Gardening is good therapy and you get tomatoes

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What?
How?
Why?
Do you feel good when working with plants?

What are the benefits you feel when working with plants?
Benefits of School-Based Community Gardens
A compilation of research findings

Academic Achievement
- A study of third and fourth grade children in a school garden nutrition program found that “the school garden supports student inquiry, connection to the natural world, and engages students in the process of formulating meaningful questions” (Habib & Doherty, 2007).
- Students involved with school gardens generally take pleasure in learning and show positive attitudes towards education (Canaria, 1996; Dirks & Otnis, 2005).
- Students who have school garden programs incorporated into their science curriculum score significantly higher on science achievement tests than students who are taught by strictly traditional classroom methods (Klammer, Walczek, & Zajc, 2005).

Physical Health
- Children who work in gardens are more likely to continue healthy eating habits through adulthood (Moss & Zidenberg-Cherr, 2002).
- Gardening during childhood exposes children to healthy food, moderate exercise, and positive social interactions and can often lead to a lifetime of gardening (Dymett & Bell, 2006).

Social and Emotional Health
- The school garden serves as a “safe place” for students. Studies show that large numbers of students report “that they feel ‘calm,’ ‘safe,’ ‘happy,’ and ‘relaxed’ in the school garden” (Habib & Doherty, 2007).
- Children who work in gardens are more likely to accept people different from themselves (Dymett & Bell, 2006).
- A study of third, fourth and fifth graders showed that students participating in a garden program had increased self-understanding, interpersonal skills, and cooperative skills when compared to non-gardening students (Robinson & Zajc, 2005).

School and Community Benefits
- I’ve learned a lot from the garden, but the community garden is also a place where I feel special when I’m in the garden.
HOW is it possible for plants to benefit us?
Biophilia: Our better nature found in Nature

Humans are innately drawn to life and the natural world because we are part of it.
Best way to describe Biophilia and is....
Biophobia: Our fear of nature found in Nature

Photo credit: © John Bell/istockphoto.com
Figure 1. Diverse functions of metalloporphyrins in Nature
Vitamin D

The sun’s UVB rays on exposed skin trigger the conversion of cholesterol stored in the skin to Vitamin D – where it is then brought from blood into liver and kidneys and ultimately interacts with receptors in the intestine and bone to maintain calcium absorption.

http://www.womensinternational.com/connections/vitamind.html
Retinal cells have a direct connection to our biological clock and are particularly sensitive to light with wavelengths within the blue spectrum (Brainard et al., 2001).
“Humans have an innate (or at least extremely ancient) connection to the natural world, and our continued divorce from it has led to the loss of not only a vast intellectual legacy born of intimacy with nature but also our very sanity.”

Theories supporting Biophilia hypothesis

- **the Attention Restoration Theory (ART)** of Kaplan and Kaplan (1989)
- **the Psycho-Evolutionary Stress-Reduction theory** of Ulrich (1983)
- **The Salutogenic theory** of Antonovsky (1979, 1987)
Attention Restoration Theory

Directed Attention

Restored Attention

Effortless Attention
Landscape for Human Health Laboratory at the University of Illinois, Urbana-Champaign

Study: examined the relationship between children with Attention Deficit Disorder (ADD) and their nature exposure through leisure activities and their attention functioning

Method: Subject comparisons both within and between

Results: The study indicates children function better than usual after activities in green settings and the "greener" a child’s play area, the less severe his or her attention deficit symptoms.

Faber, A., Kuo, F. & Sullivan, W., Coping with ADD and the Surprising Connection to Green Play Settings, Environment and Behavior, January 2001, vol. 33, no. 1, 54-77
The Capacity to Learn study will examine the effects of schoolyard nature on children’s learning and academic achievement as reflected in standardized test scores. With this study, we hope to convincingly document whether children learn more in green school settings.
University of Groningen, Netherlands

- **Study:** examined the behavior and emotional and cognitive functioning of children with ADHD in a natural and built setting.

- **Methods** Two groups of six children (age 9–17) with ADHD in the Netherlands were systematically observed, questioned, and tested during visits to a wooded area and a small town.

- **Results** Both groups performed better on a concentration task in the woods than in the school.

“...we have evolved to instinctively ‘tune in’ to scenery that induces such positive responses, because this adaptive strategy would have been significant for the survival of our early ancestors (i.e. low risk, food and water available)”.

(Ulrich, Simons, Losito, Fiorito, Miles, & Zelson, 1991)
Study by W. T. de Groot & R. J. G. van den Born –

Visions of nature and landscape type preferences: an exploration in The Netherlands

They examined a preference for 4 types of landscapes:

1. landscape made by and for people = 4%
2. park-like, arcadian landscape = 13%
3. wild, interactive landscape = 31%
4. landscape “in which one may experience the greatness and forces of nature” = 51%

“… is the process of enabling individuals, groups or societies to increase control over, and to improve their physical, mental, social and spiritual health.”

Study: examined the behavior of children in outdoor play spaces with ample green vegetation compared to typical commercially produced playground structures planted in a barren surface.

Method: Two groups of school children between the ages of 5-8 were observed, questioned, and tested during visits to the play spaces.

Result: Both groups increased the amount of physical activity in the plant-rich green outdoor play spaces over that of commercially produced playground structures in barren surface.

Study: examined the motor skills of children in outdoor forested area with rocks and slopes compared to typical commercially produced playground structures planted in a barren surface

Method: Two groups of Norwegian kindergarten children were observed, questioned, and tested during visits to the play spaces

Result: The children who played in the forest had better motor skills (balance and coordination) than the children who spent their time on the traditional playground.

Both of these studies are important because childhood experiences in nature will invariably determine exercise preferences in later life thus increasing their control over health and wellbeing.
Each theoretical framework is a function of evolution, genetics and psychology all supporting Biophilia.

- Attention Restoration Theory (ART) of Kaplan and Kaplan (1989)
- Psycho-Evolutionary Stress-Reduction Theory of Ulrich (1983)
- Salutogenic Theory of Antonovsky (1979, 1987)
BIOPHILIA is how plants benefit us
<table>
<thead>
<tr>
<th>Assertion</th>
<th>Evidence</th>
<th>Key reference/s</th>
</tr>
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<tbody>
<tr>
<td>There are some known beneficial physiological effects that occur when humans encounter, observe or otherwise positively interact with animals, plants, landscapes or wilderness</td>
<td>✓ ✓ ✓</td>
<td>Frumkin 2001, Beck and Katcher 1996, Rohde and Kendle 1994, Ulrich et al. 1991, Parsons 1991, Friedmann et al. 1983a, Friedman et al. 1983b</td>
</tr>
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<td>Natural environments, such as parks, foster recovery from mental fatigue and are restorative</td>
<td>✓ ✓ ✓</td>
<td>Kaplan 1995, Hartig et al. 1991, Kaplan and Kaplan 1990, Kaplan and Kaplan 1989, Furnass 1979</td>
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<td>There are established methods of nature-based therapy (including wilderness, horticultural and animal-assisted therapy among others) that have success healing patients who previously had not responded to treatment</td>
<td>✓ ✓ ✓</td>
<td>Fawcett and Gullone 2001, Crisp and O’Donnell 1998, Lewis 1996, Russell et al 1996, Beck et al. 1986, Katcher and Beck 1983, Levinson 1969</td>
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<td>When given a choice people prefer natural environments (particularly those with water features, large old trees, intact vegetation or minimal human influence) to urban ones, regardless of nationality or culture</td>
<td>✓ ✓ ✓</td>
<td>Herzog et al. 2000, Newell 1997, Parsons 1991</td>
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Summary of the evidence

The less green in an environment leads to...

**Social breakdown** (e.g., increased graffiti, noise, litter, loitering, illegal activity, etc.).

**Psychological breakdown** (e.g., less attention, learning, management of major life issues, impulse control, delay of gratification, more ADHD symptoms, clinical depression, anxiety attacks).

**Physical breakdown** (e.g., poorer recovery from surgery, more obesity in children, more physician-diagnosed diseases, etc.).
Any amount and type of exposure to nature creates human health and well-being benefits (even just viewing pictures of nature helps).

Nature must be tightly integrated into urban environments so it is part of immediate and daily life.

Nature is particularly crucial for vulnerable populations – children, the elderly and the poor show greater effects.
Problems in the Research:

- Limited Sampling
- Multiple variables – difficult to measure
- Theoretical Development

What we do know is....
Humans Prefer Natural - Green Elements
WHY do humans prefer natural green?
Civilization has rapidly evolved but our brains and bodies have not kept pace.
We need to tap into our core DNA to restore health and wellbeing

The mismatch between our bodies, brains and present day lifestyle affects every area of our lives

Artwork courtesy of David Wagner
When people view nature scenes, the parts of the brain associated with heightened empathy, love, and positive mental outlook were activated.

It appears that nature inspires positive feelings and connection.
Mindsight: The New Science of Personal Transformation


Daniel J. Siegel, M.D.
Place your thumb in the middle of your palm as in this figure.

Now fold your fingers over your thumb as the cortex is folded over the limbic areas of the brain.

1. Cerebral Cortex (higher function) and SALUTOGENIC THEORY

2. Limbic areas (emotion) and ATTENTION RESTORATION THEORY

3. Oldest part of brain (survival) and PSYCHO-EVOLUTIONARY THEORY

Paul MacLean, 1960 “Truine Brain
References:

References: