related to be a scientist to become one.

That many of them were some of the only women in that field of work in college.

I learned that there are many people out there such as scientists that are discovering our world.

I learned that scientists (and people in other related fields) must have a strong appreciation for their work or topic, maybe even from an early age. Science requires curiosity, hard work, and the ability to ask questions.

I learned that there are small areas of expertise for everyone and how science is a much broader term than I had originally thought.

Do you think the website helps support young people's (especially young women's) confidence in themselves and in their abilities? If so, how?

Yes, they will be inspired from these women.

I think it would help people think about science more and consider becoming a scientist. The website shows young women how accomplished you can become and how much you can learn.

Yes, because it shows other people that were like them and pursued their dream.

Sort of. I'm getting older so I don't know what younger minds are like any more.

Yes, I think it empowers young people by showing others' successes. The stories and interviews show that one doesn't have to be wealthy, or a genius, to follow a passion.

Yes, it supports them in seeing other's success and how easily that could be them.

In terms of personally relating to the stories of the scientists shown on the website, only half the students felt they did:

How well did you relate to the personal stories of the people shown on the website? Did you find any connections between your personal life and the content of the website (the scientists features and their stories)? If so, what?

I can relate to Shaundra B. Daily because she loves dancing.

I found many similar interests. Also, the interviews, videos, and pictures helped relate to the scientists on a more personal level. It showed that they had real pasts with rather average beginnings, but found what they loved, and ran with it. We all start somewhere, and these aspects of the website helped them to seem much more human and relatable.

I truly loved all the animal observation since that is an interest of mine.

In terms of the website's overall value, most students view it as a valuable resource:

What do you think about the website's overall value?
In the future many more women will become scientists because of this site.
It was a useful website because it showed me what it is to be a scientist.
Good!
It was average.
It held very valuable information, in my opinion. I was so impressed.
It is valuable in that it shows young people the reality of what a scientific job could be.

In terms of impact, students felt the website offers STEM learning and career inspiration.

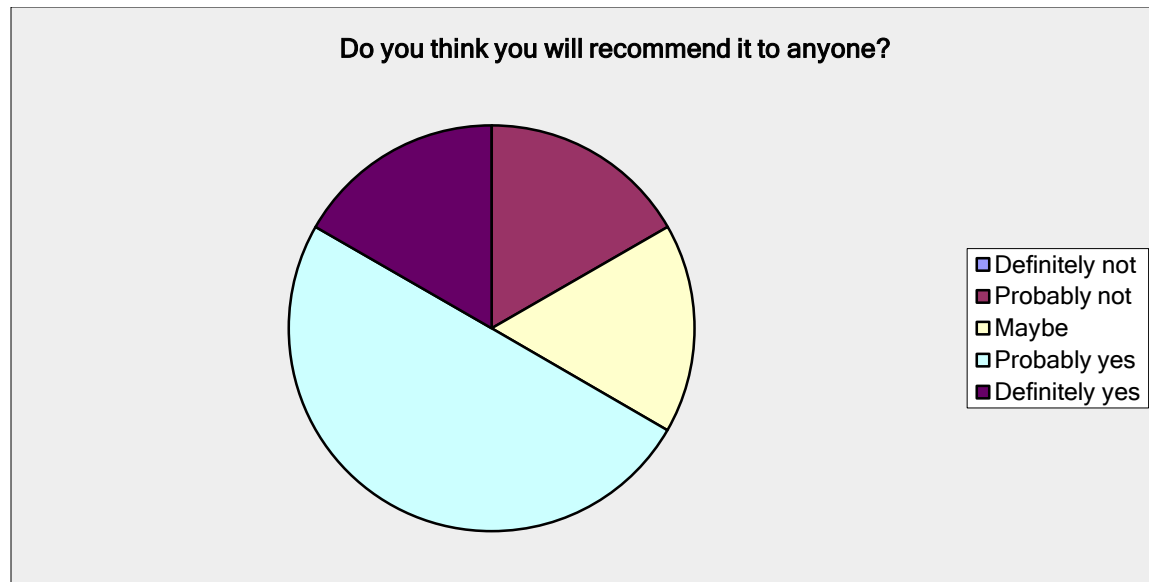
Potential impact?
Someone might be inspired by one of these women.
It helped me learn, so it would probably help other kids.
I think that 3-7 grade would benefit from this website.
I think it will influence many young people, especially girls, to become interested in science related careers. Or, if they are already interested, not to be dissuaded by societal rules and stereotypes about women.
It could impact many people to think about or even study the subjects within science.

Potential uses?
Mostly schools, teachers and kids will use this site for reports on people.
The website would demonstrate for kids what real scientists really do.
For homework and for fun!
The potential users are young people in school.

Four out of the six students said that they would probably or definitely revisit the website:

I might go back to it because I might use this as a resource for my homework.
Because it is interesting.
Because it is fascinating and could definitely be useful.
I am looking forward to finding careers that interest me.

There was mixed response about whether they'd recommend the website to others:



The reasons they would recommend it to others included:

I will recommend it to my teacher because he does an annual pick your own person report.
I might give someone in my class this website so they could use this for their homework or I might tell my teacher so that they could use this to teach.
If they were looking for something about science or technology they might find it on this website.
I was very pleased and surprised by the information given. I think many of my friends will feel the same way.

Other thoughts, comments, questions?
I would have liked it more if more people had experiments attached to it . . . more kids would like it better . . . I liked those.
The moving portraits [on the homepage] are cool!
The Millie Hughes Fulford experiment was a little confusing to do. I tried it, but didn't get what you were supposed to do.
Great idea putting background of scientists doing work on the homepage, but the homepage isn't very interesting (graphically, visually). The website didn't increase my interest much in engineering or math . . . There wasn't much on those fields.
They could make it have bigger letters [fonts], more colors, at the top maybe a collage of all the faces would be nice. If they organize the pictures a little more . . . on the homepage, maybe organize them by scientist, biologist, etc. so you can see which one you want to look at. On our computer, on their pictures, it didn't want to open some things, like the engineer . . . and photo albums, and from the search side of things there were a few glitches . . .
Thank you for creating a website that empowers young women to get involved in sciences. It is so important that girls don't get misled by TV and media.
Nice work! You have done a wonderful job, and it will benefit many children, such as myself.

Adult Expert Reviews

Most adult reviewers had overall positive views of the website, as reflected in these ratings:

What did you think of the website?	Very bad	Bad	Average	Good	Very good
Quality of information	0	0	0	3	1
How it looks (visual appeal, attractiveness)	0	0	1	3	0
Balance of pictures and words (graphics and text)	0	0	1	2	1
Ability to get you interested and excited (generate interest and enthusiasm)	0	0	2	1	1
Ability to catch your attention and keep it	0	0	1	2	1
Value as a source of information (value as a resource)	0	0	1	1	2

As with student reviewers, adult reviewers felt that the website helps highlight scientific careers and provide positive role models for young people, but their specific interest in technology, engineering, and mathematics was not greatly increased:

Did the STEM Stories website help:	Not at all	Somewhat	Very much
Highlight scientific careers	0	1	3
Challenge stereotypes about scientists	0	1	3
Provide positive role models for young people	0	1	3
Increase your interest in science	0	3	1
Increase your interest in technology	1	2	1
Increase your interest in engineering	1	2	1
Increase your interest in mathematics	1	3	0

When asked what they liked best and why, adult reviewers often mentioned the ethnic diversity represented, the personal stories, and the historical aspects:

Liked the multicultural mix of women profiled. Liked the animal rehab video. It was engaging and compelling and included cute animals. Like the captioning of the videos.
The way the personal stories were woven into the scientists area of specialization from childhood to the present using audio, video, images...
I liked the diversity of women represented on the site -- the variety of fields, ages, ethnicities. I liked that it portrayed their passion and their work but also their families and lives.
I liked the profiles about women scientists from long ago. This gave me a sense that women have always been doing science.

The most interesting things they found included:

Liked the multicultural mix of women profiled.
It was interesting to know how she scientist achieved what she did and how she grew up.
I was excited to see Heather Knight as I love OK Go's video and seeing how she constructed some of the elements of that Rube Goldberg machine. I liked finding out about Jill's Ted Prize wish -- about involving as many people as possible in SETI work.
The story of the woman who is bipolar and has PTSD and in spite of this, has become a scientist -- developing her own unique career. I also liked the story of La'ona DeWilde. To me, she is the ideal scientist--one who respects and cares for the world around her and works to make it better, rather than just asking questions out of idle curiosity and the desire to catalog and dissect.

When asked if they found the website useful, most adult reviewers responded in the affirmative, with one exception:

Sorry, but I don't see how it will be particularly useful. What's the hook to get girls to the site in the first

place?
I immediately showed it to my two children, even my 8 year old son enjoyed hearing some of stories and seeing the robotics video.
I already shared some of the interesting video clips (the frog scientist from the home page) with my children. They were interested and I can imagine going to this as a resource as they work through science topics in school, or to build on things we have seen in museums.

What did you like least?

The stories are interesting but the site just seems a bit flat and unengaging. I was disappointed in the engineer's video (Heather?). She looks like she's done incredible work, but the video didn't capture her excitement as an engineer.
Some of the icons for the various resources were a bit unclear, for instance the text under blue "i" icon seems as though it should be labeled "Interview" or "audio interview" to parallel the video icon. The "web" icon should say "web links" since I am not sure kids would understand the images of the links.
I didn't like that I couldn't navigate through the clips section -- only the home page and the profiles. I was disappointed that I couldn't follow up finding out more about Heather Knight.
The stories about men! I was confused by the presence of these stories on a site about women scientists. Why are they there?

When asked for suggestions on how to improve the site, adult reviewers focused mainly on making it more interactive and including more young scientists.

More examples of women closer to the target audience's age and experience. I prefer sites like the Exploratorium that take everyday types of experiences and make the science behind them jump out (http://www.exploratorium.edu/). If your intent is to focus on role models, include more of the exciting parts of the science.
Create an interactive section for girls to contribute their own stories, images, videos and experiences.
Break the text up in the biography highlights in the profiles section. I'd make the "go back" navigation consistent from one section to the next (can use the browser back arrow in some places and not in others). Just little things.
Perhaps you could feature young scientists who are currently studying and developing their careers-- college students, graduate students.

Most adult reviewers felt that the website is a valuable resource.

What do you think of the website overall, in terms of VALUE
The website is a valuable resource for finding out more about different scientific careers and about the backgrounds, work and values of a wide range (time in history, socio-economic status, race) of women scientists.
I think it has good value. It collects in one place in a very visually appealing format the stories of women scientists. It covers an array of fields and ethnic backgrounds, so anyone could find positive role models here. I like that it included stories about their lives as well as their work.
The website's rich and personalized content provides a wonderful resource for teacher, parents and girls, particularly girls of color.

In terms of potential benefits and impacts (to students, teachers, general public)
I liked the multicultural nature of those profiled, good role modeling there, helping students think beyond the stereotypes.
I would say that it gives a more well-rounded picture of women in science—both through looking at who they are personally and also the extent to which women have been involved in science throughout history.

I'm not sure the website is going to be that "findable" by the general public. I Googled women scientists and got a whole host of websites that weren't STEM stories. So I'd worry about that a bit. I think if people know about it and can find it, it will be very useful. I can see teachers weaving some of these stories into science units or having their students do independent research on this website. I can see informal educators who might be looking to include clips of women scientists in kiosks in exhibitions that might be able to draw from this. My kids were definitely interested in what was on the site.

For the most part girls imagine themselves becoming doctors or perhaps veterinarians if they have any interest or affinity for science, yet they have little life exposure to other fields of science. Even in a progressive educational institution such as Columbia University, fields like engineering and technology are predominately male with very few women of color (non-Asian).

In terms of potential uses (can you imagine the STEM Stories website being used in classrooms and informal settings? How do you think it could be utilized?)

If it were used in conjunction with some kind of career exploration assignment, perhaps.

I can imagine teachers having middle school and high school students use the website to learn more about the history of science, science careers, the nature of scientific experiments and women's role in the scientific world.

I could imagine assignments and exercises being developed around the resources. Students could view at home and then share and discuss in class.

What barriers, if any, might students or the general public face using this website?

Is it fully 508-compliant? Could someone use it with a screen reader, for example?

I can't think of any significant barriers. Perhaps reading level—there is a fair amount of scientific vocabulary.

Finding it to begin with is one. I never could get to anything through the clips section because of pop-up blocker issues which I couldn't resolve.

Some homes and schools do not have internet access and the bandwidth maybe too low to handle playing the videos or loading the images efficiently.

How successful do you think the project was in meeting its intended goals (to highlight careers, challenge stereotypes, and introduce strong role models)?

The goals were good, I just didn't feel inspired by the production.

Very successful. I myself was impressed with the range of women featured (age, socio-economic status, race, values, backgrounds), the diversity in their stories and the diversity in the values they promote. For example—one of the scientists, Sandy Carlson, talked about how she was a successful (tenure-track) professor but still had a balanced life. She also talked about how some of the turn-offs for her in the culture of academia/science research were the competitiveness and the role of money. She also recommended that students who are interested in science should be sure to get a broad educational background. I think these kinds of profiles challenge the stereotypes about scientists, what their lives are like and what values they hold. I'm guessing this kind of information might make the possibility or appeal of a scientific career stronger for a young woman considering it.

Very successful – the website does all of this quite well.

The website is inspiring and powerful. Highlighting both contemporary and historical female scientists provides an appreciation of the difficulties these women scientists faced in the past while focusing on successful present day scientists that female viewers can relate to.

Does the website use a tone of respect in regard to the user's abilities?
Yes.
Yes.
This is a good question! The font and stars across the top are kind of "cutesy" for lack of a better term, and perhaps targeting younger kids, but the manner and tone with which the information is conveyed seems to be aimed at a higher level. It's easy to navigate (except for the clips section).
The language and icons used throughout the site are simple yet not "dumbed down" to a point of undermining the viewers intelligence. The overall look and feel is friendly and inviting.

To what extent and in what ways does it support and nurture young women's confidence in themselves and in their abilities?
Not sure. Didn't see that it really addressed students' abilities. I could see it possibly providing role models for girls who were already interested in one of the fields highlighted, but I'm not sure it would inspire girls who weren't particularly interested in the first place.
I think the site does it best by telling the stories of women who each took a different path to a scientific career and each have their own unique way of being a scientist. Anyone can do it, if they want to.
It definitely highlights women from a variety of backgrounds and contexts pursuing their interests – that is really powerful. And it shows them meeting challenges at home, growing up, in their workplaces and leading fulfilling lives.
By relating to and identifying with successful female role models becoming a scientist seems more tangible. The wide range of fields and areas of scientific interest of these women may spark curiosity in the viewer, perhaps even in an areas she never thought of before.

To what extent and in what ways does the website encourage exploration and inductive learning?
I'm not convinced it does.
I'm not sure what you mean by inductive learning. I felt that my own interest in the fields of science, the history and the people led me on, I didn't feel discouraged or encouraged by the website.
The home page certainly invites exploration – the fact that the information is organized in a variety of ways (subject matter, dates, faces, videos) should mean that almost any "style" of website surfer should be accommodated here. Once I clicked on one face, I wanted to know more about each woman, and I wanted to explore all of the women on the home page.
The site encourages comparing and contrasting interviews, backgrounds, specializations and following threads of information organically.

Do you think the website lends itself easily to small-group use?
Perhaps. If it were part of a carefully constructed lesson plan.
Not sure. I wouldn't think it would be difficult—though looking at one computer in a small group might be frustrating, but it does seem like a place to explore individually. One could explore individually and share with a small group. I think some of the interactive pieces could be easily adapted to small group work—the Susan Solomon experiment, comes to mind.
I'm less enthusiastic about this notion. Having two or more kids work on one computer is almost always mind-numbing for the ones not in control of the mouse or keyboard.
Listening to interviews, viewing videos and analyzing information in small groups stimulates discussion and raises questions and awareness.

Is it likely that the target audience (4-8th grade girls) will find connections between their personal lives and the content on the website?
I really don't see it. This was the part I was most disappointed in.
I would say that the personal stories some of the current scientists tell about their life paths would be the place where these girls would find a connection to their personal lives.
I think so, especially in the photos of these women as children with their families, and in the videos of their field work.
The scientists that included pictures and stories of themselves when they were younger and how they discovered their passion for science are especially motivational.

Does the website encourage role-playing?
Hmmm...I don't think so.
I'm not sure. It might encourage girls to imagine themselves doing similar work or finding their own way according to their interests.
Definitely. I wondered what it would be like to work in Puerto Rico and study frogs in the middle of the night and if I would be as jazzed about it as Ruiz-Canino clearly is!
A number of exercises can easily be designed around the resources including role-playing, though such activities would need to be organized and guided by an instructor.

According to online survey results, all four adult reviewers found it “easy” to navigate or “find their way around” the site, and most felt that there were numerous navigational paths to choose from.

Does the website allow the user to select from numerous navigational paths?
Not really. You can search or browse. The searches I tried came up empty.
Yes
Definitely – one of the real strengths of the site.
The viewer not only has the option of choosing different navigational paths but also learning through a variety of modalities: audio, video, text and images. This flexibility enables viewers to use learning modalities that tap into their strengths; auditory, visual or a combination.

In response to whether the website is “kid-friendly,” adult reviewers were split. Half said yes, half no.

I'm not convinced it's particularly kid-friendly, but kids can tell you better than I can. I'm not sure that they would be motivated to click into the lists of names. I didn't find the search mechanism particularly helpful since every almost term I tried came up empty.
The website's aesthetic feel is kid friendly and rich with engaging images, audio and video. The range of questions from the scientist personal background to questions about their field we interesting.
For the most part, yes. I think some of the highlighted biographies are long and the text could have been broken up more to make it more friendly for kids.
No is a strong answer--but I think that for younger children the site is text-heavy. The text and organization seem appropriate for middle school and beyond.

Their suggestions for making it more kid-friendly included:

Try to find more stories with younger women (someone easier for the kids to identify with). Perhaps stories of high school or college students involved in research would make it seem more relevant to their ages and interests. It seems kind of flat--not much interactivity or integration of social networking or web 2.0 tools
Create an area for the student to create their own album about their science interests and personal story about an adventure or activity around their area of interest.
Break some of the text up on the highlighted biographies. Other than that, I think this is good -- it presents the information in a variety of formats (text, audio, video, photos) and makes these fabulous women and their work very real and accessible.
Perhaps more pictures and graphics, but again, I think it is fine for older children.

Does the website encourage extended exploration?
Maybe, but even though I have an intrinsic interest in the subject I wasn't very motivated to keep exploring or go back to it.
Yes
Here again, yes. The bits of information on the clips accessible from the home page – the profiles, q and a's, photo albums – all encourage deeper looking into these women's lives.
I went back to the website 4-5 times following different paths, scientists and areas of interest. Initially I was drawn to each woman's personal story which stimulated my curiosity about their work and research. The related web links provided the opportunity for more in depth exploration.

To what extent and in what ways does the website emphasize the importance of its topic matter to human relationships?
The profiles tried to create connections by having childhood pictures and stories. There was some connection in a few of the stories, the orphaned animal story, for example. In the engineer's video, on the other hand, I couldn't see the relevance of the Goldbergian contraption and the inflatable letters. Seems like she has done a lot more interesting things at MIT. I did like that there were examples of women who stumbled along their academic paths. Not all of them went to MIT. Not all of them knew from the beginning what they were going to do.
I suppose this comes up most in the personal stories—the story of Joan Gibbon Esnayra, is an example of how personal relationships influence and are influenced by scientific work.
The photos of these women's childhoods, and their stories of what learning science was like for them are strengths of the site and definitely "humanize" science in very nice and meaningful ways.
The site provides positive role models of women, particularly women of color, in fields of science which inspires girls to think about careers in science, technology, engineering and math. A diverse work environment builds a more balanced well rounded community. These women careers demonstrate a commitment and passion for better understanding, protecting and improving the world.

Are the graphics clear and easy to understand?
yes
yes
Yes. The only spot that was confusing was that I could use the back arrow on my browser to go back in some places, and not in others (not in the profile section, for example). Not a biggie, but would be nice if it were consistent throughout.
The icons, search and navigation are clear. Creating activities and creating clip collections and sets was a bit confusing.

Any comments on the quality of the graphic, audio, and video components?
The film on the coqui was too dark to really see much. The one on the engineer didn't tell me much about her work as an engineer. She looked interesting and her interview responses were interesting, but I didn't get a good feel for her work as an engineer. Also, many of the profiles were for women working outdoors, sometimes in extreme conditions. I'm not sure how the target audience would respond. In my experience if girls that age have not spent a lot of time in outdoor pursuits, they tend to tune it out as scary or something they would never do.
The graphics and the look of the website seem a little dated and frumpy to me. The quality of the audio and video was fine.
All top-notch.
The quality of the images, clips and audio is good and loads quickly. I viewed over Gbit ethernet and wireless connection from home.

Other thoughts, comments, questions?
Overall there is some good content, but it's not presented in a particularly compelling way. I started off excited about the concept and mission, but I was really surprised when I started writing about it just how flat it felt. There are so many possibilities with the technology that I was disappointed to find it so limited. Thanks for the opportunity to review it. Sorry it wasn't a more positive review.
Started with the clip of Heather Knight – I am very familiar with OK Go's This Too Shall Pass video of the Rube Goldberg machine and wanted to find out what part she played in it. Thought she might talk more about the processes, frustrations, etc., of creating her segment of the machine... also expected to hear more about where she went to school. Clip size was about right though – not intimidating length. Then watched the frog researcher clip – liked that it took you through her field work processes. Then watched the third featured clip of DeWilde, the biologist from Alaska. Was feeling a bit tired of viewing clips by that point, but could see how this might be useful to a teacher or exhibit developer who wanted to include clips of female STEM folks in their classes or work. *** Then I went to the biographies – intrigued by the ancient women – don't hear much about them. Back navigation didn't work – frustrating... arrange chronologically and not alphabetically might have helped me – that's how I was trying to navigate the long lists. Tried to find the bio on Heather Knight because I wanted to know more about her – searched and didn't come up with it. *** Then I went to clips and clicked on animals – saw the dolphin air rings – had seen pictures of those at an exhibit in North Carolina so I was interested in finding out more. Clicked on the video but it didn't work. Tried to look at Diana Reiss' e-book – said my pop up blocker had to be disabled (but I don't have one of those)... hmmm... I went back to the home page and found Diana on the swirling photos piece – went through everything on her profile there. Didn't find out about the dolphin air rings though... I then clicked through several more profiles here – four or five; looked at the photo album of all; listened to the initial interview, read the profile, and selected a few questions from each interview to explore. *** I finished browsing through the faces on the home page. I really liked the audio that went with Jill Tartar's photo album. *** I couldn't get anywhere from the clips section – no matter what I clicked on, my computer kept telling me to disable my pop-up blocker. I don't have a pop-up blocker on my mac... I tried to alter some settings, but it still wouldn't let me go anywhere. I was excited to find Heather Knight and wanted to now more about her. I would have explored engineering, animal sciences, and physics probably. And I did look at all of the above listed activities yesterday from the home page when I clicked on the faces. *** Loved the links to the SETI site on Jill Tartar's page – I am a big TED fan so was excited to see she was awarded a TED Prize, and it was easy to follow her TED Prize Wish blog and find out what she was interested in. Cool beans! Then I explored by date and chose the earliest date I could find – Hypatia. Wondering how we know about her... where was her story recorded? I'll have to find out. Then I read about Trotula. Then I read about Rachel Carson. I like the info on these highlights but it is a bit intimidating in length – might be off-putting to a student. *** I like the diversity of women represented here – through time, through fields. Wondering how they were chosen and what criteria were used to select and highlight these women?
Providing a means for views and instructors to contribute their own content, create collections and assignments would make this an even more powerful resource.

Additional comments from the survey:

Couldn't tell whether or not it was fully 508-compliant (didn't see alt tags, for instance), but it needs to be, especially if it's federally funded.
With so many social websites such as facebook, blogs... I think girls would get a lot of sharing their own areas of scientific interest and experience through text, audio, images, video...
I like the site and can see it being used in a variety of ways, in both formal and informal education settings.
I forgot to mention that I really liked the personal photographs that are available for some of the scientists. This conveys the idea that scientists are people too--just like us--they were children, had pets and siblings. This might be my favorite part of the website--demystifies scientists.

Conclusions

Based on surveys, observations, interviews, and expert reviews, the evaluators' overall assessment of the project is that it accomplished its goals and objectives. The project successfully created a high quality, free web-based set of multi-media resources about the stories of STEM scientists (mostly women, both past and present), which are now available online to help inspire and engage youth, particularly middle school girls. By leveraging their previous work with the Content Clips project, McLean Media has created a valuable resource that will likely be a beneficial addition to STEM education, both inside and outside the classroom.

Most of the students and adults surveyed and interviewed were positive about the *STEM Stories* website and found it to be interesting, informative, and could imagine it being useful especially as a resource for classroom assignments. Questions were raised about how the public would find out about the resource. Many of the students and adults interviewed and surveyed felt that the website could be even more visually appealing and engaging for middle school girls.

In general, expert reviewers and those surveyed felt that the website is a unique and valuable resource, that it offers a much-needed focus on women scientists, helps challenge stereotypes, and that it helps personalize STEM professions by highlighting scientists' personal stories. The idea that scientists are real people—with lives, families, hobbies, etc.—came through well. It was felt overall that one of the potential impacts of the website would be to help inspire young women into considering STEM studies and careers.

Our external expert student reviewers felt they became more sophisticated in their thinking about what it is a scientist is and does (and to lesser degree what it is engineers and mathematicians are and do). Overall, through engaging with the *STEM Stories* website, students reported understanding better that scientists are real people with lives, histories, passions, and interesting stories. Student reviewers also reported that they became more interested in STEM subjects and careers after exploring the website and wanted more ways to be able to interact with the scientists and other students.

Inverness' impressions of the project leaders are very positive. We feel they solicited and actually listened to feedback from a number of valuable sources. They took our advice to focus on producing quality rather than quantity of online resources, and on usability and ease of navigation over populating the website with many resources. The project successfully cultivated a nationally-renowned advisory board for the benefit of the project. Advisory board members were systematically surveyed, their input was solicited at strategic times, and the project utilized much of their input. The project proactively captured their own reflections and lessons-learned (anecdotal and intuitive) following field-testing sessions, and this led to efficiently resolving technical problems and integrating improvements.

Aligning the resources as much as possible with science standards, and highlighting the accompanying science standards, would help the *STEM Stories* website appeal to and become even more useful to teachers and/or after-school providers. Expanding the ability to browse by topic, for example, would be one good method for connecting to standards. Finally, increasing the interactivity of the website could help to bolster increased, as well as, repeated use, and continuing to pursue new avenues for marketing will be important to the project's dissemination success. Even with these recommendations, we believe the project has successfully met its original goals, is an important contribution to inspiring a new generation of STEM scientists, and we strongly suggest further dissemination.

Appendices

- A. Expert Review, Adult Reviewer's Protocol
- B. Expert Review, Student Reviewer's Protocol
- C. Online Survey

Appendix A – Adult Reviewers’ Protocol

STEM Stories Website Review Expert Reviewer’s Protocol

May 18, 2010

Thank you for agreeing to participate! We’re grateful to get your expert views (especially your education and media perspectives) on this new STEM Stories website: www.stemstories.org.

Background

The STEM Stories website was created by **McLean Media** (based in Grass Valley, CA). They received a grant from the National Science Foundation (NSF) to create a website which highlights the stories of women scientists. From their original proposal to NSF:

This Outreach and Communication project will assemble and disseminate a digital collection of multimedia clips and online activities to highlight careers, challenge stereotypes, and introduce strong role models. The *STEM Stories* collection will let children explore the lives and work of a diverse group of women through a combination of career-related content and personal stories. This project will build on the outcomes and insights of two prior NSF-funded research projects that resulted in the *Telling Our Stories: Women in Science* CD-ROM and the *Content Clips* web system environment, which was developed through the National Science Digital Library (NSDL) program. The primary audience is girls in Grades 4 - 8 and the educators that interact with them, in both formal and informal settings where computers with Internet access are available.

Through Inverness Research (www.inverness-research.org), my colleague Michelle Phillips and I were contracted to evaluate this project. Part of our summative evaluation is collecting feedback on the website from educators, students, media experts, and from the general public.

We want your complete and honest feedback. We are especially interested in hearing your thoughts on the **overall value, potential impacts, and potential uses** of the website. While some new content will be added and minor changes may be made to the website, it is pretty well set for now, so we don’t want you to spend too much time giving detailed feedback on what you would change or add. Some of that input is fine and welcomed, but again, the focus of this review is broader. It is about the overall value and potential contributions of this website to STEM learning. This review is also about getting your impression on the overall success of the project in meeting its original goals to highlight STEM careers, challenge stereotypes, and introduce strong role models (particularly for 4-8 grade girls). Your comments will be grouped with other reviewers’ comments and **reported anonymously**: We will not use your name or any identifying information about you in our report so your privacy will be maintained.

If you have any questions about this, or anything else about this review, please don’t hesitate to ask. Thanks. It’s an honor to work with you!

Anita Smith and Michelle Phillips
Inverness Research

Here's what we would like you to do . . .

- 1. Fill out the following information** so Inverness Research will know where to send the \$100 honorarium. Your name and address will be kept confidential and will not be used for any other purpose.

Your first and last name:

Address where we should send the check:

NOTE: Please allow 2-3 weeks for the check to arrive. We will try to get the Inverness Research office to send the check out ASAP, but sometimes the paperwork takes a little while, so please be patient.

So we may describe our group of expert reviewers, please tell us:

- Your profession and/or work title:
- How many years have you been doing that work:
- Have you ever reviewed or evaluated educational media before (website, video, audio, etc.)? If so, please briefly describe (an example or two would be great).

- 2. Begin exploring the website.** Follow whatever path and links within the website you want. (Just don't fill out the online survey quite yet). Follow what interests you, not what you think you "should" do or be interested in. Have fun! Jot down notes for the review as you go along. We recommend spending at least 30 minutes doing this initial exploration, then taking a break and coming back to explore the website more in another session.

- 3. Next, spend more time on the STEM Stories website.** There is quite a bit of information on the website, and we don't expect you to look at it all (by any means!), but we would like you to move around the website becoming familiar with the variety of things it offers in different sections. For example, make sure you:

- Follow at least a few of the links on the homepage. See what interests you and follow those links to read more, watch videos, listen to interviews, etc.
- Look through the "Clips" section, browsing through at least three different fields and make sure you try out at least one of every type of activity (watch a video, listen to a sound recording, look through a photo album, try an interactive activity, read a profile, follow a weblink).
- Look through the "Profiles" section. Try browsing by field, by topic, and by date. Remember to jot down notes about your impressions/reactions as you go along.
- If you want, for fun, try out the crossword puzzle (attached). This is completely optional.

4. Fill out the online survey (follow the link to the Survey Monkey survey on the STEM Stories homepage). When answering the first question, “*Choose the ONE that best describes your role while looking at the STEM Stories website*” check “OTHER” and type in your name and “reviewer” in the box so we’ll know it’s you. Complete the rest of the survey filling out the text boxes and being as thorough as possible.

5. In addition to the online survey, please respond to the following questions:

- a. What do you think about the website overall, in terms of:
 - i. Value
 - ii. Potential benefits and impacts (to students, teachers, general public)
 - iii. Potential uses (can you imagine the STEM Stories website being used in classrooms and informal settings? How do you think it could be utilized?)
- b. What barriers, if any, might students or the general public face using this website?
- c. How successful do you think the project was in meeting its intended goals (to highlight careers, challenge stereotypes, and introduce strong role models)?

Confidence

- d. Does the website use a tone of respect in regard to the user’s abilities?
- e. To what extent and in what ways does it support and nurture young women’s confidence in themselves and in their abilities?

Collaboration

- f. To what extent and in what ways does the website encourage exploration and inductive learning?
- g. Do you think the website lends itself easily to small-group use?

Personal Identification

- h. Is it likely that the target audience (4-8th grade girls) will find connections between their personal lives and the content on the website?
- i. Does the website encourage role-playing?

Contextuality

- j. Are information contexts (histories, stories, explanations, backgrounds, etc.) emphasized?
- k. Does the website encourage contemplation and interpretation?

Flexibility/Motility

- l. Does the website allow the user to select from numerous navigational paths?
- m. Does the website encourage extended exploration?

Social Connectivity

- n. To what extent and in what ways does the website emphasize the importance of its topic matter to human relationships?
- o. Does the website provide methods for contacting other people, such as a chat room for speaking to experts or email addresses for obtaining further information?

Graphic/Multimedia Concentration

- p. Is there a relatively high percentage of graphic and multimedia content?
 - q. Are the graphics clear and easy to understand?
 - r. Any comments on the quality of the graphic, audio, and video components?
 - s. Other thoughts, comments, questions?
- 6.** Lastly, after sending Anita your completed responses, **finish up this whole process by talking with Anita and/or Michelle** on the phone for 10-15 minutes. This will give us a chance to ask any questions we might have about your comments and to talk about the website overall.

Appendix B – Student Reviewers’ Protocol

STEM Stories Website Review – Student Reviewers’ Protocol

May 15, 2010

Thank you for agreeing to help us with this project! We’re excited to have your views on this new website, STEM Stories: www.stemstories.org.

Background

The STEM Stories website was created by **McLean Media** (based in Grass Valley, CA). They received a grant from the National Science Foundation to create a website which highlights the stories of women scientists. For the past few years they have been going around the country interviewing women (and some men) who made a career out of doing science, technology, engineering, and mathematics. McLean Media video-taped some of them and collected their personal stories and photos (fun job, eh?!). They also collected historical photos and information about scientists from the past. They put all this together into the STEM Stories website which became public just a few months ago.

Along with my colleagues from **Inverness Research** (www.inverness-research.org), I was hired to evaluate this project. (That’s often what happens when a group gets a big grant from somewhere like the National Science Foundation – they are required to have an outside team of researchers look at the results of the grant, collect feedback from the public, and assess its overall success.) Part of this evaluation is collecting feedback on the website from students like you, from media experts, and from the general public.

We want your complete and honest feedback. Remember, I didn’t help create this website, so don’t worry, you won’t hurt my feelings if you have something negative to say about it. We are especially interested in hearing your thoughts on the **overall value, impacts, and potential uses** of the website. We don’t want a lot of feedback on what you think should be added or changed because, while some new content may be added and minor changes might be made to the website, it is pretty much the way it is going to be for now. Your comments will be grouped with other students’ comments and **reported anonymously**: We will not use your name or any identifying information about you in our report so your privacy will be maintained. If you have any questions about this, or anything else about this review, please don’t hesitate to ask. Thanks. It’s an honor to get to work with you!

Anita Smith
Inverness Research

Here's what we would like you to do . . .

7. **Fill out the following information** so Inverness Research will know who to write the \$75 check out to and where to mail it. Your name and address will be kept confidential and will not be used for any other purpose.

Your first and last name:

Your age:

Your grade in school now:

Who we should write the check out to (you or your parent):

Address we should send the check to:

NOTE: Please allow a couple weeks for the check to arrive. I will try to get the Inverness Research office to send the check out ASAP, but sometimes the paperwork takes a little while, so please be patient.

8. So we know how much time this whole project takes you, and so we can see if our time estimates were in the ballpark, please **keep track of your time below as you check off your tasks:** *(fill out the approximate number of minutes on the lines provided)*

- | | |
|-----------------------------------------------------------------------------------|-------|
| <input type="checkbox"/> Met with Anita to get started (in-person or by phone): | _____ |
| <input type="checkbox"/> Answered the first set of questions: | _____ |
| <input type="checkbox"/> Explored the STEM Stories website, free-flow: | _____ |
| <input type="checkbox"/> Filled out the online survey: | _____ |
| <input type="checkbox"/> Explored the website in-depth according to instructions: | _____ |
| <input type="checkbox"/> Answered the second set of questions: | _____ |
| <input type="checkbox"/> Talked with Anita (in-person or by phone) to wrap-it-up: | _____ |

9. Before spending time looking at the STEM Stories website, please answer the following questions. There are no right or wrong answers. This is NOT a test! 😊

- a. When you think about **scientists**, what comes to mind?
- Who do you think of as scientists? Can you give an example or two?
 - What kinds of things do scientists do?
- b. When you think about **engineers**, what comes to mind?
- Who do you think of as engineers? Can you give an example or two?
 - What kinds of things do engineers do?
- c. When you think about **mathematicians**, what comes to mind?
- Who do you think of as mathematicians? Can you give an example or two?
 - What kinds of things do mathematicians do?

d. How would you **rate your level of interest** in: *(circle or highlight a number)*

Science	1	2	3	4	5	6	7	8	9	10
	Low			Medium				High		

Technology	1	2	3	4	5	6	7	8	9	10
	Low			Medium				High		

Engineering	1	2	3	4	5	6	7	8	9	10
	Low			Medium				High		

Mathematics	1	2	3	4	5	6	7	8	9	10
	Low			Medium				High		

10. **Spend at least 30 minutes exploring the website on your own.** Follow whatever path and links within the website that you want. Follow what interests you, not what you think you “should” do or be interested in. Have fun!
11. **Fill out the online survey** (follow the link to the Survey Monkey survey on the STEM Stories homepage). When answering the first question, “*Choose the ONE that best describes your role while looking at the STEM Stories website*” check “OTHER” and type in your name and “student reviewer” in the box so we’ll know it’s you. Then complete the rest of the survey filling out the text boxes and being as thorough as possible.
12. Next, (and remember, you don’t have to do this all in one day), **spend more time on the STEM Stories website.** There is a lot on this website, and we don’t expect you to look at it all, but we would like you to move around the website becoming familiar with the variety of things it offers in different sections. For example, make sure you:
 - Follow at least a few of the links on the homepage. See what interests you and follow those links to read more, watch videos, listen to interviews, etc.
 - Look through the “Clips” section, browsing through at least three different fields (like biology, chemistry, space, or whatever interests you) and make sure you try out at least one of every type of activity (watch a video, listen to a sound recording, look through a photo album, try an interactive activity, read a profile, follow a weblink).
 - Look through the “Profiles” section. Try browsing by field, by topic, and by date.
 - If you want, try out the crossword puzzle or the treasure hunt activity (attached).
13. After you’ve completed all of the above (1-6), **please answer these questions:**
 - a. What do you think about the website overall?
 - b. Did it help you think about scientists (and technologists, engineers, and mathematicians) in new ways?
 - c. Did it help challenge stereotypes? If so, how?
 - d. What kinds of things did you learn, in general, about the careers and personal stories of scientists (and technologists, engineers, and mathematicians)?

- e. Do you think the website helps support young people's (especially young women's) confidence in themselves and in their abilities? If so, how?
- f. Did you find any connections between your personal life and the content of the website (the scientists features and their stories)? If so, what?
- g. What do you think about the website's overall:
 - i. Value?
 - ii. Potential impact?
 - iii. Potential uses?
- h. Any other thoughts, comments, questions?

14. And lastly, **finish up this whole process by talking with me (Anita)** on the phone (or in person) for 10-15 minutes. This will give me a chance to ask you any questions I might have about your written comments or the survey and for us to talk about the overall value and impact of the website.

THANK YOU!!!!!!!

STEM Stories website evaluation -- spring 2010

1. Welcome to the STEM Stories website survey

We want to know what you think about the STEM Stories* website.

It'll only a few minutes to complete this survey.

Thanks very much, Inverness Research**

*STEM Stories (www.stemstories.org) is a free online collection of multimedia resources highlighting inspiring people (especially women) who have chosen careers in the fields of science, technology, engineering, and mathematics (STEM). Aimed at grades 4-8, as well as the general public, STEM Stories is supported by a grant from the National Science Foundation.

**Inverness Research (www.inverness-research.org) is conducting the external, independent evaluation of the STEM Stories project. We encourage you to be as honest, frank, and constructive as possible.

2. About you

*** Choose the ONE that best describes your role while looking at the STEM Stories website:**

- Student
- K-12 classroom teacher
- After-school provider
- STEM gender-equity program coordinator
- Parent
- General public
- Other (please specify)

*** Gender**

- Female
- Male

*** How old are you?**

3. About your visit to the STEM Stories website

STEM Stories website evaluation – spring 2010

*** Is this your first time on the STEM Stories website?**

Yes

No

If no, approximately how many times have you visited this website before?

one other time

a couple times (2-3)

a few times (3-6)

quite a few times (more than 6 times)

*** How did you hear about or find the STEM Stories website?**

*** What is the main reason you visited the STEM Stories website?**

*** Did you find what you wanted or were looking for?**

No, I didn't find anything I wanted or was looking for.

I found some of it.

Yes, I found everything I wanted or was looking for.

*** How easy was it to find your way around on the STEM Stories website?**

Very hard

Hard

Average

Easy

Very easy

*** Do you think the STEM Stories website is kid-friendly?**

Yes

No

Why or why not?

How would you improve the website to make it more kid-friendly?

STEM Stories website evaluation – spring 2010

*** Have you seen other websites like STEM Stories?**

Yes

No

If so, what other websites like it have you seen? How is STEM Stories website different?

4. Your thoughts on STEM Stories

*** What did you think about the website:**

	Very bad	Bad	Average	Good	Very good
Quality of information	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How it looks (visual appeal, attractiveness)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Balance of pictures and words (graphics and text)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to get you interested and excited (generate interest and enthusiasm)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to catch your attention and keep it	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Value as a source of information (value as a resource)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*** Did the STEM Stories website help:**

	Not at all	Somewhat	Very much
Highlight scientific careers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Challenge stereotypes about scientists	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Provide positive role models for young people	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increase your interest in science	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increase your interest in technology	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increase your interest in engineering	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increase your interest in mathematics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

*** Did you learn anything new about scientists or engineers?**

Yes

No

If so, briefly describe what you learned:

5. Your overall impressions of the STEM Stories website

STEM Stories website evaluation – spring 2010

*** What did you like BEST, and why?**

*** What was the most INTERESTING thing you found on the STEM Stories website?**

*** Is the website USEFUL to you?**

Yes

No

If yes, how can you use the STEM Stories website?

*** What did you like LEAST? What did you NOT like and why?**

How would you improve the STEM Stories website?

6. Lastly . . .

*** Do you think you will visit the STEM Stories website again?**

Definitely not Probably not Maybe Probably yes Definitely yes

Why or why not?

*** Do you think you will recommend it to anyone?**

Definitely not Probably not Maybe Probably yes Definitely yes

Why or why not?

*** How would you describe the STEM Stories website to a friend?**

STEM Stories website evaluation – spring 2010

Do you have any other comments?

THANK YOU VERY MUCH!
We really appreciate your time and feedback.