Adapted from **Cornell Garden-Based Learning** web page **Highlights from Journal Articles**

http://blogs.cornell.edu/garden grow-your-program/research-that-supports-our-work/highlights-from-journal-articles/

Relevancy to my program outcomes	Research Finding	Reference
	Increased Nutrition Awareness	
	This study reports that the adolescents who participated in the garden-based nutrition intervention increased their servings of fruits and vegetables more than students in the two other groups. Although further research is needed, the results of this study seem to indicate the efficacy of using garden-based nutrition education to **increase adolescents' consumption of fruits and vegetables**.	McAleese, J. D. & L. L. Ranklin. (2007). Garden-based nutrition education affects fruit and vegetable consumption in sixth-grade adolescents. Journal of the American Dietetic Association, 107:662-665.
	This study highlights the advantages of solar cookers and gardens to nutrition, health, and the environment. Study results indicate that growing their own vegetables encouraged **adults and children** to try new foods, which in turn improved eating habits. Free seeds were distributed for container gardens, which motivated new and experienced gardeners to make gardens. Both **rural and urban participants gained enthusiasm for the fresh, flavorful, nutritious, and economical vegetables they grew**, and for the varied foods they cooked in solar cookers. They realized that gardening helped to improve their nutrition, health, family, economics, and the environment.	Dow, R. M. & C.R. Dow. (1999). Using solar cookers and gardens to improve health in urban and rural areas. Alfalit International, Inc. 99: 9
	A study in Tucson, AZ showed that children who participated in the garden learned to like healthy foods. The **vegetables that the children grew had a high intrinsic value**.	Cavaliere, D. (1987). How Zucchini Won Fifth-Grade Hearts. Children Today, 16(3), 18-21.
	After gardening children have shown more positive attitudes toward fruit and vegetable snacks and an **improvement in vegetable preference scores**.	Lineberger, S. (1999). The Effect of School Gardens on Children's Attitudes and Related Behaviors Regarding Fruits and Vegetables. Thesis, Texas A&M University.
	"Use of school gardens in academic instruction" found that school gardens can positively impact children's food choices by **improving their preferences for vegetables** and increasing their nutrition knowledge.	Survey of 4194 Cal. school principals. Journal of Nutrition Education and Behavior Volume 37 Number 3, May-June 2005
	Two programs, a standard nutrition program titled Professor Popcorn (PP) and a gardening and nutrition program using lessons from the Junior Master Gardener: Health and Nutrition	Poston, Suzanne A., Shoemaker, Candice A., and Dzewaltowski, David A. (2005). A Comparison of a Gardening and Nutrition Program with a Standard Nutrition Program in an Out-of-school

	from the Garden were compared to investigate their influence on nutrition knowledge **improving fruit and vegetable preference**, and improving self-efficacy in gardening and eating fruit and vegetables in an out-of-school setting. There was a change in gardening self-efficacy for the summer JMG group compared with that of the fall JMG group. Gardening self-efficacy of the summer JMP group increased whereas that of the fall JMG group decreased.	Setting. HortTechnology. 15(3), pages 463-467.
	The title says it all: Frequency of **Eating Homegrown Produce** Is Associated with Higher Intake among Parents and Their Preschool-Aged Children.	Rural Missouri. Journal of the American Dietetic Association, Volume 107, Issue 4, April 2007, Pages 577-584 Marilyn S. Nanney, Sheldon Johnson, Michael Elliott and Debra Haire-Joshu.
	This study measured food security and hunger of households in a rural Appalachian county and assessed factors that could affect food security and hunger. **Hunger was related to** a variety of household characteristics including participation in food banks, dependence on family members and friends outside of the household for food, lacking reliable transportation, and **not having a garden.**	Holben, D.H., McClincy, M.C., Holcomb, J.P., Dean, K.L., Walker, C.E. (2004). Food Security Status of Households in Appalachian Ohio with Children in Head Start. Journal of the American Dietetic Association. 104: 238-241.
	Hiemendinger and Van Duyn report that **consumption of fruits and vegetables, as a habit in childhood, is an important predictor** of higher fruit and vegetable consumption as adults and can help to prevent or delay chronic disease conditions.	Heimendinger, J. & M. Van Duyn. (1995). Dietary behavior change: the challenge of recasting the role of fruit and vegetables in the American diet. American Journal of Clinical Nutrition, 61:1397S-1401S. and Crockett, S.J., & L. Sims. (1995). Environmental Influences on Children's Eating. Journal of Nutrition Education. 27: 235-249.
	This study examined the life-course experiences and events associated with current fruit and vegetable consumption in 3 ethnic groups. Results showed that black, Hispanic and white **respondents differed fruit and vegetable consumption**. Among white respondents, having a garden as an adult was positively associated with fruit and vegetable consumption. An **understanding of the determinants of food choice in different subcultural groups can be used to design nutrition interventions**. Experiences such as eating fresh-picked fruits and vegetables while growing up or vegetable gardening as an adult	Devine, C. M. , Wolfe, W. S., Frongillo, E. A., Bisogni, C. A. (1999). Life-course events and experiences: Association with fruit and vegetable consumption in 3 ethnic groups. Journal of the American Dietetic Association. 99: 309-314.

	may enhance the fruit and vegetable consumption among members of some ethnic groups.	
Higher Learning Achievements		
	This study assessed school teachers' perceived attitudes and barriers associated with school gardens, as well as the purpose and use of gardens in schools, specifically in relation to the link between gardens and nutrition. Results indicate that the teachers perceived **the garden to be somewhat to very effective at enhancing academic performance, physical activity, language arts, and healthful eating habits**. This research provides evidence for needed standards-based curricula materials and teacher training in relation to gardening and nutrition.	Graham, H. & S. Zidenberg-Cherr. (2005). California teachers perceive school gardens as an effective nutritional tool to promote healthful eating habits. Journal of the American Dietetic Association, 105:1797-1800.
	In a project that involved integrating nutrition and gardening among children in grades one through four, the outcomes have gone well beyond an understanding of good nutrition and the origin of fresh food, to include **enhancing the quality and meaningfulness of learning**.	Canaris, Irene. (1995). Growing Foods for Growing Minds: Integrating Gardening and Nutrition Education into the Total Curriculum. Children's Environments, 12(2): 264-270.
	Third, fourth, and fifth grade students that **participated in school gardening activities scored significantly higher on science achievement tests** compared to students that did not experience any garden-based learning activities.	Klemmer, C.D., Waliczek, T.M. & Zajicek, J.M. (2005). Growing Minds: The Effect of a School Gardening Program on the Science Achievement of Elementary Students. HortTechnology. 15(3): 448-452.
	Several variables may have affected the outcome of the study, but the results show once **weekly use of gardening activities and hands-on classroom activities help improve science achievement test scores**.	Smith, Leanna L., and Motsenbocker, Carl E. (2005). Impact of Hands-on Science through School Gardening in Louisiana Public Elementary Schools. HortTechnology. 15(3), pages 439-443.
	The purpose of this study was to develop three cognitive test instruments for assessing science achievement gain of third, fourth, and fifth grad students using a garden curriculum. The development of the test instruments occurred in three phases: 1) an initial set of test instruments which served as a prototype for length, scope, and format; 2) an adapted set of test instruments which were piloted; and 3) a set of **test instruments which were used for the assessment of the school gardening curriculum**.	Klemmer, C.D., Waliczek, T.M., and Zajicek, J.M. (2005). Development of a Science Achievement Evaluation Instrument for a School Garden. HortTechnology. 15(3), pages 433-438.
Increased Environmental Awareness		

	Elementary school and junior high school students gained **more positive attitudes about environmental issues** after participating in a school garden program	Waliczek, T.M., Zajicek, J.M. (1999). School Gardening: Improving Environmental Attitudes of Children Through Hands-On Learning. Journal of Environ. Hort. 17(4): 180-184.
	Gardening has been shown to **increase scores on environmental attitude** surveys of elementary school children.	Skelly, S. & J. Zajicek. (1998). The Effect of an Interdisciplinary Garden Program on the Environmental Attitudes of Elementary School Students. Hort Technology, 8(4): 579-583.
	"Gardens are often the most accessible places for children to **learn about nature's beauty, interconnections, power, fragility, and solace**."	Heffernan, M. (1994). The Children's Garden Project at River Farm. Children's Environments. 11(3): 221-231.
	Both passive and active interactions with plants during childhood are associated with **positive adult values** about trees. However the strongest influence came from active gardening, such as picking flowers or planting trees as a child.	Lohr, V.I. & Pearson-Mims, C.H. (2005). Children's Active and Passive Interactions with Plants Influence Their Attitudes and Actions toward Trees and Gardening as Adults. HortTechnology. 15(3): 472-476.
Increased Life Skills		
	As early as 1909, Montessori had identified several benefits to children's gardens: **enhances moral education, increases appreciation for nature, increases responsibility, develops patience, and increases in relationship skills.**	Montessori, M. (1964). The Montessori Method. Schocken.
	Studies have shown that fifth, sixth, and seventh grade students developed better **interpersonal relationship skills** after participating in a garden program.	Waliczek, T. & J. Zajicek. (1998). The Effect of a School Garden Program on Self-Esteem and Interpersonal Relationships of Children and Adolescents. Hort Technology (submitted).
	Children with learning disabilities had enhanced nonverbal communication skills, developed awareness of the advantages of order, learned how to participate in a cooperative effort, and formed relationships with adults.	Sarver, M. (1985). Agritherapy: Plants as Learning Partners. Academic Therapy, 20(4). 389-396.
Improved Wellness (Mental & Physical Health)		
	This study assessed school teachers' perceived attitudes and barriers associated with school gardens, as well as the purpose and use of gardens in schools, specifically in relation to the link between gardens and nutrition. Results indicate that the teachers perceived **the garden to be somewhat to very effective at enhancing academic performance, physical activity, language arts, and healthful eating habits**. This research provides evidence for needed standards-based curricula materials and teacher	Graham, H. & S. Zidenberg-Cherr. (2005). California teachers perceive school gardens as an effective nutritional tool to promote healthful eating habits. Journal of the American Dietetic Association, 105:1797-1800.

	training in relation to gardening and nutrition.	
	Participation with nature **enhances mental health, reduces stress, and can produce physiological benefits such as lower blood pressure and reduced muscle tension**.	Relf, D. (1988). People-Plant Relationship. In: S.P. Simson, M. C. Straus (eds.). Horticulture as Therapy. The Food Products Press, New York. Pp. 21-42.
	Results from surveying home gardeners reveal that the interaction with nature in a nurturing environment provides a number of benefits important to the gardener, including **mental well-being**.	Catanzaro, C and E. Ekanem (2004). Home Gardeners Value Stress Reducation and Interaction with Nature. Acta Hort. 639: 269-275.
	Results of this study investigating the stress experienced by Marine Corps families indicate that community gardening has great potential to help **alleviate high levels of stress** especially by **cultivating community, fostering social networking and a creating a mentorship platform**.	Fairleigh, M. (2004). Gardens for the green machine: Investigating the use of community gardening for stress treatment in marine corps families. Unpublished graduate thesis. California State Polytechnic University (Cal Poly Pomona), 3801 W. Temple Avenue, Pomona, CA.
Building Social Connections and Community		
	Students in a one-year school gardening program increased their overall life skills by 1.5 points compared to a group of students that did not participate in the school gardening program. The gardening program positively influenced two constructs: **"working with groups" and "self-understanding."**	Robinson, C.W. & Zajicek, J.M. (2005). HortTechnology. 15(3): 453-457.
	Studies in Bexar County, Texas showed that school gardening increased self-esteem, helped students develop a sense of ownership and responsibility, **helped foster relationships with family members, and increased parental involvement.**	Alexander, J. & D. Hendren, (1998). Bexar County Master Gardener Classroom Garden Research Project: Final Report. San Antonio, Texas
	A study on a youth gardening program in Detroit reports that after gardening, kids have an increased interest in eating fruit and vegetables, possess **an appreciation for working with neighborhood adults**, and have an **increased interested for improvement of neighborhood** appearance. In addition, they made new friends, and showed increased knowledge about nutrition, plant ecology, and gardening.	Pothukuchi, K. (2004). Hortiliza: A Youth "Nutrition Garden" in Southwest Detroit. Children, Youth and Environments. 14(2): 124-155.
	A study of the Robert Taylor Housing Development in Chicago offers evidence that more frequent use of outdoor green space **leads neighbor interactions and increased familiarity which produces stronger, more supportive neighborhoods.**	Kuo, F.E., Sullivan, W.C., Coley, R.L., & Brunson, L. (1998). Fertile ground for community: Inner-city neighborhood common spaces. American Journal of Community Psychology 26(6), 823-851.

	This book provides specific instances of greening and the presence of greened spaces in **promoting and enhancing recovery and resilience** in social-ecological systems disrupted or perturbed by violent conflict or other catastrophic disaster.	Tiball, K. G. & M. E. Krasny (eds). (2011). Greening in the Red Zone. Disaster, Resilience and Community Greening. Springer Verlag.
	Results from this study examining **formal and informal community-based social networks** and family adaptation in military communities suggest that communities can be important sources of tangible information and expressive support. Further, a sense of real belonging in a distinct place can help to balance the turmoil of the deployment cycle.	Bowen, G. L. & J. A. Mancini, J. A. Martin, W. B. Ware, & J. P. Nelson. (2003). Promoting the Adaptation of Military Families: An Empirical Test of a Community Practice Model. Family Relations. 52, 33–44.