G³ Girls Communicating Career Connections

Educator's Guide

EDC   NSF

Contents

Introduction and Background

Overview

Produced by youth, the Web-based video series **Girls Communicating Career Connections (GC3)** seeks to interest girls from underserved groups (e.g., girls of color, girls of low socioeconomic status—SES, differently-abled girls) in science, technology, engineering, and math (STEM) careers. Middle school-age girls worked with Education Development Center, Inc. (EDC) and its partners—the Young Women's Leadership Charter School of Chicago (YWLCS) and Spy Hop Productions of Salt Lake City—to develop the series. A grant from the National Science Foundation (NSF) made the collaboration possible.

The Videos

The GC3 Video Series' brief, engaging video segments capture the inquiry-based learning experiences of six girls—Asia, Aria, Kera, Sonia, Victoria, and Yanelly—as they investigate what it means to be a scientist or engineer. Each video encourages middle school-age girls to see the science in their everyday lives. As they watch Asia, Aria, Kera, Sonia, Victoria, and Yanelly use STEM to explore issues that are important to them, girls connect STEM to their own current interests (e.g., in sports, art, music), gain knowledge of the relevance of STEM, and glimpse what it might be like to have a STEM career.

The Educator's Guide

Whether you are a formal or informal educator, the **GC3 Educator's Guide** will help you effectively use and integrate the GC3 Video Series in your work with young people. The guide's activities, discussion ideas, and resources will complement your use of the videos and deepen learners' understanding of STEM careers.

The Web Site

The GC3 Web site offers instant access to the Video Series, Educator's Guide, and Video Production Curriculum (see below). It also provides links to resources related to STEM careers such as FunWorks. FunWorks, a one-of-a-kind digital library of resources and services, captures youths' imaginations and inspires them to explore STEM careers. Funded by the NSF, FunWorks is part of the growing National Science Digital Library (NSDL) initiative. As two related EDC initiatives, the GC3 Web site exists as a companion and complementary site to FunWorks.

The Video Production Curriculum

EDC and its partners used the EDC **GC3 Video Production Curriculum** to create the GC3 Video Series. You, too, can use the curriculum to create a STEM career video series with middle school-age girls that helps girls investigate STEM experiences and career choices and interview women who are STEM professionals in a field of their interest. The curriculum's activities also support young people in identifying biases and unspoken assumptions about gender roles and aid them in developing basic media literacy skills.

You can and should adapt the GC3 Video Production Curriculum to fit the needs of your specific group of learners, their learning styles, and the forms of media you decide to use. To facilitate

adaptation, the curriculum includes material suggestions, helpful tools and resources, and sample materials.

Why GC3?

Few middle schoolers have realistic career plans or an awareness of the world of work.[1] For many girls, youths of color, and youths at risk this problem is especially acute; they lack information about career options. In response, GC3 aims to broaden their horizons, raise self-expectations, and generate excitement about the many STEM career possibilities their futures may hold.

Together, the GC3 Video Series and Educator's Guide activities help youths envision a 21st-century, skills-based path from middle school to career. GC3 emphasizes and models the best practices of inquiry-based discovery and learning and benefits young women and their educators by:

1. Generating awareness and educating youth about STEM careers by making the connection between academic content and learning experiences, their current interests, and possible careers in a variety of STEM fields.
2. Dispelling myths and stereotypes youths and educators have about careers in STEM fields, about what careers are "appropriate" for girls, and about girls' abilities to succeed in what some people still perceive as "careers for boys."
3. Emphasizing the importance of 21st-century skill development (e.g., leadership skills, teamwork, oral communication, critical thinking) to career and life success.
4. Inspiring youth to increase their awareness of ways to realize their future career aspirations now (e.g., choose specific courses in high school, enroll in a particular afterschool program, seek out a volunteer opportunity or adult mentor, mentor their peers).
5. Highlighting the positive social impact scientific careers have on the world (e.g., environmental and energy sciences, biotechnology).

While middle school-age girls from underserved populations were the audience kept in mind during the creation of the GC3 Video Series, you can and should use the videos and materials provided on the Web site with audiences of any gender, race/ethnicity, class, and ability. The GC3 development team crafted the videos, materials, and Web site to ensure accessibility to Web users of various skills, Spanish speakers, the hearing-impaired, and the visually-impaired.

Why Girls and STEM?

From an early age, children internalize stereotypes about gender-appropriate occupations from their families and society. As a result, many young people enter school with sex-role stereotypes, especially with respect to STEM and vocational careers. While these stereotypes cause boys and girls alike to narrow their career choices—and *all* young people must understand how these stereotypes limit them[2]—they have a particularly powerful impact on girls.

For example, while many girls enjoy the social networking aspects of computers, most avoid using computers for other purposes. The Center for Women in Information Technology[3] found that some girls have mentioned the following as barriers to their use of computers:

- "It's isolating. I like to work with people and computers don't allow me to do that."
- "It's boring."

- "IT people are all geeks, and I don't want to be a geek."
- "It's all about math and numbers. I am better at talking and making friends."
- "The games are violent and that doesn't appeal to me."
- "None of my friends are into computers and neither are my parents."
- "My brother hogs the computer at home."
- "There aren't any girls in the technology classes, and I want to be in classes with other girls."
- "I want to be a mom and technology jobs will demand too much of my time."
- "I want to be a teacher (nurse, artist, veterinarian . . .) and they don't use computers."
- "I use my computer for e-mail and IM, isn't that enough?"

Many of these comments reflect thinking shaped by stereotypes and misconceptions. The comments also indicate a need for more effective approaches to engaging girls in exploring STEM and mastering the tools—such as computers—of STEM professions.

The GC3 Video Series, GC3 Video Production Curriculum, and Educator's Guide will help you dismantle these and other barriers that discourage girls from considering STEM fields. They will also aid you in dispelling stereotypes that limit young people's potential and weaken the STEM workforce. The activities in the "Video Viewing Guide" section on **page 8**, as well as the ideas presented in the "Get Active!" section on **page 29**, reinforce that STEM is for everyone.

Why Media Literacy?

While the goals of GC3 relate primarily to the exploration of STEM careers, it is important to engage learners in discussions of media forms and formats. They need to understand the roles and responsibilities of media makers and consumers, and they need to have the chance to think about and explore:

- The influence that media have on them, their communities, and society in general.
- The ways that all media demonstrate some sort of bias, either on the part of the creator of the media, the culture from which it is created, or both.
- The techniques media makers use to communicate their messages, both directly and indirectly.

These are all aspects of media literacy, a form of literacy that, according to the Center for Media Literacy, "provides a framework to access, analyze, evaluate, and create messages in a variety of forms—from print to video to the Internet."[4] The Center notes that media literacy " . . . builds an understanding of the role of media in society as well as essential skills of inquiry and self-expression necessary for citizens of a democracy."[5]

Perhaps the most important media literacy skill that a young person needs to develop is the ability to view and critique media with a critical eye. Today's youths are bombarded with mainstream media images and ideas round-the-clock. GC3 can serve as a catalyst for them to step back and reflect on the messages they are receiving. When young people have the opportunity to consume thought-provoking media works, and to dissect and analyze the underlying opinions and techniques, they become better media makers and critical thinkers.

Selected Resources

Below is a list of some exemplary online media literacy-related tools and resources that will support you in helping young people build their media literacy skills. The resources on each site can be adapted to fit your needs and those of your group of learners.

> **The Center for Media Literacy (http://www.medialit.org)**
> **Media Education Lab at Temple University (http://www.mediaeducationlab.com)**
> **New Mexico Media Literacy Project (http://www.nmmlp.org)**
> **Media Awareness Network (http://www.media-awareness.ca)**
> **The Media Channel's Teacher Toolkit (http://www.mediachannel.org/classroom)**
> **PBS Teachers on Media Literacy (http://www.pbs.org/teachers/media_lit)**

Why Video?

Video can be a powerful educational and motivational tool that promotes learners' acquisition of media literacy skills. However, a great deal of the medium's power lies in how it is used. In this Video Series, for example, video is not an end in itself but a means toward achieving thoughtfully selected learning goals and objectives.

The publication *Integrating Video in the Classroom*, by Laurie Williams of the University of Texas at Austin[6], gives good advice on how to launch a youth media project. These points have been adapted to address the use of video in the classroom and are presented below.

Effective instructional video is not video-to-youth instruction, but educator-to-youth instruction, with video being a vehicle for discovery. By reaching out to youth with a medium that is as forceful as it is familiar, you can do better what you do best: teach. Educational video is not intended to supplant you but to enhance your work with learners. If you are like many of your colleagues, once you have discovered the power of video you are likely to adopt it as an essential part of your instructional repertoire.

While you can draw upon many resources in your efforts to promote young people's interest in STEM, video can be particularly useful in the ways outlined below:

- **Providing Youth with a Range of Role Models.** It is vital for youths to see people like themselves engaged, and succeeding in, STEM careers. Video allows youths to witness a diverse array of professionals involved in a wide range of jobs and activities.
- **Highlighting STEM's Relevance to Real-World Concerns and Careers.** In addition to linking STEM topics to their role in a variety of occupations, video demonstrates STEM's real-world applications impacting social and individual interests. Anchoring topics in young people's experiences helps make STEM subjects more relevant and usable.
- **Contextualizing STEM Topics within Engaging Narratives.** Many youths relate better to subject matter when it is presented dramatically within the context of a story or real-life incident.
- **Addressing the Spectrum of Learning Styles or Modalities.** Many youths learn best when information is presented visually as well as orally. Online videos allow youth to kinesthetically, visually, and orally experience a topic.
- **Initiating Mentoring Relationships.** Videos can inspire youths to pursue learning more about a given person, field, or occupation.

Specifically, for girls, video can aid learning by:

- **Taking Advantage of Girls' Desire to Communicate.** Video provides a common experience that can act as a catalyst for group discussion and writing.
- **Incorporating "Girls' Interests" into STEM Activities.** Since males are often, and stereotypically, considered the primary consumers of science and math education, much of the curriculum material in STEM subjects centers around traditional "boys' interests." The videos in the GC3 Video Series highlight the roles science and math play in topics related to girls' experiences.

In the "Video Viewing Guide" that follows, you can learn more about how to use the GC3 Video Series and materials to spark engaging group discussions. This section also provides tips to help you take advantage of the series as a springboard for introducing STEM- and STEM career-related activities.

Video Viewing Guide

The Videos

The GC3 Video Series captures the inquiry-based learning experiences of six girls—Asia, Aria, Kera, Sonia, Victoria, and Yanelly—as they investigate what it means to be a scientist or engineer. Each video encourages middle school-age girls to see the science in their everyday lives. The information below provides snapshots of information that may be useful in helping you decide which video to show. Detailed descriptions of each video in the series follow.

Audience and Creator Demographics

The GC3 Video Series was created with the following audience demographics in mind by youth who fit all or most of the same demographic criteria:

- Middle school-aged youth (ages 11–14)
- Girls
- Youth of color, low SES, and/or who are differently abled

Suggested Grade Level(s) and Education Settings

You can show the GC3 Video Series in formal and informal education settings that serve middle school-age youths, ages 11–15 years. While the activities suggested in the following pages work in the classroom, if you are an informal educator you will find it easy to adapt them for your program. Informal educators seeking tips on how to adapt the suggested activities and all educators seeking other activity suggestions should take a look at the "Activities and Resources" section on **page 29**.

Accessibility

The GC3 Video Series is accessible to hearing-impaired individuals via closed captioning and descriptive transcripts in English and Spanish. The GC3 Video Series is also accessible to visually-impaired individuals via descriptive transcripts in English and Spanish.

You can find tips and resources on how to adapt this Guide's activities for learners with special needs on the following sites:

The Access Center: Improving Outcomes for all Children K–8 (Office of Special Education) (http://www.k8accesscenter.org/index.php)
Center for Applied Special Technology (CAST) (http://www.cast.org)
EDC's Addressing Accessibility in Mathematics (http://www2.edc.org/accessMath/resources/strategies.asp)
LD Online (http://ldonline.org)

Learning Outcomes

The GC3 Video Series will produce positive learning outcomes for youths and educators alike.

Youth Learning Outcomes

After watching and discussing the GC3 videos, youths should be able to do the following:

1. Make the connection between academic content and learning experiences, current interests, and possible careers in a variety of STEM fields.
2. Dispel myths and stereotypes about careers in STEM fields, about what careers are "appropriate" for girls, and about girls' ability to succeed in what are often perceived as "careers for boys."
3. Understand the importance of 21st-century skills development (e.g., leadership skills, teamwork, oral communication, critical thinking) to career and life success.
4. Identify steps they can take now to realize a future career (e.g., choose specific courses in high school, enroll in a particular afterschool program, seek out a volunteer opportunity or adult mentor, mentor their peers).
5. Describe the positive social impacts scientific careers have on the world (e.g., environmental and energy sciences, biotechnology).

Educator Learning Outcomes

After reviewing the GC3 Educator's Guide and guiding youths through the GC3 Video Series, you should be able to do the following:

1. Dispel myths and stereotypes about careers in STEM fields, about what careers are "appropriate" for girls, and about girls' ability to succeed in what are often perceived as "careers for boys."
2. Demonstrate knowledge of girls' education in STEM and factors contributing to their interest in and choice of careers.
3. Identify and utilize powerful multimedia career resources that you can use in the classroom as well as in out-of-school contexts.
4. Deepen and extend learners' GC3 experiences with rich discussions and hands-on activities.

Educational Standards

While the GC3 Video Series and Educator's Guide have not been aligned to any particular national or state standards, you can use them as resources to supplement curricula that meet the following national and state science standards.

National Science Education Standards

Content Standard A: Science as Inquiry
As a result of activities in grades 5–8, all students should develop:

- Abilities necessary to do scientific inquiry
- Understandings of scientific inquiry

Content Standard E: Science and Technology
As a result of activities in grades 5–8, all students should develop:

- Abilities of technological design
- Understandings of science and technology

Content Standard F: Science in Personal and Social Perspectives
As a result of activities in grades 5–8, all students should develop an understanding of:

- Personal health
- Populations, resources, and environments
- Natural hazards
- Risks and benefits
- Science and technology in society

State Science Standards

Use http://www.eduhound.com (click on "Standards & Testing") or a search engine to access state science standards.

National Educational Technology Standards

In addition to supplementing curricula that meet national and state science standards, the GC3 Video Series and Educator's Guide provide information that supports educators and youth who have the goal of meeting the National Educational Technology Standards put forth by the International Society for Technology in Education (ISTE). These standards can be found at http://www.iste.org/AM/Template.cfm?Section=NETS.

Creators and Content

Aria

Aria is 13 years old, and she lives on the west side of Chicago. Lately, Aria has noticed a lot of changes in her neighborhood. What causes these changes? What will happen in the future? Aria's search for the answers to these questions leads her to the Field Museum in Chicago where she meets Alaka Wali, a cultural anthropologist who helps her understand people and the communities that they transform and that transform them.

This video addresses:
- ways in which observation and curiosity can inspire scientific research
- ways in which STEM professionals can have a positive impact on society through their work

Asia

Asia is a young woman who lives in the south side of Chicago. She works hard in school and finds inspiration in cooking and food. As she thinks about her video, she wonders whether science has anything to do with her passion and interests. How do these two things connect? Asia interviews Alicia Thomas and finds something unexpected in the world of food science.

This video addresses:
- different STEM careers that can relate to a common interest or passion

- different paths people use to get to their STEM careers
- finding STEM in careers that seem unlikely to use STEM

Kera

Kera has noticed that life is very precious—and she thinks it's really important to make sure that everyone is safe and healthy. Kera is already very interested in a career in medicine where she can work with children because children are our future. In her video, Kera interviews Melissa Grey and learns all about a STEM career— pediatric nurse practitioner—that she hasn't heard about yet.

This video addresses:
- different STEM careers that can address issues important to youth and society
- knowledge and skills necessary for STEM professions (and how to begin obtaining them now)
- different types of interaction STEM professionals encounter in their jobs

Sonia

Sonia is in 7th grade, and she feels strongly about taking care of the Earth and the environment. Sonia loves animals and is very concerned about their protection and welfare. For her piece, Sonia takes a trip to the Shedd Aquarium in Chicago to explore a career in marine biology with Michelle Sattle.

This video addresses:
- different STEM careers that can address issues important to youth and society
- ways in which STEM professionals can have a positive impact on society through their work
- different STEM careers that can relate to a common interest or passion
- women in STEM careers

Victoria

Victoria is a Peruvian middle school student in Salt Lake City, UT. Victoria loves art and fashion. When she started thinking about creating her video, she tried to think of ways that science, technology, engineering, and math might connect to her own interests. These seemed like such different things! Finally, Victoria learned just how much science and technology could be used in a career in graphic design and print making. For her piece, Victoria interviewed one of Salt Lake City's most well-known artists, Leia Bell.

This video addresses:
- different STEM careers that can relate to a common interest or passion
- finding STEM in careers that seem unlikely to use STEM
- women in STEM careers

Yanelly

Yanelly has always enjoyed science and math. She was curious to learn more about forensic detectives and how they really use science and math in their daily jobs. In her video, Yanelly took a tour of the crime lab at the West Valley City Police Department, and she learned all about crime scene investigation by interviewing Nicole Davis.

This video addresses:
- knowledge and skills necessary for STEM professions (and how to begin obtaining them now)
- different paths people use to get to their STEM careers
- ways in which STEM professionals can have a positive impact on society through their work
- women in STEM careers

Selecting Videos

Choosing which GC3 video or videos to show your youth can sometimes be a challenge, especially if you have a limited amount of time to do so. Below is a quick guide that may help you identify the videos that best suit your needs.

Running Time
Shortest video: Sonia
Longest video: Yanelly

Field
- Science:
  - ❍ *Asia* (Flavor Chemist)
  - ❍ *Kera* (Pediatric Nurse Practitioner)
  - ❍ *Sonia* (Aquarist)
  - ❍ *Yanelly* (Forensic Detective)
- Technology:
  - ❍ *Victoria* (Poster Artist)
- Social Science and Education:
  - ❍ *Aria* (Applied Anthropologist)

STEM Career Topic
- Different paths people use to get to their STEM careers:
  - ❍ *Asia*
- Different STEM careers that can address issues important to youth and society:
  - ❍ *Kera*
  - ❍ *Sonia*
- Different STEM careers that can relate to a common interest or passion:
  - ❍ *Asia*
  - ❍ *Sonia*
  - ❍ *Victoria*
- Different types of interaction STEM professionals encounter in their jobs:
  - ❍ *Kera*
- Finding STEM in careers that seem unlikely to use STEM:
  - ❍ *Asia*
  - ❍ *Victoria*

- Knowledge and skills necessary for STEM professions (and how to begin obtaining them now):
  - ❍ *Kera*
  - ❍ *Yanelly*
- Ways in which observation and curiosity can inspire scientific research:
  - ❍ *Aria*
- Ways in which STEM professionals can have a positive impact on society through their work:
  - ❍ *Aria*
  - ❍ *Sonia*
  - ❍ *Yanelly*
- Women in STEM careers:
  - ❍ *Sonia*
  - ❍ *Victoria*
  - ❍ *Yanelly*

Aria

3:35 | Created by Aria | Interviewing Alaka Wali about **Applied Anthropology**

Aria is 13 years old, and she lives on the west side of Chicago. Lately, Aria has noticed a lot of changes in her neighborhood. What causes these changes? What will happen in the future? Aria's search for the answers to these questions leads her to the Field Museum in Chicago where she meets Alaka Wali, a cultural anthropologist who helps her understand people and the communities that they transform and that transform them.

Let's Discuss . . .

The following are suggested discussion questions/topics for pre-viewing and post-viewing *Aria*. You can find more discussion tips in the "Something to Talk About" section on **page 26**.

Before You Watch . . .

You may want to ask learners the following questions before they view *Aria*:

- Have you ever tried to make up your own science experiment? Tell us about it. What did you want to learn or find out?
- What is a problem you've noticed recently in your neighborhood or school? Do you think anyone can do anything about it? Who do you think could do the most to help solve the problem? If that person started to solve the problem, what do you think you might be able to do to help?

Now What?

Pairs of learners, small groups of learners, or the entire group of learners can work together to process the following questions. The questions engage learners in **identifying ways in which observation and curiosity can inspire scientific research** and **analyzing ways in which STEM professionals can have a positive impact on society through their work**.

- Aria observed changes in the kinds of people who live in her neighborhood. Then, she learned that there's a kind of scientist who studies changes similar to the ones she observed. Can you think of some interesting changes you've observed in your neighborhood or school? Can you think of reasons why those changes might have happened?
- Alaka used science to try to make a positive change in society and to solve problems by studying why people behave the way they do.
  - ❍ Let's think of people who use science and math a lot in their jobs. Do these people also make positive changes in society or solve problems? Can you give an example of how they do this?
  - ❍ What are other jobs that people do to try to make positive changes in society or solve problems? Can you think of how people who do those jobs use science or math to get their jobs done?
- Alaka talked about why she likes science—she said it allows us to be free. What do you think she meant by that?

Fact!

Girls are more successful in math and science programs that incorporate a cooperative, hands-on approach than in programs that stress competition and individual learning.[7]

Hands On!

You can use the activity below (found from a resource provided in the Activities and Resources section of this Guide) in conjunction with *Aria* to reinforce the idea that observation and curiosity can inspire scientific research. That is, if learners have a question about the world, they might be able to do an experiment to simulate the way the world works to find an answer.

- **Who Polluted the Potomac?**
  from Sustainability Camp Curriculum for Tofina Botanical Gardens Foundation
  http://www.tbgf.org/sustainable-kids/
  curriculum/006a-pollution-game.php

Keep Exploring!

If your learners would like to keep exploring concepts introduced in the above activity, here are a few other related activities that they might enjoy.

- Explore more about Alaka's work and anthropology at the **Field Museum's** Web site. Online interactives featured on the site further enhance some of the Museum's exhibits.
  http://www.fieldmuseum.org
  http://www.fieldmuseum.org/exhibits/online_interactive.htm
- Take the Rubbish Challenge by **Waste Watch** and show youth how science is linked to everyday life. This interactive game helps youth realize that they can take steps to save the Earth. Exploration of the **Recyclezone** Web site is a great introduction to showing youth the intersection of STEM and issues they might notice in their own lives.
  http://www.recyclezone.org.uk/fz_challenge.aspx
  http://www.recyclezone.org

Other Areas to Explore!

Aside from anthropology, here are some suggested topic areas and concepts for you to explore with learners after they watch *Aria*:

- Different facets of anthropology, such as archaeology
- Urban neighborhood issues, such as homelessness/housing, asthma, and unsafe playgrounds or neighborhoods.
- Careers that help address social or environmental issues

Aria was interested in social phenomena, and she explored the people-related STEM job of an applied anthropologist. Other related jobs include:

- Computational scientist
- Statistician

Check out the GC3 Web site for more information on these careers!

4:05 | Created by Asia | Interviewing Alicia Thomas about **Flavor Chemistry**

Asia is a young woman who lives in the south side of Chicago. She works hard in school and finds inspiration in cooking and food. As she thinks about her video, she wonders whether science has anything to do with her passion and interests. How do these two things connect? Asia interviews Alicia Thomas and finds something unexpected in the world of food science.

Let's Discuss . . .

The following are suggested discussion questions/topics for pre-viewing and post-viewing *Asia*. You can find more discussion tips in the "Something to Talk About" section on **page 26**.

Before You Watch . . .

You may want to ask learners the following questions before they view *Asia*:

- What are your favorite things to do? Do you think you use any math or science when you do those things?
- Let's talk about different kinds of jobs. Does anyone have an idea about what they want to do as an adult? *Have learners name some jobs, and choose one to focus on.* Can anyone name a job that is similar to [chosen job]? How are they similar? How are they different?
- Can you think of a job that uses a lot of math and science, but that most people don't think of as using so much math or science?

Now What?

Pairs of learners, small groups of learners, or the entire group of learners can work together to process the following questions. The questions engage learners in **exploring different STEM careers that can relate to a common interest or passion, identifying different paths people use to get to their STEM careers,** and **finding STEM in careers that seem unlikely to use STEM**.

Science Helper

The number of taste buds varies from person to person. An adult has an average of 9,000 taste buds (a child can have as many as 10,000), and this affects the way each person perceives tastes. Some people have only a maximum of 500 tastebuds. More tastebuds means the individual perceives more types of taste. Taste becomes weaker with age.

- Asia decided to explore culinary arts because she really likes cooking and food. What are you interested in?
- When Asia thought about what she wanted to be, she realized that there were many jobs to choose from. She also realized that there are many ways to incorporate the things she enjoys, like food, into work. When Alicia, the flavor chemist, talked about her job, she said that she didn't really set out to be a flavor chemist—it just turned out that way. Can you think of people who use food in their work? Think again about your interests and your favorite things. Can you think of different people who use these interests or things in their work?
- Alicia said that flavor chemists study how flavor systems or food systems impact people. What do you think she meant by this?
  - ❍ Can you give examples of other kinds of scientists and how they might impact people with their work?

Spicy foods (like chili peppers) stimulate pain receptors, not taste buds. They cause a sensation of burning on the skin, too.

❍ What are other jobs that study flavor systems or food systems?

• In the video, Alicia talked about the different kinds of people who are flavor chemists. She talked about how people who study subjects like biochemistry or physical science can be flavor chemists. What subjects do you think a flavor chemist needs to study? When you think about a job you might want to do, what subjects do you think you might need to study to do that job well?

❍ Remember when I asked you to name some jobs that use a lot of math or science but that most people don't think of as using so much math or science? Can you name any more jobs like that?

• Alicia said that "The world is really open to someone who has a background in science." What do you think she meant by that?
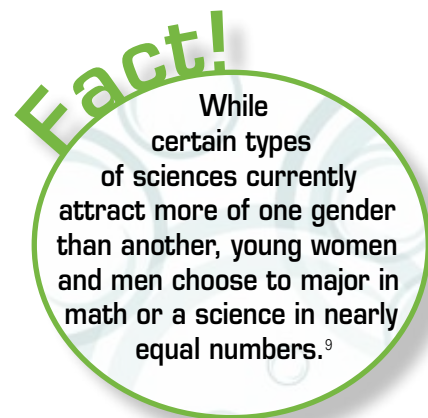
Hands On!

You can use the activity below (found from a resource provided in the Activities and Resources section of this Guide) in conjunction with Asia to reinforce the idea that one need not look very far to find something related to STEM. Instead, learners can find STEM in their everyday interests or their favorite things.

• **Your Sense of Taste: The Relationship Between Taste and Smell** by Karen Kalumuck from Exploratorium http://www.exploratorium.edu/snacks/your_sense_of_taste/index.html

Keep Exploring!

If your learners would like to keep exploring concepts introduced in the above activity, here are a few other related activities that they might enjoy:

• **Kitchen Chemistry**, by the Discovery Channel UK, includes information about the science of cooking and the chemistry of taste. http://www.discoverychannel.co.uk/science/kitchen_chemistry

• The University of Guelph's **Ice Cream Science** site goes into great detail about the making of the popular frozen dessert. http://www.foodsci.uoguelph.ca/dairyedu/icecream.html
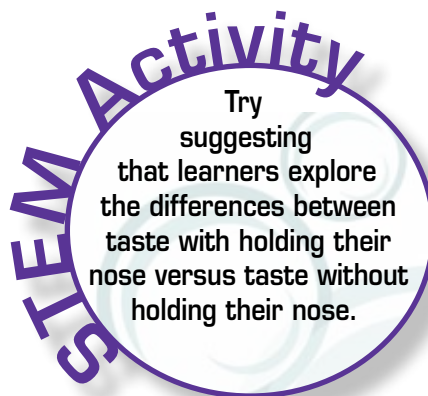
Other Areas to Explore!

Aside from food science, here are some suggested topic areas and concepts for you to explore with learners after they watch *Asia*:

• Life science/anatomy
• Chemistry
• Careers related to learners' interests

Asia was interested in culinary arts, and she explored the food-related STEM job of a flavor chemist. Other related jobs include:

• Agricultural and food scientist
• Toxicologist

Check out the GC3 Web site for more information on these careers!

Fact!
While certain types of sciences currently attract more of one gender than another, young women and men choose to major in math or a science in nearly equal numbers.[9]

STEM Activity
Try suggesting that learners explore the differences between taste with holding their nose versus taste without holding their nose.

Kera

3:51 | Created by Kera | Interviewing Melissa Grey about **Pediatric Medicine**

Kera has noticed that life is very precious—and she thinks it's really important to make sure that everyone is safe and healthy. Kera is already very interested in a career in medicine where she can work with children because children are our future. In her video, Kera interviews Melissa Grey and learns all about a STEM career— pediatric nurse practitioner—that she hasn't heard about yet.

Let's Discuss . . .

The following are suggested discussion questions/topics for pre-viewing and post-viewing *Kera*. You can find more discussion tips in the "Something to Talk About" section on **page 26**.
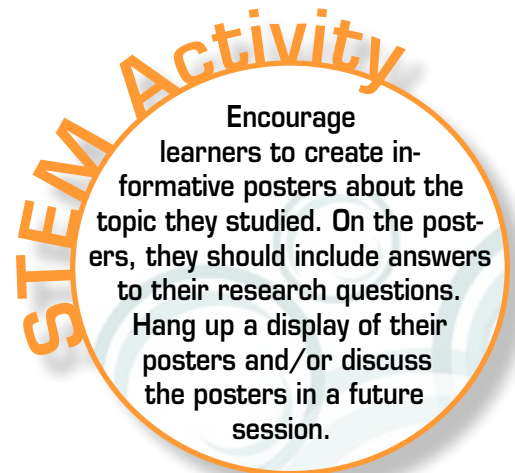
Before You Watch . . .

You may want to ask learners the following questions before they view *Kera*:

- Think about the things or people that are most important to you. What are your top two? Why?
- What do you think you'll go on to do after you finish high school? Why?
- Describe what a scientist might look like or do. Who do you think that a scientist might need to talk to or interact with every day?

Now What?

Pairs of learners, small groups of learners, or the entire group of learners can work together to process the following questions. The questions are meant to engage learners **in identifying different STEM careers that can address issues important to youth and society, understanding the knowledge and skills necessary for STEM professions (and how to begin obtaining them now),** and **considering the different types of interaction STEM professionals encounter in their jobs.**

- Kera talked about how she thinks it's important to look out for children's health because children are our future and she likes helping people. What are other things that are important for us to do to help each other or to take care of each other? What other people or things should we look out for or protect? Why do you think so?
- Kera said she wanted to be a pediatrician when she grows up, but she interviewed a pediatric nurse practitioner because both pediatricians and pediatric nurse practitioners are concerned about health. What are some other jobs where people might be concerned about health?
  - ○ Can you name some different jobs that are all concerned about the same thing?
- Melissa talked about all of the subjects she needed to study and all of the work she needed to do to become a pediatric nurse practitioner. Kera also talked about the things she'll need to do now in order to reach her career goals. Think about the job you'd like to do. What are the different things you might have to learn in school to do that job? What kinds of skills do you think you'll need to know to do that job? How many years of school do you think you'll need to complete to learn all of those skills?

STEM Activity

Encourage learners to create informative posters about the topic they studied. On the posters, they should include answers to their research questions. Hang up a display of their posters and/or discuss the posters in a future session.

- When Kera was thinking about exploring careers, one question she had was about how much money nurse practitioners make. Think about what you'd like to do in the future. How much money do you think people make in that job?
- Melissa said that nursing is about relating to people. She talks to patients all the time.
  - ○ Does this sound like the kind of person you described earlier when I asked you who a scientist might interact with every day? Why or why not?
  - ○ In what other science or math jobs might someone need to work with a lot of people?
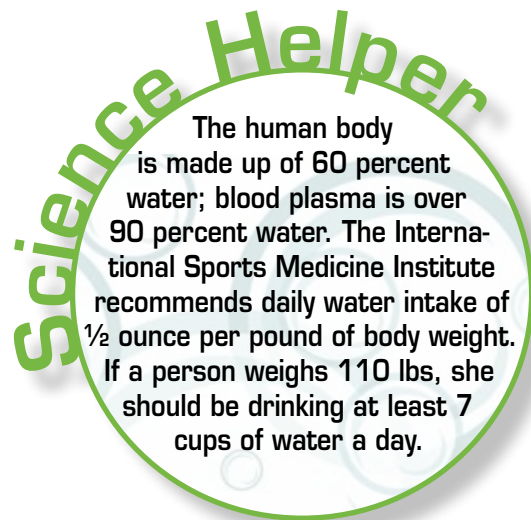
Hands On!

You can use the activity below (found from a resource provided in the Activities and Resources section of this Guide) in conjunction with *Kera* to reinforce the idea that STEM professionals use lots of different skills and knowledge sets in their daily work. Learners can start thinking about those skills and knowledge sets now to prepare for jobs they might want to do in the future.

- **Epidemic Proportions: Researching Epidemics in the Math Classroom**
  by Alison Zimbalist from The New York Times Daily Lesson Plan
  http://nytimes.com/learning/teachers/lessons/19980908tuesday.html

Keep Exploring!

If your learners would like to keep exploring concepts introduced in the above activity, here are a few other related activities that they might enjoy:

- **Infection Detection Protection**, by the American Museum of Natural History, offers young people a number of online interactives where they can learn about the origins and spread of bacteria. http://www.amnh.org/nationalcenter/infection/index.html
- Howstuffworks.com shares an article about **How Emergency Rooms Work**. Suggest that learners explore different people who work in the ER and find out how each professional contributes to helping someone get better. http://www.howstuffworks.com/emergency-room.htm

Other Areas to Explore!

Aside from pediatrics, here are some suggested topic areas and concepts for you to explore with learners after they watch *Kera*:

- Medicine/public health
- Statistics/applied math
- Child Development

Kera was interested in medicine, and she explored the health-related STEM job of a pediatric nurse practitioner. Other related jobs include:

- Pediatrician
- Biomedical engineer

Check out the GC3 Web site for more information on these careers!
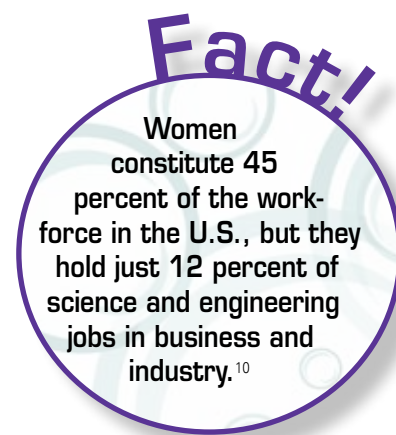
Sonia

3:22 | Created by Sonia | Interviewing Michelle Sattle about **Marine Science**

Sonia is in 7th grade, and she feels strongly about taking care of the earth and the environment. Sonia loves animals and is very concerned about their protection and welfare. For her piece, Sonia takes a trip to Shedd Aquarium in Chicago to explore a career in marine biology with Michelle Sattle.

Let's Discuss . . .

The following are suggested discussion questions/topics for pre-viewing and post-viewing *Sonia.* You can find more discussion tips in the "Something to Talk About" section on **page 26**.

Before You Watch . . .

You may want to ask learners the following questions before they view *Sonia*:

- Have you ever been responsible for doing something? What were the things you had to do? What happened or what would have happened if you didn't do those things?
- If you could create your own job, what are some of the most important things you'd like your job to have?
   - ❍ Who or what would you like to work with?
   - ❍ Do you care where you work? Would you like to be outside or behind a desk?
   - ❍ Would you make things? Fix things? Take things apart?

Now What?

Pairs of learners, small groups of learners, or the entire group of learners can work together to process the following questions. The questions engage learners in **thinking about different STEM careers that can address issues important to youth and society, identifying ways in which STEM professionals can have a positive impact on society through their work, considering different STEM careers that can relate to a common interest or passion,** and **addressing the stereotypes of women in STEM careers.**

- Sonia talked about how she thinks taking care of animals is related to taking care of ourselves. What are other things that are related to taking care of ourselves? Why do you think so?
- Michelle's job carries a lot of responsibility with it. In the video, Michelle talked about all of the things she needed to do to take care of animals. What did she mention? What would happen to the animals if Michelle wasn't doing her job?
- Think about a job you'd like to do. What responsibilities does that person have?
- Michelle said that she knew she wanted to have a career in science since she was a little girl. She said she was interested in animal care and the ocean and just set her sights on doing those things when she grew up. What are you interested in? Do you think there are jobs where people do things related to those interests?
- Michelle talked about how there were very few women working as aquarists when she first started working at

Fact!

Overall, women are less likely than men to intend to pursue a science or engineering degree; however, women are more likely than men to intend to major in social/behavioral or biological/agricultural sciences.[11]

the Shedd Aquarium. Why do you think there weren't so many women then? Later, Michelle talked about how ¾ of her department is now made up of women. Why do you think there are more women now?

Hands On!

You can use the activity below (found from a resource provided in the Activities and Resources section of this Guide) in conjunction with *Sonia* to reinforce the idea that people can have a positive impact on others and the environment through their work. The first step to doing so is to understand how everything is interrelated.

- **Oh Deer!**
  by Patty Dalton from the Information Institute of Syracuse
  http://www.eduref.org/Virtual/Lessons/Science/Ecology/ECL0043.html

Keep Exploring!

If your learners would like to keep exploring concepts introduced in the above activity, here are a few other related activities that they might enjoy:

- Explore more about Michelle's work and marine science at **Shedd Aquarium**'s Web site. Online interactives featured on the site further enhance some of the Aquarium's exhibits. http://www.sheddaquarium.org
- The American Museum of Natural History's Web site, "**Ology**," has wonderful online interactives and resources on marine biology and other interesting topics. http://www.amnh.org/ology/marinebiology#channel

Other Areas to Explore!

Aside from marine science, here are some suggested topic areas and concepts for you to explore with learners after they watch *Sonia*:

- Marine biology
- Environmental science
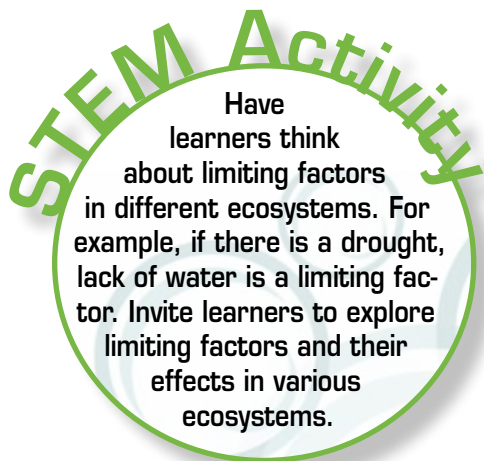- Careers related to learners' passions or beliefs

Sonia was interested in taking care of animals, and she explored the nature-related STEM job of an aquarist. Other related jobs include:

- Plasma physicist
- Geoscientist

Check out the GC3 Web site for more information on these careers!

Victoria

4:01 | Created by Victoria | Interviewing Leia Bell about **Graphic Design**

Victoria is a Peruvian middle school student in Salt Lake City, UT. Victoria loves art and fashion. When she started thinking about creating her video, she tried to think of ways that science, technology, engineering, and math might connect to her own interests. These seemed like such different things! Finally, Victoria learned just how much science and technology could be used in a career in graphic design and print making. For her piece, Victoria interviewed one of Salt Lake City's most well-known artists, Leia Bell.

Let's Discuss . . .

The following are suggested discussion questions/topics for pre-viewing and post-viewing *Victoria*. You can find more discussion tips in the "Something to Talk About" section on **page 26**.
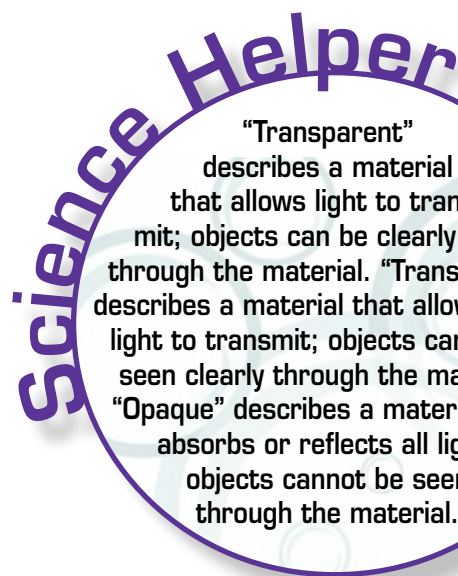
Before You Watch . . .

You may want to ask learners the following questions before they view *Victoria*:

- Can you name a job that you're interested in doing when you grow up? Do you think that you'll need to learn a lot of science or math to do that job? Do you think that job uses a lot of technology?

Now What?

Pairs of learners, small groups of learners, or the entire group of learners can work together to process the following questions. The questions engage learners in **finding STEM in careers that seem unlikely to use STEM, addressing the stereotypes of women in STEM careers,** and **considering different STEM careers that can relate to a common interest or passion**.

- Leia talks about how technology is really linked to her job. Did you think that poster artists and graphic designers used technology so often? What other kinds of technology do you think Leia uses every day to run her business?
- Think about the job you talked about earlier. Can you imagine ways in which people who do that job might use technology? What about science or math?
- It seems like there are lots of steps that Leia takes in order to make a print. Do you think this is similar to doing a science experiment or a math problem? Why or why not?
- Leia talks about how she is a mom, too. Do you know other moms who have careers? What do they do?
- Leia says there aren't very many women who do poster art and graphic design, and Victoria said it was hard to find a girl graphic designer. Why do you think there aren't many women in this field?

Science Helper

"Transparent" describes a material that allows light to transmit; objects can be clearly seen through the material. "Translucent" describes a material that allows some light to transmit; objects cannot be seen clearly through the material. "Opaque" describes a material that absorbs or reflects all light; objects cannot be seen through the material.

Hands On!

You can use the activity below (found from a resource provided in the Activities and Resources section of this Guide) in conjunction with *Victoria* to reinforce the idea that non-science and non-math careers can be related to STEM.

- **Shadows & Light, Science & Puppetry**
  by Theresa Sotto from The Kennedy Center ArtsEdge
  http://artsedge.kennedy-center.org/content/3895/

Keep Exploring!

If your learners would like to keep exploring concepts introduced in the above activity, here are a few other related activities that they might enjoy:

- Science and…film? Explore the **Science Photo Library** and find science film footage that can be used with students to demonstrate the art of science. http://www.sciencephoto.com/motion
- **Sodaplay** allows users to create their own online soda models and share them with each other. This is a great way to find STEM in art and art in STEM. Youth can check out other people's soda models or create their own! http://archive.sodaplay.com/zoo/index.htm

Other Areas to Explore!

Aside from graphic design, here are some suggested topic areas and concepts for you to explore with learners after they watch *Victoria*:

- Architecture
- Film production (set design, lighting, sound)
- Careers that may seemingly not involve STEM

Victoria was interested in art and fashion, and she explored the art-related STEM job of a poster artist. Other related jobs include:

- Game designer
- Robotics designer

Check out the GC3 Web site for more information on these careers!
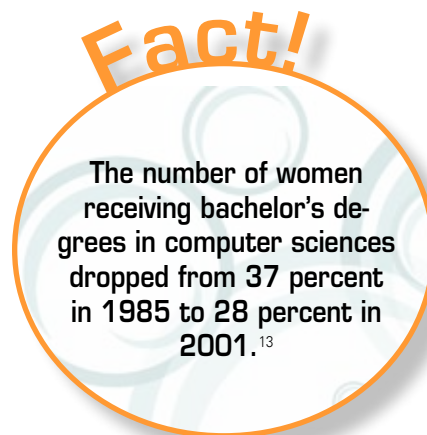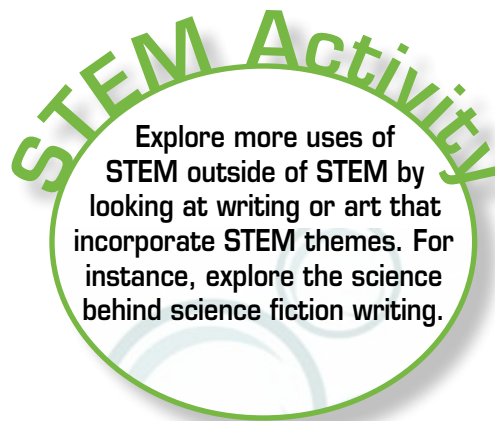
Yanelly

4:57 | Created by Yanelly | Interviewing Nicole Davis about **Forensic Science**

Yanelly has always enjoyed science and math. She was curious to learn more about forensic detectives and how they really use science and math in their daily jobs. In her video, Yanelly took a tour of the crime lab at the West Valley City Police Department, and she learned all about crime scene investigation by interviewing Nicole Davis.

Let's Discuss . . .

The following are suggested discussion questions/topics for pre-viewing and post-viewing *Yanelly*. You can find more discussion tips in the "Something to Talk About" section on **page 26**.

Before You Watch . . .

You may want to ask learners the following questions before they view *Yanelly*:

- What is forensic science? Have you heard of it before? What does a forensic scientist do?
  - ❍ Do you think that is an interesting job? Why or why not?
- Can you name the kinds of things you'll need to do starting now to get the job you'd like to have?

Now What?

Pairs of learners, small groups of learners, or the entire group of learners can work together to process the following questions. The questions engage learners in **considering different STEM careers that can relate to a common interest or passion, understanding the knowledge and skills necessary for STEM professions (and how to begin obtaining them now), identifying ways in which STEM professionals can have a positive impact on society through their work,** and **addressing the stereotypes of women in STEM careers.**

STEM Activity

> **Study** the science disciplines in a more substantive way by having learners conduct interviews, go on field trips, read scientific papers, or do some career shadowing.

> **Try** using Fun-Works (http://www.thefunworks.org) as an activity that might help learners think more about their interests and STEM.

- Nicole mentioned that at first she wanted to be a police officer, but that didn't quite fit with her interests. And she also talked about how she liked science and it made sense for her to put the two together. If you could do a job where you mixed two subjects together, what two subjects would you pick? What do you think you would do?
- Nicole talked about the different college degrees she has and how much time she spent in school and college in order to be a forensic detective. She also mentioned she did an internship. Can you explain what an internship is?
  - ❍ Think about a job you'd like to do. Can you think of a place where you might be able to do an internship to learn more about that job?
- Yanelly learned a lot about the equipment and techniques that Nicole uses in her job. Can you identify some technologies that Nicole uses?
  - ❍ What kinds of science concepts do you think Nicole needs to know for her job?
  - ❍ Do you think Nicole needs to know math at all? Why or why not?
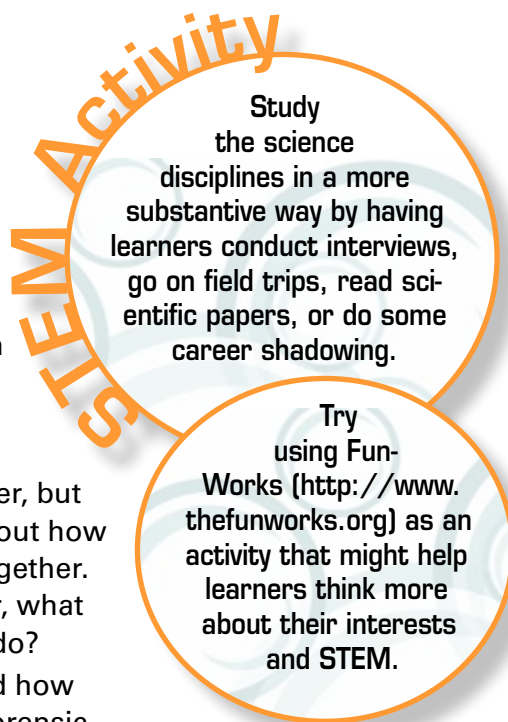
- Yanelly talked about how she learned that girls can be forensic detectives, too. Can you name other jobs where there might be more men than women? Why do you think this is?
  - ❍ Do you think women and men can do these jobs equally as well? Why or why not?

Hands On!

You can use the activity below (found from a resource provided in the Activities and Resources section of this Guide) in conjunction with *Yanelly* to reinforce the idea that STEM careers can be exciting, interesting, and fun.

- **What do Scientists Do?**
  from the Science NetLinks
  http://www.sciencenetlinks.com/lessons.
  cfm?DocID=289

Keep Exploring!

If your learners would like to keep exploring concepts introduced in the above activity, here are a few other related activities that they might enjoy.

- Try your hand at forensics! **PBS' History Detectives** Web site offers games that allow youth to figure out mysteries! This is a great way to demonstrate how science can be used to pick out clues and discern fact from fiction.
  http://www.pbs.org/opb/historydetectives/games/index.html
- Do you think you can solve a mystery? Check out the mysteries offered by **Access Excellence**, where science-based clues will lead your youth in the right direction!
  http://www.accessexcellence.org/AE/mspot/

Other Areas to Explore!

Aside from forensic science, here are some suggested topic areas and concepts for you to explore with learners after they watch *Yanelly*.

- Chemistry
- Psychology
- Careers related to solving puzzles and discovering the unknowns

Yanelly was interested in science and the world, and she explored the STEM job of a forensic detective. Other related jobs include:

- Atmospheric scientist
- Civil engineer

Check out the GC3 Web site for more information on these careers!

Something to Talk About: Video Discussions

The GC3 Video Series can spark discussion, and subsequently action, about STEM and STEM careers among groups of middle-schoolers. In the pages that follow, you will find a wide range of strategies from the Center for Women in Information Technology[15] and the Gender Chip Project.[16] These strategies will help you engage learners in discourse and analysis that ensure they get the most out of viewing the GC3 Video Series.

What Do GC3 Discussions Accomplish?

You can use the GC3 Video Series to do the following:

- Inspire young people to talk about what they want to be when they grow up.
- Dispel the myth that STEM fields are "uncool."
- Show that many exciting and rewarding careers are available in various areas of STEM.
- Emphasize that no matter what profession you choose, knowledge of STEM fields is important.
- Encourage young people to think about STEM as a tool to invent a new way of doing things.
- Make young people aware that women don't just use STEM knowledge. Women also create, develop, and discover new STEM knowledge that changes the world, and they own STEM businesses.
- Motivate young people to begin thinking about and preparing for a career in STEM *now*.

Preparing for Discussions

Adobe Youth Voices and the YouthLearn Initiative provide tips on how you can set up and prepare for a great discussion. Here are some of those tips, and others, for use with the GC3 Video Series.

Several weeks before the screening . . .

- Pick the video(s) you would like to screen. Learners' interests and logistics (time constraints, special interests, etc.) might influence your decision.
- Identify and invite relevant community members or organizations to view the videos with your learners and take part in pre- and post-screening discussions.
- Screen the videos ahead of time to note possible discussion points relevant to your learners.
- Identify your purpose for showing the video(s). Once you figure out your main goals for showing the video(s), you can begin to identify the youth outcomes that you would like to address during your discussion.
- Research the STEM fields and STEM careers presented in the video(s). Knowing some basic information can help keep your discussion on track and help address any confusion. This guide provides several resources and references for each video to aid you in this process.
- Ensure that your viewing space is accessible to all viewers. This includes making sure that the proper equipment will be available and that the environment is comfortable for viewing and discussion. Viewers with limited hearing will benefit from a location with good acoustics; viewers with limited vision will benefit from the use of a large screen. Smaller rooms (versus large halls) encourage more open dialogue.

Several days before the screening . . .

- Confirm the location, equipment, and seating.
- Confirm the date, time, and location with any partnering community members or organizations.
- Confirm the date, time, and location with all learners.
- Test your screening equipment and familiarize yourself with ways to navigate the video.

A few hours before the screening . . .

- Cue the video(s) and test the screening equipment.
- Arrange the room for screening. Having seats arranged directly in front of the facilitator encourages participation.

Right before the screening . . .

- Briefly introduce any present community members/organizations and facilitator(s).
- Encourage learners to introduce themselves.
- Give some background information on the video(s), the GC3 Video Series, and filmmaker(s).
- Provide all learners with a focus. By charging all learners with a specific responsibility while viewing, you can keep learners "on task" and direct the learning experience to the activity's objectives. You might consider using a handout that learners can fill out as they watch the video. Or, you might want to ask questions that learners should think about as they watch, such as: "What do you think this video will be about?" "What do you think a [professional] does?" "What is a problem that a [professional] might solve?" "If you met a [professional], what question might you ask him/her?"

During the screening . . .

- Pause the video and ask open-ended questions about the video content. Asking learners about what they're watching can keep them engaged in the learning process. You might want to use questions such as: "Now, what do you think a [profession] does?" "What other problems do you think a [profession] might solve?" "What would/could happen if . . . ?" "If you met a [professional], what question might you ask him/her?"

After the screening . . .

- Allow all learners to express their feelings about the film. Post-viewing reflection can help your learners focus on connecting video content to their own experiences and interests. You might want to use questions such as: "What is something new that you learned?" "Do you have any questions about [profession]?" "If you wanted to know more about [profession], what could you do next?"
- Focus your discussion. There are many themes present in the GC3 Video Series, so it's important to choose your discussion questions strategically and keep your learners on topic.
- Ask open-ended questions about the video content. You might want to use questions such as: "What is a problem or issue you would like to address?" "How would you go about solving this problem?" "What options would you consider?" "What would/could happen if . . . ?"

- Remind learners that the purpose of the discussion is not to critique the video—the video is the conversation starter, the springboard for the discussion and the problem-solving you hope to accomplish. Eventually, you will want to move the discussion focus away from the video itself and into STEM- and STEM career-related topics.
- Encourage learners to support their opinions with evidence.
- If a discussion strays, ask a question about the film to bring learners back to the topic at hand.
- Encourage learners to ask their own questions, identify new problems, and develop the next investigation. Youth-designed investigations allow each learner to explore the video topic as it relates to her or his own experiences and interests.
- Be aware of time. All good questions always lead to more questions, so be aware of practical and logistical issues such as time limits. At the same time, never squelch enthusiasm when learners are on a roll.
- Document questions and answers as you go. Whenever possible and appropriate, use techniques like mapping to provide a conceptual, visual structure to the ideas you hear. Let learners see you write their thoughts and ideas on the map.

For more suggestions on how to initiate and guide discussions related to media, see the "Media Literacy" section on **page 5**. You might also find that the "STEM Profile Worksheet" on **page 44** is useful as a discussion aid.

Activities and Resources

Get Active! Using More Than Just Media

If you're like many of your colleagues, you know that it can be challenging to find activities that reinforce and extend the topic(s) covered in media. You might want to consider using some of the following ideas adapted from the Center for Women in Information Technology[17] and from Integrating Video in the Classroom by Laurie Williams[18] to help you optimize learners' experiences with the GC3 Video Series. Some of the activities help all learners examine sex-role stereotypes and think about STEM careers. Other activities focus on how to promote girls' interest in STEM topics and careers.

Activity Ideas

Make STEM a Central Focus in Group Discussions. As noted above, engaging young people in regular conversations about STEM helps them see the multiple ways in which STEM is applied in the world.[19] Some specific discussion ideas are listed below:

- Find out ways that young people use STEM in their daily lives. Use this information to start a discussion on what they consider technology. Point out some other uses of technology they might often encounter but have not yet mentioned. Begin to discuss how people use technology in many aspects of life.
- When discussing STEM and STEM careers, give young people plenty of time to ask questions. If they have no questions, ask open-ended questions to get the conversation started such as, "What do you think is the most important skill you need to be a successful . . . ?" or "What can a _____ do to help make the world a better place or help other people?"

Try to Make STEM Learning as Hands-on as Possible. Get young people involved—use a game, an exercise, or any lively, interactive learning experience to make STEM more exciting and to demonstrate how applicable STEM can be to their lives. Research has shown that group activities and hands-on experiences boost girls' interest in and motivation to learn math and science in particular.[20] Some examples of ways to do this are included below:

- Invite learners to be your computer aides. Ask them to control the mouse when navigating the Internet with the group. Or, ask them to be responsible for the technical clean-up (e.g., deleting or organizing files) at the end of the day. Use lots of manipulatives in the lower grades to boost young people's spatial skills.
- Have learners use computers to operate and "own their own businesses." For example, have them create spreadsheets to process the income and expenses and project cash flow, and engage them in using graphics programs to prepare advertising flyers and letterhead.
- Using information from the Bureau of Labor Statistics (http://www.bls.gov/audience/students.htm), ask young people to construct various types of graphs, manually or with a computer, that illustrate labor market and earnings statistics in STEM professions or by gender.

Incorporate STEM into Other Subjects or Activities. While there are many ways to do this, two effective approaches are described below:

- Have young people read novels that have science themes or that are science-related to appeal to girls who relate primarily to literature.
- When incorporating technology into your activities, emphasize learning how to create final products over learning how to use the equipment. For example, teach learners to publish their own newspapers, newsletters, and creative work by using a desktop publishing program.

Make Young People Aware of Equity Issues. Show them examples of sexism and sexist assumptions from media past and present. Some ideas are included below:

- Invite young people to write a skit about gender equity in STEM fields.
- Have young people create a visual presentation on girls and boys in nontraditional roles. Also, have young people create multimedia presentations on men and women that have shattered stereotypes by entering nontraditional careers.
- Ask young people to identify what they perceive to be barriers (challenges, obstacles, problems) to reaching their goals. Then ask them how they will overcome those barriers.

Discuss Career Opportunities in STEM Fields. Engage young people in discussing the financial and psychological rewards of these jobs/careers and what it takes to be successful. This could include internships, education, interest level, technical and personal skills, and 21st-century skills such as teamwork, problem-solving, and creativity. Some activities to build upon this discussion are listed below:

- Invite female and minority STEM professionals to visit your group.
- Conduct field trips to facilities where female and minority STEM professionals work.
- Present information on STEM occupations and earning annually.

Resources for Learners

When young people begin to take STEM concepts outside of their learning environments, they increasingly see the prevalence of STEM in their everyday lives. You can invite young people to continue their explorations beyond your classroom or program by recommending some of the following online STEM career resources and links to other media projects for youths. The media projects are great places for youth to experience others' work or possibly share their own.

STEM Career Resources

ASU Virtual Counseling Center
http://vcc.asu.edu/stem.shtml
ASU has identified a number of Web-based "programs for stimulating STEM interests" and provides links to such sites. Sites are available in a wide variety of age ranges (elementary through high school) and can be used in the classroom as well as in more informal settings.

Ask a Biologist
http://askabiologist.asu.edu/index.html
ASU hosts this Web site where learners can explore biology by submitting questions to real biologists. In addition, learners can find videos and podcasts, articles, scientist profiles, and more.

Engineer Girl!

http://www.engineergirl.org

The EngineerGirl Web site is part of the National Academy of Engineering's (NAE) Celebration of Women project. Through this site, NAE seeks to bring national attention to the opportunity that engineering represents to all people at any age, but particularly to women and girls. The site connects youths to information about different engineering careers, women in engineering, and classes that can help them prepare for engineering careers.

Exploratorium AfterSchool

http://www.exploratorium.edu/afterschool/activities

The Exploratorium aims to bring science and math enrichment activities into out-of-school time, including hands-on activities and digital videos.

Funology

http://www.funology.com

Funology is all about the "science of having fun." Home to a variety of fun science- and math-related activities, this site demonstrates that science can be fun and fun can be science. In addition, science- and math-related jokes and facts can keep young people learning while they're searching for their next activity.

FunWorks

http://www.thefunworks.org

FunWorks is a career exploration digital library for middle school-age youth (ages 11–15, grades 6–9) and their educators. Developed by EDC and funded by the NSF, FunWorks houses a nationally recognized collection of STEM career exploration resources developed for—and by—middle school-age youth. In addition, you can access the GC3 Web site, Video Series, and this *Educator's Guide* via FunWorks.

Girls are I.T.

http://www.girlsareit.org

Girls are I.T., an interactive Web site for girls ages 11–14, provides information about career opportunities in Information Technology (IT). The Web site is part of a program designed to inspire girls to see IT as an exciting career opportunity. This program appeals to the girls' interest in community, creativity, and social benefit by including an interactive "Tech Timeline" that showcases important moments in the history of technology, a section called "Cool Careers in IT," and a section called "Imagine I.T." with postings showing how girls think IT will grow and evolve in the future. The ideas are based on their study in four areas: wireless sensors, nanotechnology, programming for the Internet, and disability assistance.

Great Science for Girls

http://gsg.afterschool.org/public/resources.cfm

Great Science for Girls has a list of recommended Web sites that are geared toward girls but can be used with all youth. Click on "Websites for Girls" to find them.

IWASwondering…

http://www.iwaswondering.org

The National Academy of Sciences' (NAS) Web site IWASwondering.org seeks to showcase the accomplishments of contemporary women in science. It highlights for young people the varied and intriguing careers of some of today's most prominent scientists.

My Pop Studio

http://mypopstudio.com

My Pop Studio introduces the key concepts of media literacy through fun interactive games that appeal particularly to girls ages 9–14. Using My Pop Studio, youths learn about genre by playing TV producers, consider how advertising and celebrity culture reinforce narrow conceptualizations of beauty, explore values messages in Popstar Producer, and create comics that reflect on the role of cell phones and text messaging as they affect relationships.

PBS Kids: Zoom Science

http://pbskids.org/zoom/activities/sci

ZOOM, a daily interactive television series, challenges 5- to 11-year-olds to "turn off the TV and do it!" Based on the original hit series from the 70s, ZOOM is packed with science experiments, recipes, plays, games, jokes, chats, poems, and volunteer ideas all sent in by viewers and offering a wealth of activities for kids to do by themselves, with friends, or with their parents. The nearly 75 separate areas on the ZOOM Web site offer an online opportunity to further explore concepts and activities introduced by the TV show.

Science Buddies

http://www.sciencebuddies.org/

Science Buddies offers learners free science fair ideas, answers, tools, and resources. This Web site includes an "Ask an Expert" page as well as ideas for teachers.

Science: It's a Girl Thing!

http://facebook.dj/scienceitsagirlthing

Science: It's a Girl Thing! includes a series of short, entertaining, and educational videos and free downloadable PDF activity cards for parents and educators to use in working with girls. When complete, there will be ten activity cards and four videos. The hub of this project is a Facebook area, and it uses the power of social media to connect with parents and educators about how to foster girls' interest in science and technology, and why that is important. Funded by the National Science Foundation, the program offers Web-based and easy-to-use resources for conducting science activities at home. It builds on everyday science that parents already know.

Wonderwise

http://wonderwise.unl.edu/01kids/kids.htm

The University of Nebraska State Museum and Nebraska 4-H Youth Development have partnered to develop Wonderwise, a women in science learning series. The Web site also features fun resources about a variety of science careers for youth to explore.

Other Media Projects

Adobe Youth Voices

http://www.adobe.com/aboutadobe/philanthropy/youthvoices

Adobe Systems Incorporated has launched an international philanthropic effort to promote youth media makers who "create with purpose." The Web site includes spotlights on projects around the globe as well as a growing gallery of youth media works on a range of personal and social topics.

Center for Women in Technology

http://www.umbc.edu/cwit/video.html#viewvideo

CWIT's "You Can Be Anything" video uses the power of media to give young people, particularly girls and young women, a positive impression of the career opportunities available in IT

and science-related fields where technology plays a major role. This short, fast-paced video uses the techniques of music videos to portray a wide variety of women, both past and present, using technology in a variety of fields. The music and images are combined in ways that are intended to appeal to young people, engage their emotions, capture their attention, and convey the message that technology is cool and offers many exciting fields for women as well as men.

The Gender Chip Project
http://www.genderchip.org
The Gender Chip Project offers both a documentary and companion materials designed to assist teachers, parents, and mentors who are encouraging girls to the pursue careers in science, technology, engineering, and mathematics.

PBS Kids: DragonflyTV Scientists
http://pbskids.org/dragonflytv/scientists/index.html
Learners can access short videos about the careers of 75 different scientists featured on various episodes of DragonflyTV.

Smithsonian Women in Science
http://www.smithsoniannetworks.com/site/smithsonian/show_women_science.do
Developed for Women in Science month, this Smithsonian video series captures the everyday work of four different female scientists from around the world.

TestToob
http://www.testtoob.com
TestToob allows middle school and high school science aficionados to post and view science videos and network with like-minded teens. A world of video sharing, community networking, and scientific fun, TestToob provides young people from around the world a place to showcase their experiments, get feedback on their scientific trials, and learn from each other.

Women in Science, Technology, Engineering and Mathematics ON THE AIR!
http://www.womeninscience.org/
The Women in Science, Technology, Engineering and Mathematics ON THE AIR! Web site is an audio resource for young girls, young women, parents, middle and high school teachers, college professors, guidance counselors, researchers, organizational leaders, and anyone interested in learning more about the past, present and future role of women in science and technology education, fields, and careers.

WomenTech World – "Career Options for Women: Emerging Technologies"
http://www.womentechstore.com/edv41.html/careervids.html
Career Options for Women: Emerging Technologies will introduce young people to 35 high-wage career areas ranging from Automotive to Engineering to Robotics and Automation. Each DVD reveals the personal experiences and insights of successful women in technology and trades occupations. These 35 career videos, available for purchase, feature women in traditionally male jobs and are designed to inspire young people to enter exciting technology, trades, and science occupations.

Youth Media Exchange

http://ymex.org

This site allows youth to upload videos and other media related to global issues. Users can react to uploaded media with ratings and comments and can also post media as a response.

Youth Noise

http://www.youthnoise.org

Youth Noise is an online community for youth social and political activism, with opportunities to learn, share ideas, and take action.

Resources for Educators

You may find the following STEM career, STEM curriculum, media, and media-making resources helpful as you begin to incorporate the videos into a learning experience for young people.

STEM Career Resources

Career Voyages

http://www.careervoyages.gov

The Career Voyages Web site, sponsored by the U.S. Department of Education and the U.S. Department of Labor, offers a wide range of information and advice for young people, parents, and career advisors including in-depth profiles of many occupations and related educational requirements and resources. A video tutorial is available at the top of the home page for new users.

Education World—Curriculum Article: Career Counseling Resources on the Internet

http://www.education-world.com/a_curr/curr115.shtml

This *Education World* article highlights some of the best free resources related to career counseling on the Internet, courtesy of the American School Counselor Association (ASCA).

FunWorks

http://www.thefunworks.org

FunWorks is a career exploration digital library for middle school-age youth (ages 11–15, grades 6–9) and their educators. Developed by EDC and funded by the NSF, FunWorks houses a nationally recognized collection of STEM career exploration resources developed, for—and by—middle school-age youth. In addition, you can access the GC3 Web site, Video Series, and Educator's Guide via FunWorks.

Sloan Career Cornerstone Center

http://www.careercornerstone.org/forteach.htm

The Career Cornerstone Center was developed to help individuals explore the fields of science, technology, engineering, mathematics, computing, and healthcare. Here, educators can find STEM career resources such as podcasts, career information, a professional database, and links to other helpful sites.

STEM Curriculum and Activity Resources

10x10 List

http://momox.org/10x10.html

This Web site hosts a compilation of Web resources about women in science. The site provides

links to biographies of women in science and engineering, videos and CDs for learners, activities and lessons, and games and online activities.

After School Exchange

http://www.thirteen.org/edonline/afterschool/activities/tips_dev_act.html

This Web site, developed by Thirteen/WNET in New York, offers tips for developing activities specifically for after school, including sample activities.

Energy Information Administration: Energy Kid's Page

http://www.eia.doe.gov/kids/classactivities/teachers&students.html#intermediate

A selection of energy related stories, hands-on activities, and research articles are provided for different youth age groups. An educator guide provides extension activities that use this Web site as a resource. Most of the activities on this page were developed by the National Energy Education Development Project (NEED) in cooperation with the Energy Information Administration (EIA).

Exploratorium After School and Exploratorium Snacks

http://www.exploratorium.edu/afterschool/activities

http://www.exploratorium.edu/snacks

The Exploratorium aims to bring science and math enrichment activities into out-of-school time, including hands-on activities, digital videos, professional-development materials, program support resources, research publications, concept maps, and teaching tips.

Gender & Science Digital Library

http://www.gsdl.org

EDC's Gender & Science Digital Library (GSDL) offers resources and services that help educators promote and implement gender-equitable science education in formal and informal settings to both male and female learners. GSDL also assists in increasing female involvement in the sciences and provides resources to researchers and others working to understand the link between gender and science, including how gender influences the development of science and the role of women within science.

Great Science for Girls

http://gsg.afterschool.org/public

Great Science for Girls: Extension Services for Gender Equity in Science through After School Programs (GSG) works with intermediaries to build the capacity of afterschool centers to deliver evidence-based programming that will broaden and sustain girls' interest and persistence in STEM.

Inclusive Schools

http://www.inclusiveschools.org

Celebration Ideas: Activities and Resources for Schools, Classrooms, and Families is a publication available for purchase through the inclusive schools network that provides lesson plans as well as resources for educators of learners with special needs.

ITEST Learning Resource Center

http://itestlrc.edc.org

The NSF ITEST Learning Resource Center at EDC provides information about and links to a variety of resources related to the major themes of the ITEST program. Educators, policymakers, and researchers concerned with expanding the interests and skills of young people and educators in STEM fields will find these resources useful.

Middle School Portal: Math and Science Pathways

http://msteacher.org

http://msteacher2.org

The Middle School Portal: Math and Science Pathways offers a middle school view into excellent online materials from the NSF's NSDL. Educators can examine several electronic publications in which content specialists spotlight superior digital resources and offer teaching tips for important topics as well as access augmented NSDL catalog records organized in subject browse lists.

National Partnership for Quality Afterschool Learning

http://www.sedl.org/afterschool/resources

http://www.sedl.org/afterschool/lessonplans

The National Partnership for Quality Afterschool Learning has developed tools and resources to help afterschool practitioners improve their ability to create and implement activities that support learning. The Afterschool Training Toolkit describes promising practices in the arts, literacy, mathematics, science, technology, and homework help. The lesson plan database contains fun and enriching lesson plans for afterschool projects working in arts, literacy, mathematics, science, and technology. Finally, four curriculum databases contain expert reviews of materials for literacy, mathematics, science, and technology.

PBS Kids: SciGirls

http://pbskids.org/dragonflytv/gps/scigirls.html

http://pbskids.org/dragonflytv/parentsteachers/scigirls.html

DragonflyTV SciGirls is a collaborative program designed to encourage outreach professionals and science museum educators—often partnering with local youth organizations, educators, and parents—to deliver hands-on science encouragement and career guidance to girls in their communities. SciGirls is based on existing standards-based DragonflyTV outreach resources, which teach the process of full inquiry.

SciGirls will empower youth to ask questions, communicate, and encourage one another. This project supports collaborative, tactile learning, setting young people, and specifically girls, on the "science fast track" toward improved critical thinking skills, enhanced problem-solving abilities, and ultimately, career success. In addition to program information, the two SciGirls Activity Guides are available free online.

PBS Kids: Zoom Science

http://pbskids.org/zoom/grownups/index.html

ZOOM is a daily interactive television series that challenges 5- to 11-year-olds to "turn off the TV and do it!" Based on the original hit series from the 70s, ZOOM is packed with science experiments, recipes, plays, games, jokes, chats, poems, and volunteer ideas all sent in by viewers and offering a wealth of activities for kids to do by themselves, with friends, or with their parents. The nearly 75 separate areas on the ZOOM Web site offer an online opportunity to further explore concepts and activities introduced by the TV show. The "grownups" portion of the site offers a variety of activities and tips for parents and teachers.

Society of Women Engineers

http://aspire.swe.org

This Society of Women Engineers Web site provides educators with curriculum and learning resources as well as assessment tools that can help youth become more excited about engineering.

STEM Teams

http://www.coe.neu.edu/groups/stemteams

The *Growing a STEM Team!* Manual is designed to serve as a resource for people interested in conducting gender equitable outreach to K–12 classrooms. The manual has two parts. The first part contains classroom tested engineering activities for grade 8 middle schoolers. The second part describes how to form and prepare a team of youth, faculty, and practicing engineers (a "STEM Team") to deliver these activities in the classroom.

Thinkfinity

http://www.thinkfinity.org

Thinkfinity's goal is to improve young people's achievement in traditional classroom settings and beyond by providing high-quality content and extensive professional development training.

TryEngineering

http://www.tryengineering.org/lesson.php

TryEngineering is a Web site that combines information on engineering as a program of study and career choice with interactive activities. Designed for a range of audiences, TryEngineering offers valuable information for school counselors, educators, parents, and learners—including a variety of lesson plans that align with education standards—to allow educators and learners to apply engineering principles in the classroom.

Wonderwise

http://wonderwise.unl.edu/02teach/teacher.htm

The University of Nebraska State Museum and the Nebraska 4-H Youth Development have partnered to develop Wonderwise, a women in science learning series. While each kit must be ordered, the Web site features free activity guides for parents and educators who wish to use the kits. The Web site also features fun resources about a variety of science careers for youth to explore.

Media Resources

Copyright and Fair Use Videos

http://mediaeducationlab.com

Use these *Schoolhouse Rock*-style videos to help learners understand about 21st-century social responsibility, focusing on copyright and fair use. These videos and accompanying curriculum materials help young people understand the rights of owners and the rights of users. They learn how fair use protects young people's rights to quote from, use, and repurpose existing copyrighted materials as part of the process of human creativity.

Youth Media Reporter

http://www.youthmediareporter.org

Youth Media Reporter (YMR) is the professional multimedia journal that serves practitioners, educators, and academics in the youth media field. YMR's purpose is to build the field by documenting, from multiple perspectives, the insights and leading lessons in engaging young people in video, film, television, radio, music, Web, art, and print.

Media-Making Resources

Ourmedia Learning Center

http://www.ourmedia.org/learning-center

This page offers a variety of accessible resources for users to get started creating and sharing video, audio, text, and multimedia content on the Web.

Jumpcut

http://jumpcut.com

Jump Cut is a free online tool for video editing and publishing to the Web. This online creative community allows people to share clips, images, sounds, and other resources.

Listen Up!

http://www.listenup.org

A national intermediary to support the development of the youth media field, ListenUp! features tips on youth media-making techniques and an extensive collection of youth media works from leading programs across the country.

Media That Matters

http://www.mediathatmattersfest.org

The Media That Matters Film Festival is a showcase for short films on the most important topics of the day. These films from communities around the world engage diverse audiences and inspire them to take action.

MediaRights

http://www.mediarights.org/launchpad

MediaRights.org's Launchpad includes a youth media distribution toolkit, which is a resource for the development of outreach and exhibition strategies.

VoiceThread

http://voicethread.com

A VoiceThread, an online media album that holds essentially any type of media (images, documents, and videos), allows people to make comments in five different ways—including voice, text, audio file, or video. A VoiceThread allows group conversations to be collected and shared in one place, from anywhere in the world.

YouthLearn on Youth & Media

http://www.youthlearn.org/youthmedia

EDC's YouthLearn Initiative has been researching and supporting the youth media field for many years. This section of the initiative's Web site explores the core elements and outcomes associated with youth media, showcases a number of exemplars from the field, and addresses how best to evaluate the media-making process.

Credits

Education Development Center, Inc.

Newton, MA | www.edc.org

The GC3 initiative is based at Education Development Center, Inc. (EDC). For 50 years, EDC has been a pioneer, building bridges among research, policy, and practice. EDC's award-winning programs and products, developed in collaboration with partners around the globe, consistently advance learning and healthy development for individuals of all ages. Today, EDC manages 325 projects in 35 countries. EDC's work strengthens nearly every facet of society, including early child development, K–12 education, health promotion, workforce preparation, community development, learning technologies, basic and adult education, institutional reform, medical ethics and social justice.

Education, Employment, and Community Programs (EEC) at EDC offers an integrated approach to human development, which captures the creativity and potential of communities, schools, and workplaces. With diverse public and private partners, EEC works to turn promising innovations into successes that work for all people, especially those who face educational, economic, or health obstacles. EEC combines the lessons of research and practice to establish lasting systems and structures that help learners achieve, workers advance in their careers, and citizens improve their communities.

EDC Staff

Sarita Pillai, Principal Investigator and Project Director
Sarita Pillai is a senior project director at EDC. Drawing on her background as a computer scientist and technology developer, her role involves managing national projects that focus on the creation of powerful technology-based resources for educators and youth, with a special focus on the needs of diverse learners. In particular, she specializes in program and resource development aimed at engaging underrepresented youth in scientific education and future careers—by working with young people and placing them at the center of design and development efforts. As the director of the youth-developed FunWorks science career exploration digital library and the GSDL, she has helped shape technology and content strategy for the NSF's NSDL system. She also serves as co-principal investigator for NSF's National ITEST Learning Resource Center at EDC, which supports close to 100 projects around the country, located in schools and community-based settings, focused on building IT skills and knowledge of school-age children and teachers through intensive hands-on science experiences. Sarita has presented nationally and internationally on the use of digital libraries for education, learner-centered technology design and development, strategies for engaging youth in STEM, and the development of innovative and inclusive learning technologies.

Anthony Streit, Co-Principal Investigator
Anthony Streit is a senior project director with EDC who manages a variety of projects related to technology integration, media literacy, and project-based learning for formal and informal education. His many projects include the Youth Media Learning Network, a training initiative funded by Open Society Institute and the Kellogg Foundation. He is also overseeing the development of a new Program Guide with Adobe System Incorporated's signature youth media initiative, Adobe Youth Voices. Tony is an experienced filmmaker, media artist, and instructor who has designed and led project-based learning activities with youth since 1990. His work with youth has garnered numerous awards including two Emmy nominations and the inaugural Coming Up Taller Award from the Clinton Administration.

Deidre Searcy, Senior Research Associate
Deidre Searcy worked directly with learners from the Young Women's Leadership Charter School and led the development of the GC3 media template and sample segment. Deidre is a media educator and youth media expert with 20 years of experience developing arts education curriculum. Just prior to joining EDC, Deidre was director of the Chicago International Film Festival. She has extensive experience working to position media arts as a catalyst for change in inner-city schools.

Kimberly Lucas, Research Assistant
Kimberly Lucas worked on the development of the GC3 Educator's Guide and Video Production Curriculum. Kim currently also works on the Project Role of Informal Science Education in Youth Persistence in STEM Courses Pilot Study, a two-year pilot study addressing critical methodological challenges inherent in doing longitudinal research linking informal STEM experiences and school achievement. Kim holds an undergraduate degree in psychology and sociology from UCLA and a Master's degree in child development and urban and environmental policy and planning from Tufts University.

GC3 Project Advisory Board

Meghan McDermott
Executive Director, Global Action Project

Renee Hobbs
Founder, Media Education Lab & Professor, Temple University

Claudia Morrell
CEO, Multinational Development of Women in Technology

Claudia Mincemoyer
State Coordinator, Pennsylvania 4-H Afterschool
Associate Professor & Extension Specialist, Department of Agricultural and Extension Education, Pennsylvania State University

Dr. Bonnie Arons-Polan
Science Assessment Specialist, Boston Public Schools

Anne Lucietto
Manufacturing Engineering Supervisor, Caterpillar, Inc.
Fellow Life/Outreach Member, Society of Women Engineers
Life Member, Girl Scouts of the USA

Young Women's Leadership Charter School

Chicago, IL | www.ywlcs.org

In August 2000, the Young Women's Leadership Charter School (YWLCS) of Chicago opened its doors as the only all-girls public school in the city. YWLCS's charter is based on the belief that a single-sex school for young women in the public schools can prevent the disengagement from math, science, and technology that often takes place as girls enter adolescence. It is the mission of the YWLCS to inspire urban girls to engage in rigorous college preparatory learning in a small school focused on math, science, and technology that nurtures their self-confidence and challenges them to achieve. Enthusiasm, energy, and a vision of learning math, science, and technology for the future unifies YWLCS students, parents, staff, board members, and the larger education community of Chicago.

YWLCS Lead Design Team

The GC3 Video Series was created in part by an energetic group of grade 7 girls at YWLCS.

Aria

Aria had just turned 13 when she completed her video. Some of her friends call her "wild child" because she is such an independent spirit. She loves sciences. She used to go on "archaeological digs" when she was younger (really just digging for rocks). She wanted to discover things that have never been discovered before.

Asia

Asia loves to cook, loves food, and was surprised to find a connection between cooking and science. She had never thought about how a flavor chemist might help with health problems like hypertension and obesity by figuring out chemically how to reduce sodium and fat without reducing flavor. Asia thinks that food can bring people together, especially cheesecake.

Kera

Kera is 13. She has a close and supportive family. Her mom is a nurse, but Kera had never considered nursing as a career. She has been interested in becoming a pediatrician for a while, because she says she just loves little kids.

Sonia

Sonia loves animals and is passionate about protecting the planet and seeking harmony between people and nature. She has had several pets including fish and turtles. Her favorite marine creature is the stingray. She plans to apply for the Shedd Aquarium program for teens when she reaches high school.

Spy Hop Productions

Salt Lake City, UT | www.spyhop.org

Since 1999, Spy Hop Productions has provided approximately 1,000 youth participants per year with hands-on and mentorship-based learning experiences in the documentary arts, film/video production, audio engineering, and interactive design. In collaboration with community partners such as the Utah State Office of Education, the Sundance Institute, the University of Utah, and the Salt Lake City Mayor's Office, Spy Hop Productions' dynamic studio learning environment actively engages youth in an array of innovative multimedia programs. Spy Hop continually strives to close the "digital divide" by reaching out to underserved youth and marginalized communities needing access to and instruction in the latest digital technologies. The majority of Spy Hop's programs are offered free of charge, and financial assistance is available to youth who cannot afford tuition-based workshops.

Spy Hop Design Team

The GC3 Video Series was created in part by an energetic group of 8th grade girls at Spy Hop Productions.

Victoria
Victoria was born in Peru and recently moved to the United States five years ago with her family. Victoria loves to write and also enjoys learning about fashion. Her favorite part about the class was using the cameras and working with her friends.

Yanelly
Yanelly is the president of the MESA club and is also the Student Body secretary of her junior high school. In her spare time, Yanelly enjoys playing all kinds of sports, but especially loves soccer. During the class she explored Forensic Detective work and realized that this is what she wants to be when she grows up. Yanelly is super excited to learn more about this career.

Priscilla
Priscilla is in 9th grade and is the Student Body president of her junior high school. Priscilla is excited to celebrate her Quinceañera. In her spare time, Priscilla enjoys hanging out with her friends and family.

Sashua
Sashua loves music, especially Hip Hop, and is interested in learning more about producing music. She is in 9th grade and is one of the 9th grade Senators at her school. Sashua also enjoys hanging out with her friends and going to the mall.

Spy Hop Staff

Matt Mateus, Programs & Alumni Studio Director
Matt Mateus has been teaching audio for the past five years at Spy Hop Productions. A Utah native, Matt has been involved with creating and recording music since he was a teenager. Over the years, he has released or appeared on more than a dozen recordings nationally and internationally. He has toured the U.S. and Europe many times and continues to do so with his band. After spending a couple of years training as a recording engineer in New York City under some amazing

tutelage, Matt returned to Salt Lake City and began teaching at Spy Hop. He brings "real-life" experience to his teaching and embraces the role of youth mentor. Aside from the work that he does at Spy Hop, Matt pioneered a program at a local middle school to help improve academic scores and he spent his summer building a recording studio for the local Boys and Girls Club.

Shannalee Otanez, Mentor
Shannalee Otanez first began working in media at Spy Hop Productions at just 16 years old as a member of Utah's first all youth radio program called Loud and Clear. Since then she has realized her passion for producing documentaries and is now studying film at the University of Utah. Shannalee had a blast teaching the girls over the summer and hopes to keep in touch with them through the years to come.

Featured STEM Profiles

Check out these folks with fascinating STEM careers! They are featured in the GC3 Video Series.

Alicia Thomas
Field: Flavor Chemistry
Title: Director of Sensory and Applied Statistics
Organization: Kraft Foods

Alaka Wali
Field: Applied Anthropology
Title: Director of the Center for Cultural Understanding and Change
Organization: The Field Museum

Melissa Grey
Field: Pediatric Medicine
Title: Pediatric Nurse Practitioner
Organization: Young Women's Leadership Charter School Health Clinic

Michelle Sattle
Field: Marine Science
Title: Aquarium Collections Manager and Head Aquarist for Caribbean Reef Exhibit
Organization: Shedd Aquarium

Leia Bell
Field: Graphic Design
Title: Poster Artist and Owner
Organization: Signed & Numbered

Nicole Davis
Field: Forensics
Title: Forensic Detective
Organization: West Valley City Police Department

Karen Hansen
Field: Pediatric Medicine
Title: Pediatrician
Organization: Center for Safe and Healthy Families, Primary Children's Medical Center

Worksheets

STEM Profile Worksheet

Just how do people get into STEM careers? This worksheet can help young people figure out the paths that GC3 professionals have taken to get into the STEM careers they're in today. You can use this worksheet to emphasize the multiple paths to STEM careers. This worksheet was adapted from material provided by SciGirls® and used by permission from SciGirls®, a production of Twin Cities Public Television, Inc.

Name of STEM professional: _____

What kind of STEM professional is she? _____

What sorts of work does she do? _____

_____

_____

_____

Did she always want to have this career? _____

_____

_____

_____

What did she need to do to prepare for this career? _____

_____

_____

_____

When she was a youngster, what were her interests? How did she get interested in science?

_____

_____

_____

What kind of school did she go to? How long did she go to the school?

_____

_____

_____

What kind of classes did she take? _____

_____

_____

Has she had any other careers? _____

_____

_____

What kind of school did she go to? How long did she go to the school?

_____

_____

_____

What does she like best about her work now? _____

_____

_____

_____

If you could work with her, what sorts of things would you like to investigate?

_____

_____

_____

What other careers can people with her training have? _____

_____

_____

_____

What responsibilities does she have? _____

_____

_____

_____

What people does she work with? _____

_____

_____

_____

What kinds of science and math skills does she use in her work? _____

_____

_____

_____

What kinds of technology tools does she use in her work? _____

_____

_____

_____

Activity Planning Guide

You might find this activity planning guide, adapted from the Adobe Youth Voices and the YouthLearn Initiative (see "Resources for You") to be a useful tool in integrating video into an activity about STEM careers.

Goals for the Activity:
What will youth accomplish or produce by the end of the activity? What skills will they practice or develop?

Name of Activity:	
Lead Educator:	
Duration:	

Materials and Equipment
What tools will you need to support your goals?

1.	
2.	
3.	
4.	
5.	

_____

_____

_____

Preparation
What activities and tasks must you do prior to the session?

_____

_____

_____

Activity Steps
Include strategies for youth leadership in each step, as appropriate.

Amount of Time	Activity Step	Related Goals

Assessment
What indicators will you use to determine what youths have learned from the lesson?

Learning Outcome	Indicator

What did the youths learn, and how will they apply their knowledge?

Outcome	Application of Knowledge

Resources Used
What resources will you use in creating this activity, and what resources will you use in carrying out the activity?

	Resources for Creating Activity	Resources for Carrying Out Activitiy
Technology Tools		
Websites		
Print Materials		
Community		
Other		
Notes/Ideas		

Variations

(Integration of different technology tools, adjustment for age groups, etc.)

_____

_____

_____

_____

Footnotes

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