

Food Literacy, Mental Health, and Gardening in Schools: Lit Review
Mental Health and Healthy Eating Benefits for Students Involved in School Gardens

Mental Health in Canada:⁶

- 31% Canadians report having high sense of coherence (only 12% age 12-19) (30% in BC)
- 52% report having high self-esteem (44% age 12-19)(49% in BC)
- 23% report having a high sense of mastery (18% age 12-19) (23% In BC)
- 29% report some distress in their lives
- Youth aged 12-19 had the lowest prevalence of positive mental health indicators.
- Women = 2x more likely to report depression, more prone to distress, and more affected by distress
- Intergenerational transfer of disadvantage → Social and economic inequities tend to get passed down and perpetuate through generations. This results in increasing health inequities over time (WHO)⁴

What is Mental Health?

- “The capacity of each and all of us to feel, think, act in ways that enhance our ability to enjoy life and deal with the challenges we face. It is a positive sense of emotional and spiritual well being that respects the importance of culture, equity, social justice, interconnections and personal dignity” – Public Health Agency of Canada
- “A state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community” – World Health Organization
- Programs that promote positive mental health have been shown to decrease the risks of mental illness and related disorders. (PHAC)
 - “Mental health promotion is the *process* of enhancing the capacity of individuals and communities to take control over their lives and improve their mental health” (PHAC)
- *Strong evidence shows that many mental and physical health conditions emerge in later life but originate in early life – WHO⁴
- Adverse conditions in early life are associated with higher risk of poor mental health ⁴

What are the Determinants of Mental Health?

- Shaped largely by the **social, economic, and physical environments** people live in⁴

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- **SES**^{6,4}
- Social inequalities are associated with increased risk of many common mental disorders⁴ (**Social Equality** is a determinant of Mental Health)
- General consensus that building positive mental health from childhood builds the greatest mental health benefits that impact society as a whole⁴
- Certain subgroups are at higher risk for mental ill-health. This disadvantage starts before birth and accumulates throughout life⁴
- Actions that promote mental health are essential in improving the health of the world's population and in reducing health inequalities⁴
- **Self-esteem**⁵
- **Coping skills**⁵
- **Social support** – strongly and positively associated with sense of coherence, self-esteem, mastery, and happiness, and negatively correlated with depression, distress, and impact of distress^{5,6,4}
- **Cultural respect**⁵
- **Equity**⁵
- **Social justice**⁵
- **Interconnectedness**^{5,4}
- **Personal dignity**⁵
- **Sense of being**: the way we are and how we feel about ourselves⁵
- **Sense of belonging**: the way we relate to others and to our social, physical and cultural environments⁵
- **Sense of becoming**: what we do in our lives, our aspirations, and how we develop⁵.
- **Cognitive status**⁶
- **Happiness**⁶
- **Work stress**⁶
- **Sense of coherence**: psychological well-being. Life is viewed as meaningful and manageable, and comprehensible⁶

- **Mastery:** degree to which individuals believe their life is under their control⁶
- Chronic **physical health** problems are closely associated with depression⁶
 - Childhood obesity is associated with both immediate and long-term health risks²⁰
 - Obesity is correlated with isolation and depression as many children and youth are bullied at school²⁰
 - A report written in 2013 identified that almost one-third of Canadian children and youth are overweight or obese²⁰
 - A report written in 2010 stated that Statistics Canada had found 26% of Canadian children aged 6 to 11 were overweight or obese with that percentage rising to 28% for Canadian teenagers and 61% for Canadian adults²⁰
 - Rates of diabetes and obesity are increasing among Ontario's children²⁰
 - If nothing is done, the current generation of children in Ontario will develop chronic illnesses much younger and be more affected as they age²⁰
 - The current generation of children in Ontario may live shorter, less healthy lives than their parents²⁰
- **Food/nutrition**⁴
 - Healthy eating patterns during childhood are associated with reduced risk of chronic diseases and obesity later in life²⁰
 - 3.9 million Canadians are food insecure¹⁹
 - Nutrient inadequacies in Aboriginal children and adolescents from certain communities have been documented for iron, folate, vitamin D, calcium and vitamin A²⁰
 - 93% of community members report that Community Food Centre Programs are an important source of healthy food¹⁹
 - School gardening programs can lay a foundation for schools to function as community food Centre programs.
 - Water, sanitation, housing⁴
 - **Neighbourhood trust/safety**⁴
 - **Community based participation**⁴

- The **built environment** is an important factor in both mental and physical health⁴
 - “Access to the natural environment and outdoor spaces is vitally important for good mental health”⁴
 - Participating in **activities outdoors** such as running, walking, cycling, and gardening have known benefits for mental health⁴ and have been shown to reduce stress, anxiety, and depression
 - Early experiences in positive outdoor environments help students develop a greater sense of environmental stewardship in developing life and adulthood²⁰
 - **Contact with nature**, both large and small-scale^{8,10}

How can we promote positive mental health?

- Involve the population as a whole, and orient approaches to **focus on building strengths**, resources, knowledge and assets for health.⁵
- **Community involvement** in planning/controlling issues and processes.⁵
- Strategies that promote positive mental health and psychological resources will also contribute to problem reduction and possibly prevention of mental health issues⁶
- According to PHAC, mental health promotion is an approach that sees all people as holistic beings and applies equally to all people⁵
- Start early! Target programs with children and youth
 - Childhood weight and dietary habits track into adulthood²⁰
- Increase self-esteem⁵
- Increase coping skills⁵
- Increase social support and well-being in individuals and communities⁵
- Build respect for culture⁵
- Create equity and social justice⁵
- Building interconnectedness and social support^{5,6,4}
- Reaffirm Personal dignity⁵
- Build Resiliency⁶

- Empower Individuals⁴
- Teach individuals to utilize resources offered by a supportive environment⁵
- Poverty reduction⁴
- National policies to increase employment, education, healthcare, housing, services⁴
- Schools play a big role in the development of social, emotional, academic, and cognitive ability, which all impact a child's short term and long term mental health and provide a way to reach the entire population. ⁴
- Address intergenerational transfer of inequity⁴
- School approaches usually include changes to the school ethos, liaising with parents, special teacher training, educating parents, community involvement, and collaboration with external agencies.
 - The Pan-Canadian Joint Consortium for School Health reports, "research has shown that it is more effective to work more comprehensively, that is, integrating policies and practices that support student learning, health and well-being into every aspect of the school environment"²⁰
- According to the WHO, important to take a community-based approach as well as individual approach to supporting positive mental health. The best outcomes occur when community members are engaged. ⁴
 - Best targets for community programs are creating a social inclusive community, eliminating violence and discrimination, and improving access to economic resources⁴
- Make health care universally accessible
- Increase access to the natural environment and outdoor spaces^{4,7,8,9,10}
 - "Incorporation of nature into children's everyday settings appears to have significant outcomes for health and well-being, in particular mental health." – Maller, Henderson-Wilson & Townsend⁸

What is Resiliency?

- Important concept in mental health promotion.
- The ability to 'bounce back' from set-backs and lows in life and learn from them in a positive way; the capacity to re-establish your life balance, and the feeling of being in control of yourself and the outside world⁵
 - All lives are series of ups and downs

- People who lack resiliency will be left in a state of depression, frustration, or self-destruction after a difficult experience in life.
- “It’s like building up a set of poker chips; every time you have a positive experience you get another poker chip. The more you get, the better your self-esteem is, so the knocks are more likely to bounce off you. If you don’t get the opportunity to build up the stack of positive experiences, you’re constantly going to feel negative. Gardening is a positive experience [that’s] non-threatening, enjoyable, sociable. And they learn outside.” – Teacher, re: school gardening program¹³

What is Empowerment?

- When people or communities recognize and foster their own sense of personal strength
- Sense of personal control
- Feeling that you can rely on yourself or supportive others during difficult situations
- Childhood offers a range of opportunities to learn health practices and behaviours that can be maintained throughout adulthood²⁰
 - Evidence suggests that eating habits developed during early childhood are sustained into adolescence and adulthood²⁰

Background/Determinants of Health:

- What young vulnerable adults in Ontario communities prepare to eat on a daily basis depended on financial, psycho-social, and environmental circumstances³
- Stress, poor body image, depression, or loneliness can deter people from preparing food at home
 - The proportion of meals that Canadians prepare and eat at home declined from 70% in 2001 to 65% in 2008²⁰
 - The average Canadian visited restaurants 184 times in 2007²⁰
- Even when people knew how to prepare food, they often struggled with budgeting, planning, and shopping for food.

What is Food Literacy?

- Set of skills and attributes that helps people in preparation of healthy, tasty, affordable meals^{1,3}
- An essential life skill

- Choosing and preparing healthy foods in an economical manner requires some knowledge²⁰
- Requires external support (Food Environment) – healthy food access, living conditions, learning opportunities, positive socio-cultural environments.
- Food and Nutrition Knowledge (learning environment), Food preparation skills and experience (socio-cultural environment), Organizational skills and experience (food & facilities), and psycho-social factors (living conditions) all contribute to food literacy¹.
- Includes not only knowledge about healthy food and food preparation, but ability to budget, plan meals, store, and shop for food.
- Can include skills like gardening, hunting, and fishing
- A report written for Ontario by the Metcalf Foundation in 2010 identified they were seeing a decline in food literacy – “the ability of people to shop for and cook food in a healthy way”²⁰
- Barriers to developing/Applying Food literacy³:
 - Absence or inadequacy of positive social and psychological environment: social isolation, lack of role models, weight concerns, depression, stress, lack of self-esteem
 - Caregivers, including parents, home caregivers, and teachers impact the food patterns and choices of children and youth²⁰
 - Poor Learning environment: Low literacy/numeracy, no food classes, or food classes not geared toward needs or interests of the population
 - Food is fundamental to personal health and the health of communities, but individuals cannot always make the connection to the kind of food they want²⁰
 - Food, food preparation facilities, and the food environment: poor housing, lack of utensils/ingredients, poor access to healthy food
 - Living conditions: low income, unemployment, food insecurity
 - Over 10% of Canadian households with children experienced moderate or severe income-related food insecurity in 2004 - 5.2% of these families experienced food insecurity at the child level²⁰

What is the connection between Food Literacy and Mental Health?

- Food literacy links to mental health components like confidence, social connectedness, and resilience³
- Ability to cook for ones-self and ability to improvise in the kitchen builds confidence¹

- Preparing food for others identified as a source of pride and satisfaction¹
- Builds Resilience because it builds food skills and the confidence to improvise and problem solve, and the ability to access and share information.³
- Contact with nature is important for mental, emotional, and social health in children⁸
 - Encourages imagination and creativity, cognitive/intellectual development, and enhances social relationships
- Students involved with school gardens develop²⁰:
 - better social relations
 - a better relationship with the environment
 - are more engaged, enthusiastic and aware in school
- Learning skills to cook empowers individuals to be able to make the choices necessary to consume a healthy diet¹⁹
- As reported by The Ministry of Health *School health: Guidance document (2010)*, “the 2006 HBSC (*Healthy Behaviour in School-Aged Children*) Survey found that students with higher academic achievement and a positive attitude towards school are more likely to engage in healthy behaviours and have better emotional health and well-being”

How does gardening enhance food literacy?

- Provide opportunities to try new vegetables and foods and learn to enjoy healthy food (Which they may not come across in the home environment)
- Opportunities to try vegetables and foods prepared in different ways than they may have tried before (may increase acceptance)
- Help contextualize and support healthy eating messages
- Increase knowledge of healthy food
- Skills, Knowledge, and Attitudes related to gardening, food, and food literacy are passed from children to their families and communities.
- Increased children’s involvement in cooking, promoting healthy eating, and sharing knowledge and skills gained in the education setting^{2, 14, 16}
- School gardens created a notable change in attitude towards vegetables and fruit in primary schools in New Zealand and Australia^{2, 18}
- Help contextualize and support healthy eating messages

- 94% of respondents reported school gardens enhanced elementary students' understanding of the benefits of fruit and vegetable consumption²
- Increased understanding of options for preparing fruit and vegetables²
 - Higher food preparation frequency has been associated with greater fruit and vegetable preference and self-efficacy for healthy eating²⁰
- Students who participate in planning and implementation of school gardens report increased self-confidence²
- Learning about the origins of food/where food comes from/ Food system ecology^{17, 18}
- Learning new cooking skills at harvest time⁹
- Tasting new foods⁹
- Learning about food preservation⁹
- In the UK, schools participating in a school gardening program all reported that many students were surprised to find out where/how food grows (ex. Potatoes come out of the ground)¹³
 - Increased knowledge of where food comes from increased students' interest in trying new foods, flavours, and recipes¹³
- Provide experiential learning about food, food growing, cooking, tasting, and eating that influence healthy eating behaviours¹⁴
- After participating in a school garden program, Australian students had improved knowledge and confidence in relation to growing, preparing, cooking, and eating food.¹⁴
- Increased understanding and acceptance of different cultures¹⁶
- The British Columbia Agriculture Plan, Strategy 20 (2008), has identified that there is a growing gap between youth and the origins of their food²⁰
 - Identified current need to²⁰:
 - Reconnect young people with the land
 - Link urban and agricultural communities together
 - Provide hands-on learning opportunities

How do school gardens impact healthy eating?

- Currently <50% of boys and girls aged 4-18 consume 5 or more servings of fruit and vegetables per day (US data)¹⁶

- Less than 50% of youth aged 12 to 19 in Ontario consume vegetables and fruit at least five times per day - a trend similar to the national rate²⁰
- Canadian children and adolescents rarely meet nutritional recommendations for intakes of fruit, vegetables, and whole-grain products²⁰
- Canadian children have been recognized as consuming high intakes of energy-dense/nutrient-poor foods and taking part in suboptimal eating habits such as breakfast skipping²⁰
- Health Canada reported that among Canadians aged four or older, 41% of snack calories came from foods that are not within one of the four food groups in Canada's Food Guide (2012)²⁰
- Increased access to healthy food^{9, 10, 12}
 - Children consume more fruits and vegetables when fresh produce is available and accessible²⁰
- Increased vegetable and fruit consumption^{2, 9, 10, 11, 12, 14, 16, 20}
 - Most, but not all studies report this.
- Increased preferences for vegetables as a snack^{18, 20}
- Increased intake of a wider variety of fruits and vegetables²⁰
- Increase interest in and willingness to try new foods and recipes^{13, 14, 15, 16, 18}
 - Even when the vegetables/ foods aren't things that were grown in the garden¹⁸
- Increased knowledge of where food comes from increased students' interest in trying new foods, flavours, and recipes^{13, 14}
- 91% of respondents reported that opportunities to harvest and taste food from the garden furthered student awareness and appreciation of nutritional food (Canadian data, 2006)²⁰
- Increased knowledge about a variety of healthy foods
- Enjoyment in learning encourages children to pass on healthy eating messages and new foods/recipes to their families^{2, 14}
- School gardens created a notable change in attitude towards vegetables and fruit in primary schools in New Zealand and Australia^{2, 18}
- Participants in Australia indicate that they prepared more meals at home after their child participated in a school gardening program¹⁴

What are other benefits of School Gardens?

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UBC Dietetic Intern Project: Heather Woodward, December 2014
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- Horticulture therapy is well recognized by mental health professionals to treat people who live with mental disorders, PTSD, stress and anxiety.¹¹
 - Mind (UK) Recommends that ecotherapy (including gardening) be recognized as a clinically valid treatment for mental distress
- Provide **access to healthy food** (help increase food security)^{9, 10, 12}
- Often integrated with the broader **community**: Provides interaction and enhanced sense of community.^{9, 11, 12, 13, 15, 17}
 - 87% of people said they felt that they belonged in their community at their local community food centre¹⁹
- Support the reduction of inequalities^{2, 14}
 - “Gardening is cross-curricular. From those with limited language and who need physical help to the most able, it covers them all” Royal Horticultural Society¹⁵
 - **Inclusive** of all children
 - **Non-competitive** alternative to sports
 - Motivate establishment of vegetable gardens at home
- Increase **physical activity** during the day^{2, 10, 11, 12, 15, 20}
- Enhance **psychosocial** development (responsibility, **self-esteem**)^{2, 13, 16}
- Creates a sense of **pride** and ownership within the education system → This influenced their motivation to try new vegetables and fruit^{2, 13, 14, 15, 17}
- Observed improved **negotiation, collaboration** and **communication** skills (all contribute to community and positive mental health)^{2, 9, 10, 14, 17}
- Increased **confidence** and ability to work **independently**^{2, 13, 15}
- Reduces **Stress**^{9, 10, 11}
- Provide a **safe space on** school grounds where students can go to be quiet and reflective, or ‘escape’¹³
 - Having these outlets/safe spaces can improve emotional health
 - Gardens create a sense of **comfort, security, and belonging**, particularly for students who don’t fit in as well with the general school structure – the garden has been identified as a place of refuge²

- Increased **Resilience**^{13, 15}
 - Encourages students to become **active, independent learners** (would increase resiliency)
- Improvements in **Emotional Well-being**^{12,13}
- Foster **Community** and **family involvement**^{9, 13, 15}
 - Attract community members and elders (ex. Grandparents) to share their expertise²
 - Often unique opportunities to involve fathers more in children’s lives¹³
 - Opportunities to build connections with local businesses and organizations
- Opportunities for student **leadership** (builds confidence, independence, self-management)^{15, 16}
- In students with special needs → noted to support development of **muscle coordination** and **fine motor skills**^{2, 13, 16}
- Inclusion of all students in all stages of gardening (prep, decision making, doing, harvesting etc.) created a sense of **belonging, contribution** and **connection** to the school^{2, 11, 13, 14, 16}
- Working on long-term projects builds resilience, **commitment, perseverance, problem solving** skills, and the ability to **plan ahead**; all valuable employment skills^{9, 13, 2, 14}
 - “Research revealed that the changeable nature of gardening projects – where anything from the weather to plant disease can affect the outcome – forced children to become more flexible and better able to think on their feet and solve problems” – Royal Horticulture Society¹⁵
- Sense of **autonomy** and **responsibility**^{13, 15} can increase the motivation to learn, participate
- Was noted to develop awareness of the living environment, and as a result increased **caring** and thoughtful **attitudes** towards living things, including peers²
- Mind study (UK) → outdoor activities (over 50% gardening) benefited both mental and physical health.⁷
 - Directly benefited mental health by lowering stress and boosting self-esteem
 - Reported to provide a **sense of meaning and purpose**¹¹
 - Develops skills and builds **social connections**^{7, 10, 14}
- Increase **contact with nature** and green space
 - Students involved with school gardens develop a better relationship with the environment²⁰

- Many opportunities for children to interact with nature now happen at school because of the urban environment we live in and decreased availability of natural spaces in environments.
- Reported benefits of activities involving hands on learning in nature (including gardening):⁸
 - Improved **self-esteem**^{9, 13, 15, 16}
 - Improved **social skills**^{11, 13, 20}
 - Experience of freedom and **creativity**¹⁵
 - Accommodation of children with **different learning styles and abilities**^{13, 14, 15}
 - **Practical knowledge** of [how to grow food]
- Unstructured activities: (“free time” with little direction)⁸
 - Promote exploration and discovery
 - Give **children a place in the world**
 - Foster connection with nature
- Structured activities:⁸
 - Connection with community^{13, 15}
 - Learning practical skills¹³
 - Problem solving
- Helps develop **teamwork** and **cooperation**^{9, 13, 15, 20}
- “Gardening and community food growing therefore deserve the attention of health professionals, spatial planners, and other policy makers who are all well placed to make it possible for people to participate in beneficial horticultural activities, wherever they live” – Professor Time Lang, City University of London¹⁰
- Children **perform better mentally** when they have access to green space¹⁰
 - Relieves symptoms of ADHD¹⁰
 - Students more likely to explore widely (90%), to learn about their local environment (91%), and to have a greater sense of wonder and curiosity (92%) (Ontario data, 2005)²⁰
- Incorporating school gardens into curriculum improves academic performance²⁰

- Students are more engaged, enthusiastic and aware in school²⁰
- Students are more interested in learning about subjects from science and math to English and history²⁰
- Greater understanding for ecological cycles and sustainable agriculture²⁰
- Gardens can be a good setting to teach science, math, literacy, economics, history^{13, 15}
- Students gain useful and marketable skills²⁰
- Potential to reduce **bullying**^{13, 14}
- Create opportunities for games of various group sizes and increase cooperative play²⁰
- School ground greening²⁰:
 - Softens play surfaces so that there are fewer injuries²⁰
 - Calms student traffic²⁰
 - Stated reports of (Ontario data, 2005)²⁰:
 - An increase in cooperative play (73% of study participants)
 - A decrease in boredom (74%)
 - A decrease in negative and aggressive play (66%)
 - Students were being more civil (72%)
 - Students were communicating more effectively (63%)
 - Students were more cooperative (69%)
 - Discipline problems had decreased (44%) or remained the same (40%)
 - Incidents of aggressive behaviour had decreased (45%) or remained the same (53%)
 - Half of the study participants felt that green school grounds were more inclusive with respect to gender (54%), class (42%), race (46%) and ability (52%), while the other half reported no change
- Schools experience less conflict inside the classroom²⁰

How do cooking, and other hands-on food activities enhance food literacy and mental health?

- Many people involved in these programs report increased confidence in their ability to cook, shop, eat independently and healthy (as a result of increased knowledge and skills)¹⁹
- Many participants report an increased sense of belonging in the community after participating in community food Centre programs¹⁹
- Many participants in Canadian food Centre programs report forming friendships¹⁹ (increases community interconnectedness)
- 90% of food skills program participants report positive changes in their mental health¹⁹
- 88% of food skills participants report increased confidence in making healthy food choices¹⁹
- It was noted that student participants in the Northern Fruit and Vegetable Pilot Program, a program designed to increase the intake of fruit and vegetables of elementary school age children in a defined area of Northern Ontario, changed their preferences for certain fruits and vegetables from “never tried it” to “like it”²⁰

Evidence: For hands on, experiential learning in young adults and children:

- Preferred learning styles of young, vulnerable adults¹:
 - Direct-experiential learning
 - School-based opportunities
 - Community Cooking programs
- Recipes/Online learning NOT identified as an acceptable substitution for hands-on learning
- Confidence in the kitchen is higher among people who learn earlier in life¹
- Completing a physical task can lead to feelings of contentment and relaxation¹⁰
- Feelings of accomplishment of having succeeded at completion when tasks are non-competitive¹⁰
- Can improve behavior and increase motivation^{13, 15}
- Allows students to take more control over their learning¹³
- 91% of parents report that their children showed increased confidence in the kitchen after attending an after school program¹⁹

- Students have reported learning better in the garden because they feel more calm than when they are in the classroom^{13, 15} (escape from classroom pressures)
- Sense of accomplishment from hands on 'building' or 'using tools'¹³ can increase motivation and focus, especially in typically 'disruptive' kids and boys
- Gardening and cooking hands-on learning have been shown to increase engagement in student who are otherwise difficult to engage in learning^{14, 15}
- Offer opportunities for social inclusion¹⁴
- Vulnerable Youth in Ontario: Motivated to prepare food because of cost, taste, personal health, health of their children, independence, pleasure, and creativity¹

Stopping the cycle: What can we do to take action and change the situation?

- "Schools have a vital role to play in preparing our young people to take their place as informed, engaged, and empowered citizens"²⁰
- Canada is the only nation in the former G8 that has no universal student nutrition policy and no federal funding for student nutrition programs²⁰
- Interventions are likely to be more successful when they²⁰:
 - Involve parents and their caregivers
 - Address physical activity and eating habits together
 - Develop long term goals
 - Are integrated into the school curriculum
 - Modify the school environment
 - Are culturally sensitive
 - Are done in collaboration with community partners
- Parents from non-English speaking backgrounds, typically uncomfortable in classroom literacy programs, also volunteered in the kitchen and garden²⁰ (Australia)

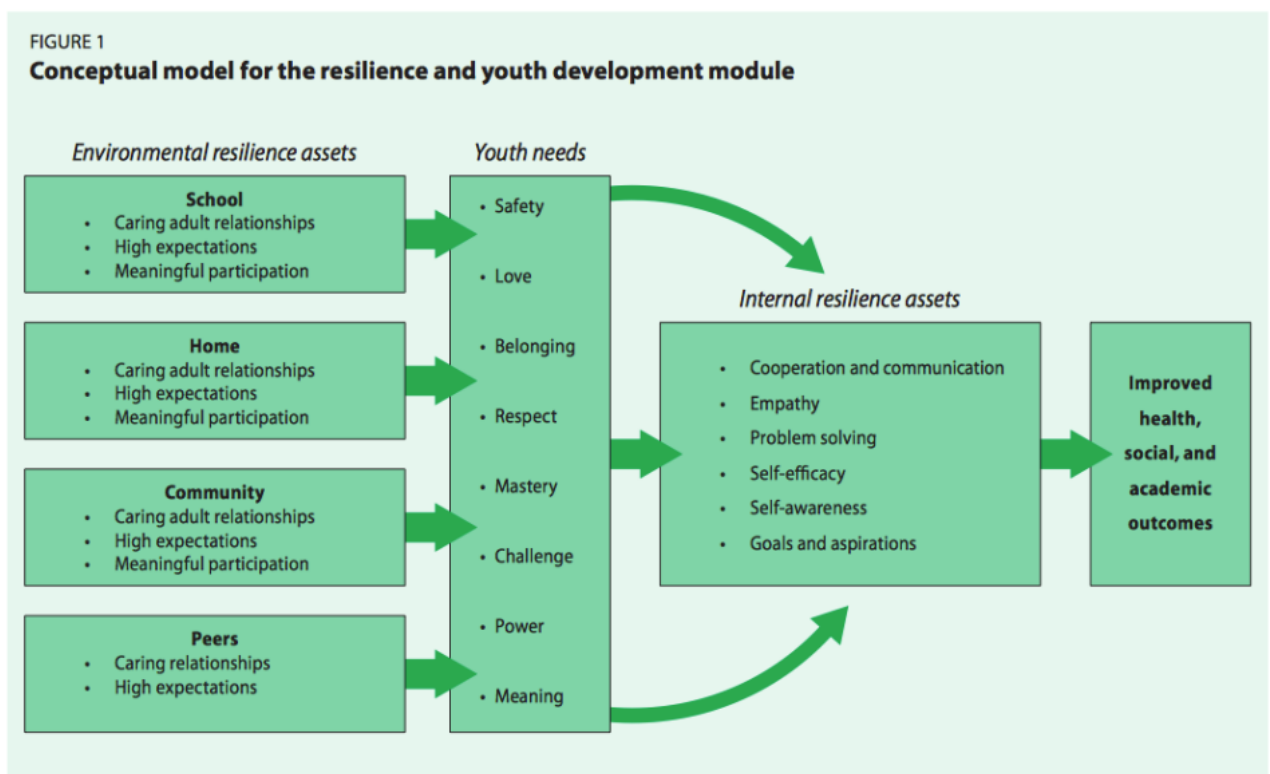
Opportunities to Enhance Food Literacy (and mental health) in the school Environment:

- School Gardens
- School Kitchens/ cooking classes

- Curriculum updates
- Before and after school programs
- Student Nutrition Programs
- Student involvement in preparation of cafeteria food
- Peer nutrition programs
- Train teachers to combine food literacy programs with resiliency building. Train teachers in food skills
- Encourage parents/teachers to involve children in age-appropriate food preparation from a young age
- Create programs that are designed to build job and life skills (cooking/ food related/ budgeting/shopping/ growing)

“In our current food environment where processed convenience foods are readily available, expensive, and often unhealthy, becoming food literate is a life skill that enhances resiliency” – Food Literacy for Life Study Flyer

Appendix 1: Determinants of Food Literacy¹:



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