

What is the power of trees?

TREES AS A PUBLIC HEALTH INTERVENTION

December 2, 2021

Jamil Bey, PhD - CEO UrbanKind Institute

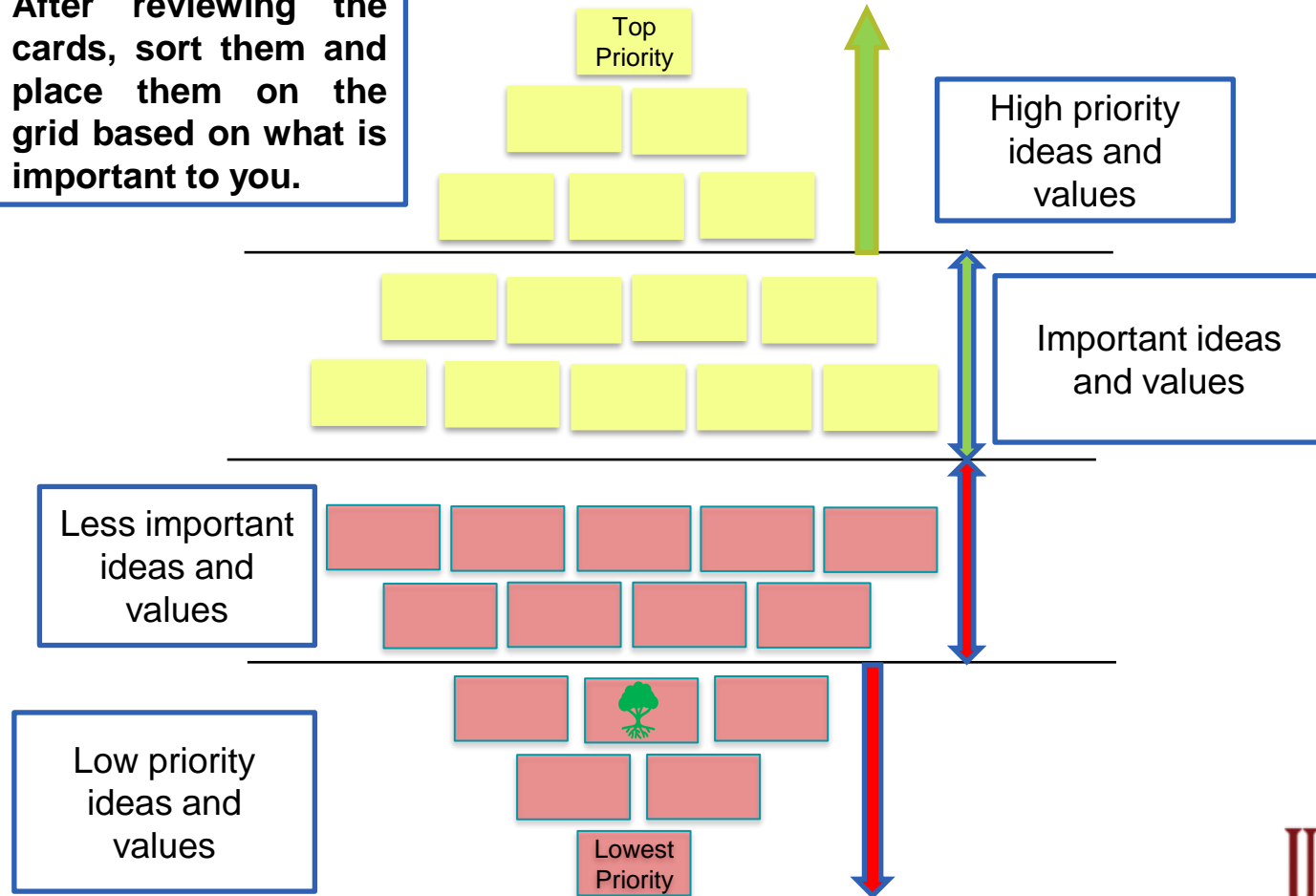
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Clara Kitongo, MSPPM - Tree Pittsburgh / One Tree Per Child Program Coordinator



















Prioritize & Compromise

Quality schools	Public safety	Anti-litter strategies	Play spaces	Healthcare	Nutritional foods	Plant more street trees 
Stormwater management	Bike-friendly infrastructure	Reduce energy burden	Improve soil quality	Improve air quality	Street parking for residents	Include youth in vision and planning
Manage & reuse vacant lots	Community Benefits Agreements	Quality after school programs	Pet friendly facilities (e.g., dog parks)	Aging-in-place strategies	Mixed commercial & residential	Anti-displacement strategies
Pedestrian-friendly infrastructure	Attractive to development investors	Affordable quality housing	Welcoming plan for new residents	Return vacant properties to tax roster	Culturally relevant food options	Economic opportunities for residents
Respect needs of long-term residents	Strengthen police-community relations	Affordable, reliable, & efficient public transit	Resident engagement/participation strategies	Establish & follow development metrics	Manage vacant properties & blight	Culturally relevant entertainment

After reviewing the cards, sort them and place them on the grid based on what is important to you.



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Isabela Angelilli

- <https://drive.google.com/file/d/1svC4mL9u8ldz6itYvxMC1ncy3r7EoPZt/view?usp=sharing>

Trees are social determinants of health

Conditions in the environment where people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks.



**TREES ARE
GREEN INFRASTRUCTURE**

Less respiratory disease
Less cardiovascular disease
Less diabetes
Decreased heat waves
Less obesity
Better pregnancy outcomes
Improved attention
Improved mental health
Less gun violence/crime
Decreased overall mortality

Air, Trees, Respiratory Illness



Urban trees remove large amounts of air pollution, improving urban air quality (1-5)

In an urban area
Extra 343 trees per km² associated with
29% lower prevalence of childhood **asthma** (5-7)

Lovasi G. et al. J Epidemiol Community Health 2008

Green Heart Study - Louisville (KY)

Dr. Ted Smith – Center for Health Air, Water and Soil
Envirome Institute, University of Louisville

1. Nowalk DJ et al. Urban For Urban Green 2006. 4: 115–123
3. Nowalk DJ et al. Urban For Urban Green. 2018. 29: 40-4
4. Fares S et al. Environ Pollut. 2016;218:1278-1286
5. Chen G et al. Urban For Urban Green. 2021; 127230
6. Lovasi GS et al. J Epidemiol Community Health 2008. 62(7):647-92008
7. Alcock I et al. Environment International 2017. 109: 29-41.
8. Rao M et al. Environ Pollut. 2014; 194: 96-104

The Problem of Trees, Pollen and Allergies



(1)

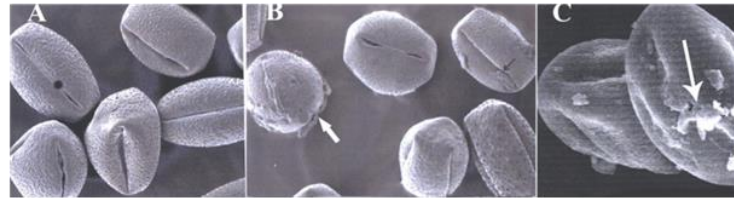
May 2020

How urban planners' preference for male trees has made your hay fever worse

Horticulturists urge better sex mix of city trees to mitigate rising asthma and CO2 pollution levels



Agglomeration of air pollutants on pollen surface (2, 3)



- ➡ Change the pollen and make it allergenic
- ➡ Together with pollen help stimulate allergic response

RIGHT TREE RIGHT PLACE

1. Cariñanos P et al. Landscapand Urban Plan. 2011; 101 (3): 205-214
2. Ouyang Y et al. Int Forum Allergy Rhinol. 2016; 6 (1): 95-100
3. Rezanejad F. and Majd A. Book Chapter. Advanced Topics in Environmental Health and Air Pollution. 2011.



Heat waves have
negative
health impacts



Heat waves
Increase ozone and
particulate
mater pollution

Heat Island Effect

92°F

Trees lower surface
temperatures
(Shade)

96°F

Trees lower
air temperatures
(Evapotranspiration)

1. Graham DA et al. Urban For Urban Green. 2016; 20:180–186
2. Jeong MA et al. Int J Biometeorol. 2016; 60(7):999-1014
3. Yang L et al. Procedia Eng. 2016;169:11-18
4. Vargo SB et al. PLoS One. 2014; 9(6):e100852
5. Kilbourne EM et al. JAMA. 1982 Jun 25; 247(24):3332-6
6. Wong NH et al. Habitat Int. 2005; 29: 547–558.

Trees Can Help Decrease Floods



Stormwater Green Infrastructure Plan



A typical community forest of
10,000 trees will retain
approximately 10 million gallons
of rainwater per year

Trees decrease crime and gun violence (1-4)

Dr. Eugenia South - University of Pennsylvania
Center for Health Initiatives and Behavioral Economics

541 vacant lots randomized to
Remediation – No intervention (control)
Tracked police reported crime for 3 years (1)

Crime	Gun assaults	Burglaries
-9.2%, $P < 0.01$	-5.8%, $P < 0.05$	-13.7%, $P < 0.001$

58% reduction in people's fear of going outside due to safety concerns
and 76% increase in use of outdoor space (1)



1. Branas C et al. PNAS 2018; 115 (12)
2. Kuo FE et al. Environ. Behav. 2001; 33:543–71
3. Kondo MC et al. Am J Epidemiol. 2017; 186:289–96
4. Kondo MC et al. Am. J. Public Health. 2015;105:e114–21

School Performance Grows in Trees



Observational studies

Dr. Ming Kuo's - University of Illinois

Dpt. of Natural Resources and Environmental Sciences

- ➡ Greener schools have higher test scores, even after taking income into account (1)
- ➡ Planting trees within 250m may boost scores most (1)

Experimental studies

- ➡ Window view of nature - Better exam performance (2)
- ➡ Attention Restoration Theory: Exposure to natural environments improves attention scores (3-5).



1. Landscape and Urban Planning, 2021. 206 (1039662)
2. Benfield J et al. Environment and Behavior. 2015. 47 (2)
3. Ohly H et al. J Toxicol Environ Health, 2016. Online.
4. Taylor AF. J Atten Disord. 2009; 12:402-09
5. Berman MG. J Affect Disord. 2012; 140:300-05

Trees Improve Mental Health Outcomes



**Walk in a forest (forest bathing)
compared to a walk in the city ⁽¹⁻⁴⁾**

- Hostility and depression scores decreased
- Increased vitality scores
- Lower cortisol levels (stress hormone)
- Decreased HR and Blood pressure (relaxation)
- Increased depression remission

1. Morita E et al. Public Health. 2007;121, 54–6
2. Berman M et al. J Affect Disord. 2012;140(3):300-5
3. Park BJ et al. Environ Health Prev Med. 2010; 15(1): 18–26
4. Hartig T et al. 2003. J Environ Psychol 23: 109–123

Changing the context within which health problems occur is a leading opportunity for high-impact change, often better than focusing on individuals and lifestyles.

Branas C. et al. Am J Public Health. 2016;106:2158–2164

Why Would We Not Try Trees?



Program Overview

★ Over **2,000** 🌳🌳🌳 planted since 2017

★ Over **1,000** students engaged in Pittsburgh and surrounding school districts in Allegheny County

★ **14** PPS Schools



One Tree
Per Child
Pittsburgh

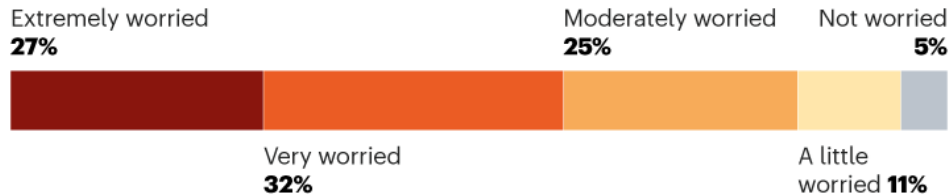


TREE PITTSBURGH

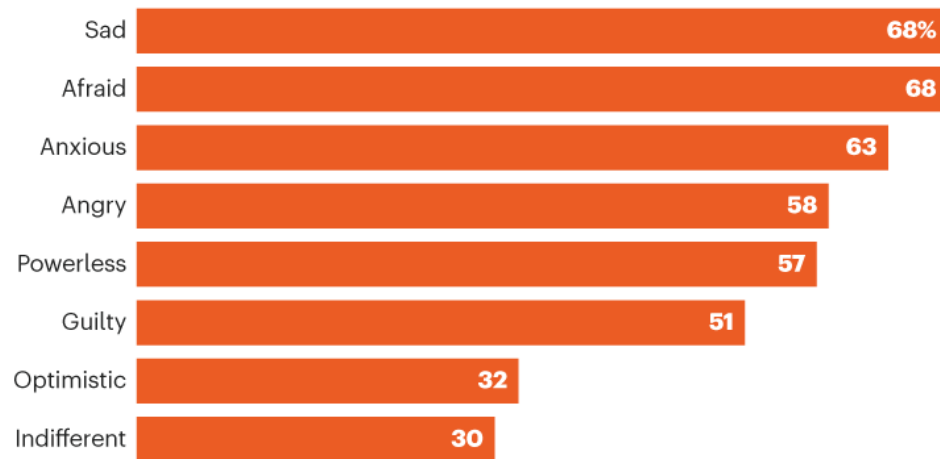
CLIMATE ANXIETY

A survey of 10,000 young people shows that negative feelings about climate change can cause psychological distress.

How worried are you about climate change?



Climate change makes me feel...



Source: Young People's Climate Anxiety Revealed in Landmark Survey, 09.22.2021

<https://www.nature.com/articles/d41586-021-02582-8>

doi: <https://doi.org/10.1038/d41586-021-02582-8>

©nature



One Tree
Per Child
Pittsburgh



Why Schools and Children?



★ Schools are a focal point for community, bringing families, community leaders, children and many stakeholders together.

★ Children are also the most vulnerable to the poor air conditions that are presented in the city. When they are engaged, they are so inspiring and remind us why it is important to clean up the air.

★ Research from many institutions, and scientists shows that students exposed to nature and trees have fewer behavioral issues and perform better academically.

A+ Schools Report to Community 2021

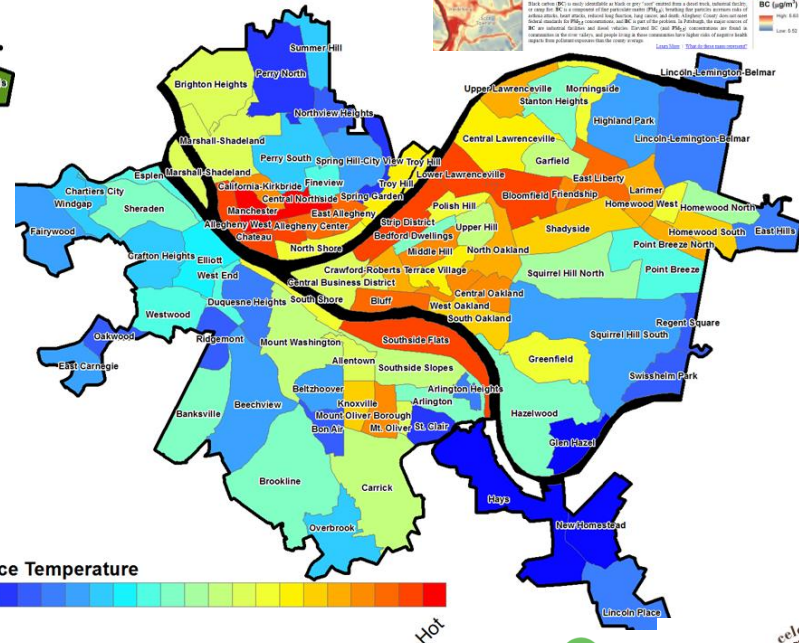
11,257 students will need help getting back on track in Reading and Literature

14,423 students will need help getting back on track to understanding Math at grade level



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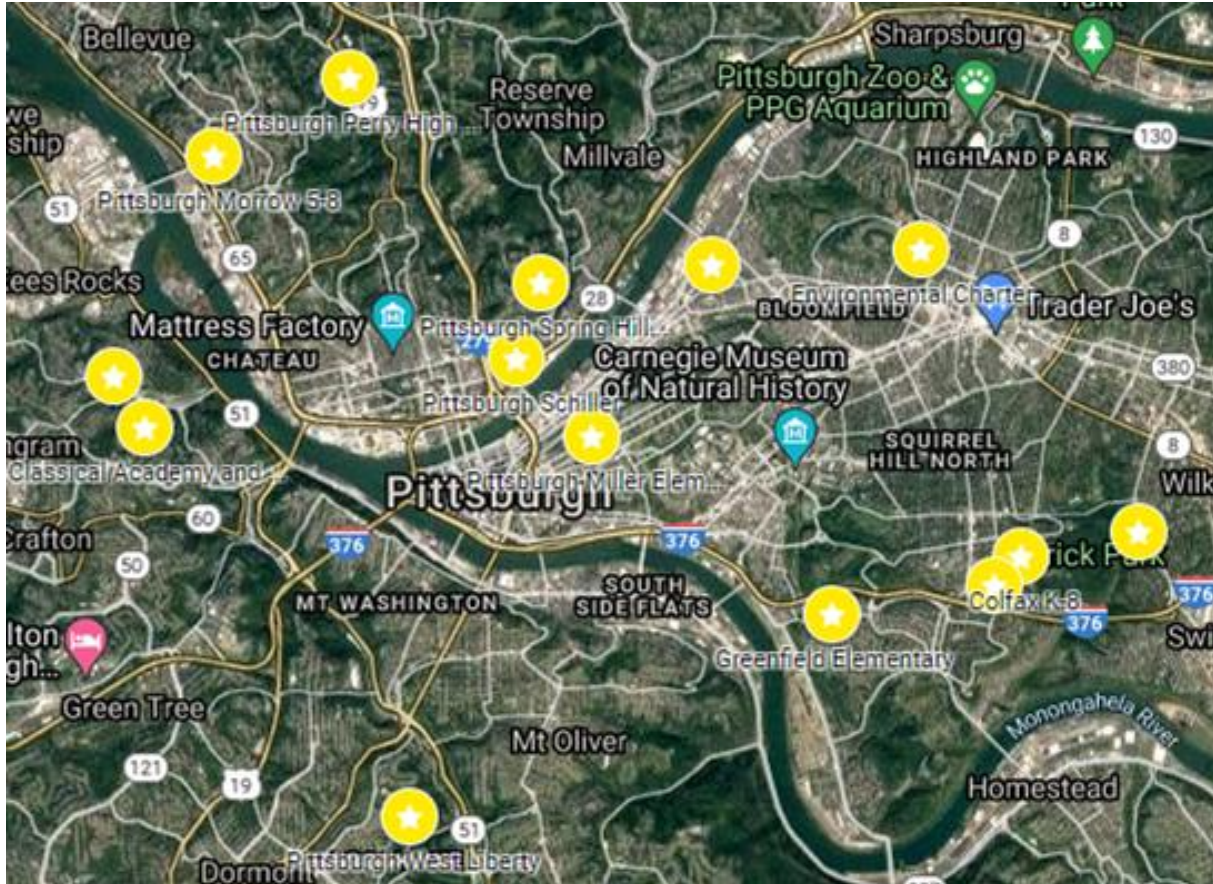




-
- One Tree Per Child Pittsburgh
- TREE PITTSBURGH 15 YEARS

Pollution Map: <https://breatheproject.org/pollution-map/>

One Tree Per Child Engaged Schools in City of Pittsburgh



How can you get involved?

Plant and distribute 2,000 trees to students and families in 2022! 🌲🌲🌲

Scan this
code

Follow this link:  
<https://forms.gle/nnrABJSybFxq36Mx7>



1. Provide a place to play
2. Supply healthy fruits, nuts and seeds
3. Produce clean and cool air
4. Provide homes for animals and critters
5. Improve soil and prevent landslides
6. Absorb stormwater
7. Provide a shady place to meet
8. Beautify and improve property value
9. Reduce stress and calm emotions
10. Inspire creativity

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