Research in Support of SciGirls

As someone who educates, encourages, and empowers girls to be scientists, you know that girls are naturally inquisitive. You know that girls love to explore, they're creative, and they're smart. In other words, you already know that your girls possess the qualities to be great scientists. At *DragonflyTV*, we honor these qualities by connecting science to girls' favorite activities. As a result, we've learned that girls are as eager and able to do meaningful inquiries as their male lab partners, teammates, and friends.

But researchers have actually specified distinct ways in which girls learn, experience, and enjoy science—ways that are different, and sometimes downright opposite, from those of their male counterparts. In addition, recent research describes the particular ways in which girls engage most fully with science museum and science center exhibits.

Here are some ways to make science engaging and fun for girls, based on this research:

- **Girls require communication and interaction among *all* group participants.** Girls like to hear from everyone, and they enjoy collaborating. Make time to hear what everyone thinks.
- **Discussion and participation must be harassment-free.** Try to create a hassle-free zone for your girls.
- **Girls enjoy real-life contexts of science content.** For girls, it's sort of cool if an experiment works in a lab, but they want to see it work in their homes, backyards, or other environments.
- **Girls respond well to informal assessments, with open-ended tasks set in contexts familiar to all.** So propose a destination, but let girls figure out how to get there in the way that is best for them.
- **Girls value diverse ways of knowing, viewing, and describing the world.** In other words, it's okay if everyone doesn't know or use the same terminology for everything. Value these perceptions; even if they are ultimately incorrect, this trial and error is part of the scientific process for everyone.
- **Girls like to challenge dominant ways of thinking about science and consider how scientific knowledge is valued and legitimated.** Give girls permission to test boundaries and break from the status quo. Give them space for brave thinking.

At *DragonflyTV*, we're big believers in empowering girls in their scientific explorations, and have "walked the walk" from the very beginning of our program. As you view *DragonflyTV* video segments and use our materials, please keep an eye out for these *DragonflyTV* essentials:

- *DragonflyTV* segments show how research questions are drawn from the child's prior experiences and knowledge (e.g., "Hmmm . . . is my cat right- or left-handed?").
- *DragonflyTV* segments portray research questions in the context of things that are currently interesting to girls, and take science inquiry to some non-traditional spheres of interest. So even if you don't love hip-hop music or frog research, your girls might.
- *DragonflyTV* is sex-equitable in its language, illustrations, and examples.
- *DragonflyTV* includes some social and environmental applications of science and puts its inquiries in a real-world context. As a result, we're doing science at the horse ranch, on the playground, and in the countryside.
- *DragonflyTV* portrays girls and women in all science disciplines (not just biology, where they tend to gravitate on their own). Check out our Scientist Profiles to meet women who create robots, study volcanoes, and more.
- *DragonflyTV* emphasizes communication among its co-investigators. Disagree? That's fine. Talk it out.
- *DragonflyTV* investigations are open-ended (i.e., the outcome is not predetermined). So guess what? Sometimes they fly, sometimes they flop. *Just like real science.*

Research Regarding Girls and Science Museums

I. Science Museum Exhibits

Science museum researchers observe that girls do have discernibly distinct behaviors in science museums, compared to the behaviors of boys, and of adults. (Greenfield, 1995) As such, these characteristics of science museum exhibits have added value in engaging girls:

- Girls engage in science museum exhibits in pairs or groups, and allow each other time and space to interact fully with the exhibit and become familiar with it. A well-designed exhibit allows for these interactions to take place. (Taylor, 2005)
- The exhibit that successfully engages girls allows the girls to interact with each other as much as with the exhibit. A well-designed exhibit prompts these kinds of social interactions among girls. (Jensen, 1994; Taylor, 2005)
- Girls are prone to following the behavior of an adult authority (i.e., parent or teacher) when interacting with an exhibit. A well-designed exhibit encourages adult females to interact both with the exhibit and with their girls. (Taylor, 2005)

II. Science Museum Camps

Girls-only camps foster a more complete set of behaviors among girls than do camps of mixed gender participants. Successful museum-based activities, whether camplike experiences or sleepovers, have these characteristics:

- They provide activities that allow girls to work in small groups.
- They provide activities that are hands-on, open-ended explorations.
- One researcher suggests that hands-on activities need to be fun for girls. Based on this researcher's materials, a better descriptor than "fun" would be "meaningful to girls' daily lives," as this will keep the girls engaged in the activity. In the case of a project called Techbridge, the value of the formal activities was evident in that they spilled into the girls' interests outside the museum class. (Kekelis, Heber, and Countryman, 2005)
- Short video (not to exceed 20 minutes) can be an engaging prompt for girls before they participate in a project. Video showing adult mentors doing work similar to the work girls are about to engage in has been a successful part of the Wonderwise project, developed at the University of Nebraska State Museum, for example. (Spiegel, 2003; Spiegel, Dethlefs, and Diamond, 2005)
- Successful museum experiences for girls recognize, allow for, and foster social interactions among the girls participating. (Brunner, 2005; Taylor, 2005)

Once again, you'll see that the values portrayed in the *DragonflyTV* SciGirls video resources are consistent with this research.

Sources

Brunner, Cornelia. (2005). The universe of making things: toward a female-friendly technology. *ASTC Dimensions* May/June, 2005. 16-18.

Greenfield, T. A. (1995). Sex differences in science museum exhibit attraction. *Journal of Research in Science Teaching* 32(9), 925-938.

Jensen, Nina. (1994). Children's perception of their museum experience: A contextual perspective. *Children's Environments* 11(4), 300-324.

Kekelis, Linda, Heber, Etta, and Countryman, Jeri. (2005). A bridge to technology: designing a program for girls. *ASTC Dimensions* May/June, 2005. 3-4.

Spiegel, A. N. (2003). Wonderwise 4-H: the trial testing process. Lincoln, NE: Center for Instructional Innovation, University of Nebraska-Lincoln.

Spiegel, A. N., Dethlefs, T. M., & Diamond, J. (2005). Girls and boys learning science: lessons from the Wonderwise Project. Lincoln, NE: Center for Instructional Innovation, University of Nebraska-Lincoln.

Taylor, D. (2005). Social science: observing women and girls in the museum. *ASTC Dimensions*. May/June, 2005. 11-12.

So now that you're armed with fun, girl-centered videos and materials, grab your gang and start investigating! And thank you from all of us at *DragonflyTV* for guiding, leading, and encouraging the next generation of astronauts, physicists, entomologists, and other scientists (who just *happen* to be female).