

## Gender Differences—Achievement in Science and Math

A review of gender-related differences reveals that, although girls and boys enter school with similar abilities, during the middle school years, females begin to lag behind males in perceptions of their abilities in mathematics, science, and technology related skills (Backes, 1994). Girls also lose interest in science and math as early as the seventh grade (Hansen, 1996), and by the eighth grade, girls' interest in mathematics and confidence in their mathematics abilities have eroded, even though they perform as well as boys in math (NSF, 2004). The *Girls in Science* program, targeting girls ages 11-14, was broad in scope and intensive, which provided the unique opportunity to impact girls to enter the fields of science, math, engineering, and technology (STEM). The *Girls in Science* program focused on the inter-relatedness of science to all aspects of life. The *Girls in Science* program specifically emphasized investigative learning, collaboration, hands-on activities, and innovative technologies in the learning environment.

Adolescence is a difficult time for young people as they experience extreme physical, emotional, and psychological changes (Brooks-Gunn & Reiter, 1992). If the social environment is not supportive of education, a tension can result between parents, peers, and academic success (Bricklin & Bricklin 1967, Bleuer, 1996). Furthermore, grades and other school performance measures can adversely affect a student's self-concept. Academic achievement has been shown to be an important indicator of postsecondary education aspirations. With a reciprocal relationship between academic self-concept and achievement, monitoring school performance by teachers, counselors, and parents is important (Redd, Brooks & McGarvey, 2001; VanHook, 1993).

When considering possible interventions to increase the likelihood that young women would consider careers in math and science, it is critical to address the question, "Why do young women stop taking math and science courses?" One important reason for this phenomenon is the transition into adolescence. Rogers and Gilligan (1988) discuss the silencing of girls as they move into adolescence, noting that prior to adolescence, "young girls" display capabilities for self-confidence and resistance to harmful feminine behaviors as well as detailed knowledge of their social interactions, and until the age of eleven or twelve girls are quite clear and candid about what they think, feel, and know (Rogers & Gilligan, 1993). As females enter adolescence, they seem to lose their sense of self. They lose their self-confidence, resiliency, assertiveness, curiosity, enthusiasm for life, and willingness to take risks. They become extremely self-critical and sometimes self-loathing (Pipher, 1994). This pervasive and overwhelming lack of self-confidence and the loss of faith in their abilities is a principle reason why young women choose to bypass math and science courses (AAUW, 1992; Betz & Fitzgerald, 1987; Pipher, 1994). Continuing to take science and math courses, is strongly correlated with confidence and a sense of ability (AAUW, 1992). Young women make choices about continuing math and science courses—choices that will have long-term career consequences—at a time when they are losing their sense of self, self-direction, and self-confidence (Reyes, 1984).