

Overview of Current Research Supporting Garden-Based Learning

The research supporting Garden-based Learning and school gardening opportunities is broadly categorized here in relation to Academic Achievement, Nutrition Knowledge & Eating Habits, Agricultural & Ecological Literacy, or Behavior & Attitudes. The cited research reports were collected, reviewed, and summarized as a project of the University of California Cooperative Extension Garden-Based Learning Workgroup. For more detail on these articles and to find additional studies, visit the **Research** page of the **California School Garden Network website at www.csgn.org**. To ask about our research review process, contact Jeri Ohmart at jlhmart@ucdavis.edu.

ACADEMIC ACHIEVEMENT

- Participants in a comprehensive garden-based instructional curriculum in a California middle school showed significant gains in overall GPA and specifically in math and science compared to the control group. They also showed improvement on a range of psychosocial measures. (Murphy 2003)
- Students in 14 third grade Indiana classrooms who participated in Junior Master Gardener curriculum showed significant gains in knowledge in science, horticulture and the environment compared to control groups. (Dirks 2005)
- A similar study with 5th grade inner city students (Texas) showed significant increase in mean test scores in science after participating in a supplementary garden-based education project. The greatest increase was in the plant growth and development subject area. (Smith and Motsenbocke 2005)
- Students engaged in hands-on gardening lessons showed increased positive attitudes towards content material and learning in general. (Bell 2001; Waliczek 2003)
- Teachers surveyed believe that curriculum based on experiential, garden-based learning activities are more conducive to the learning environment and that students learn more effectively. In addition, teachers working in schools with garden programs show higher morale and more “general satisfaction with being a teacher at that school.” (Murphy 2003; Skelly & Bradley 2000)
- A study by Lieberman & Hoody (1998) reported on the use of an environment-based teaching strategy termed “Environment as an Integrating Context (EIC) for Learning”. The study included at least one garden-based learning project (GBL) and results showed better performance than non-EIC schools on standardized achievement assessments in reading, writing, math, science and social studies. This study has implications for garden-based learning, as GBL is based on similar experiential and environmental approaches to education (Lieberman & Hoody 1998)
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NUTRITION KNOWLEDGE AND EATING HABITS

- Studies have shown that garden-based nutrition education can significantly increase children’s knowledge of, preference for, and consumption of fresh fruits and vegetables. GBL combined with nutrition education is more effective than nutrition education alone. A six-month follow-up to this study indicates that these results can be lasting. (Morris et al. 2002)
- In a study by McAleese and Rankin (2007), sixth-grade students involved in a garden-based nutrition education program increased their fruit consumption by 1.13 servings per day and vegetable consumption by 1.44 servings per day, more than doubling their overall fruit and vegetable consumption.
- A Texas study showed that gardening with supplemental nutrition instruction had a positive effect (significant difference) on attitudes, preferences and knowledge of fruits and vegetables. (Nolan 2006)

AGRICULTURAL AND ECOLOGICAL LITERACY

- Students’ environmental attitudes are significantly more positive after participating in a school garden program compared to nonparticipating students. (Waliczek & Zajicek 1999; Skelly & Bradley 2000; Subramaniam 2002; Waliczek et al. 2003; Lohr & Pearson-Mims 2005; Dirks 2005)
- Food systems approach to curriculum in an urban middle school showed significant improvement in overall ecoliteracy garden subscale, health, behavioral dimensions. Furthermore, project-based

learning improves students' knowledge and understanding of ecology and the environment. (Murphy 2003; Lieberman & Hoody 1998)

- Work by Gardner (1999) succinctly defines and substantiates the “naturalist intelligence.” Framing education around agriculture and the environment allows certain students to succeed who have this identifiable intelligence. Educators can then use that to reach these students in other subject areas.

BEHAVIOR AND ATTITUDES

- Students at schools that incorporate hands-on gardening into their curriculum demonstrate more concern for and willingness to care for living things. (Eames-Sheavly 1994; Murphy 2003)
- Students show more positive attitudes towards school and improved interpersonal relationship as a result of working in a school garden program. Also, school garden programs can result in increased interest and excitement for learning. (Waliczek 2001; Murphy 2003; Dirks & Orvis 2005)
- Teachers working in schools where garden programs are integrated into the curriculum show higher morale and more “general satisfaction with being a teacher at that school.” (Murphy 2003)
- Students involved in a school garden program gain insight about and appreciation for how people have survived over time. (Hayden-Smith 2006; Eames-Sheavly 1994; Subramaniam 2002)

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