Children & Nature Network

GREEN SCHOOLYARDS CAN PROVIDE MENTAL HEALTH BENEFITS

THE ISSUE

1 in 5 children has, or has had, a serious mental health disorder at some point in their lives.[1]

MENTAL HEALTH PLAYS A CRITICAL ROLE IN THE COGNITIVE, EMOTIONAL, & SOCIAL DEVELOPMENT OF CHILDREN AND YOUTH.

Green schoolyards can enhance mental health and well-being and promote social-emotional skill development.

GREEN SCHOOLYARDS HELP KIDS FEEL:

CALMER & LESS STRESSED [2,3]

Views of green landscapes from classroom windows helped high school students recover more quickly from stressful events.[4]

POSITIVE & RESTORED [3]

Forest schools enhanced positive and decreased negative emotions.[5]

RESILIENT [2]

Natural areas enhanced feelings of competence and increased supportive social relationships that help build resilience.[2]

GREEN SCHOOLYARDS PROMOTE SOCIAL-EMOTIONAL SKILLS

PRACTICE

RELATIONSHIP SKILLS [2]

Children demonstrated more cooperative play, civil behavior and positive social relationships in green schoolyards.[6,7]

DEVELOP

SELF-AWARENESS & SELF-MANAGEMENT

Green schoolyards can reduce aggression and discipline problems.[6,7]

Gardening at school helped students feel proud, responsible & confident.[2]

SUPPORTING RESEARCH

[1]www.nimh.nih.gov/health/statistics/prevalence/any-disorder-among-children.shtml [2]Chawla et al. (2014). Green schoolyards as havens from stress and resources for resilience in childhood and adolescence. *Health Place*, 28, 1-13. [3]Kelz et al. (2015). The restorative effects of redesigning the schoolyard: A multi-methodological, quasi-experimental study in rural Austrian middle schools. *Environ Behav*, 47(2), 119-139. [4]Li & Sullivan (2016). Impact of views to school landscapes on recovery from stress and mental fatigue. *Landscape Urban Plan*, 148, 149-158. [5]Roe & Aspinall (2011). The restorative outcomes of forest school and conventional school in young people with good and poor behaviour. *Urban For Urban Gree*, 10(3), 205-212. [6]Bell & Dyment (2008). Grounds for health: The intersection of green school grounds and health-promoting schools. *Environ Educ Res*, 14(1), 77-90. [7]Nedovic & Morrissey (2013). Calm, active and focused: Children's responses to an organic outdoor learning environment. *Learn Environ Res*, 16(2), 281-295.

ADDITIONAL RESEARCH USED FOR THIS INFOGRAPHIC AVAILABLE AT research.childrenandnature.org

C&NN recognizes that not all studies support causal statements.

Children & Nature Network

GREEN SCHOOLYARDS CAN INCREASE PHYSICAL ACTIVITY

THE ISSUE

Less than 3 in 10 high school students get 60 minutes of physical activity every day.[1]

REGULAR PHYSICAL ACTIVITY ENHANCES WELL-BEING & ATTENTIVENESS IN THE CLASSROOM.

Green schoolyards can promote physical activity by offering a variety of active play options that engage children of varying fitness levels, ages and genders.

MORE OPTIONS, MORE ACTIVITY

85%

OF EDUCATORS AND PARENTS said green schoolyards support a wider range of play activities than other types of schoolyards.[2]

PROMOTE

running climbing jumping lifting[2]

trees logs shrubs rocks

Variety in landscaping increases variety in active play.[2]

MEETING DIVERSE & CHANGING NEEDS

GREEN SCHOOLYARDS COMPLEMENT CONVENTIONAL PLAYGROUNDS WITH OPPORTUNITIES FOR

LIGHT & MODERATE PHYSICAL ACTIVITY

that are more appealing to some children.[3,4]

GREEN SCHOOLYARDS CAN CONTRIBUTE TO

GIRLS' PHYSICAL FITNESS

Physical activity decreases as children grow, especially for girls. Green schoolyards sustain activity as children age and preferences change.[5,6,7]

SUPPORTING RESEARCH

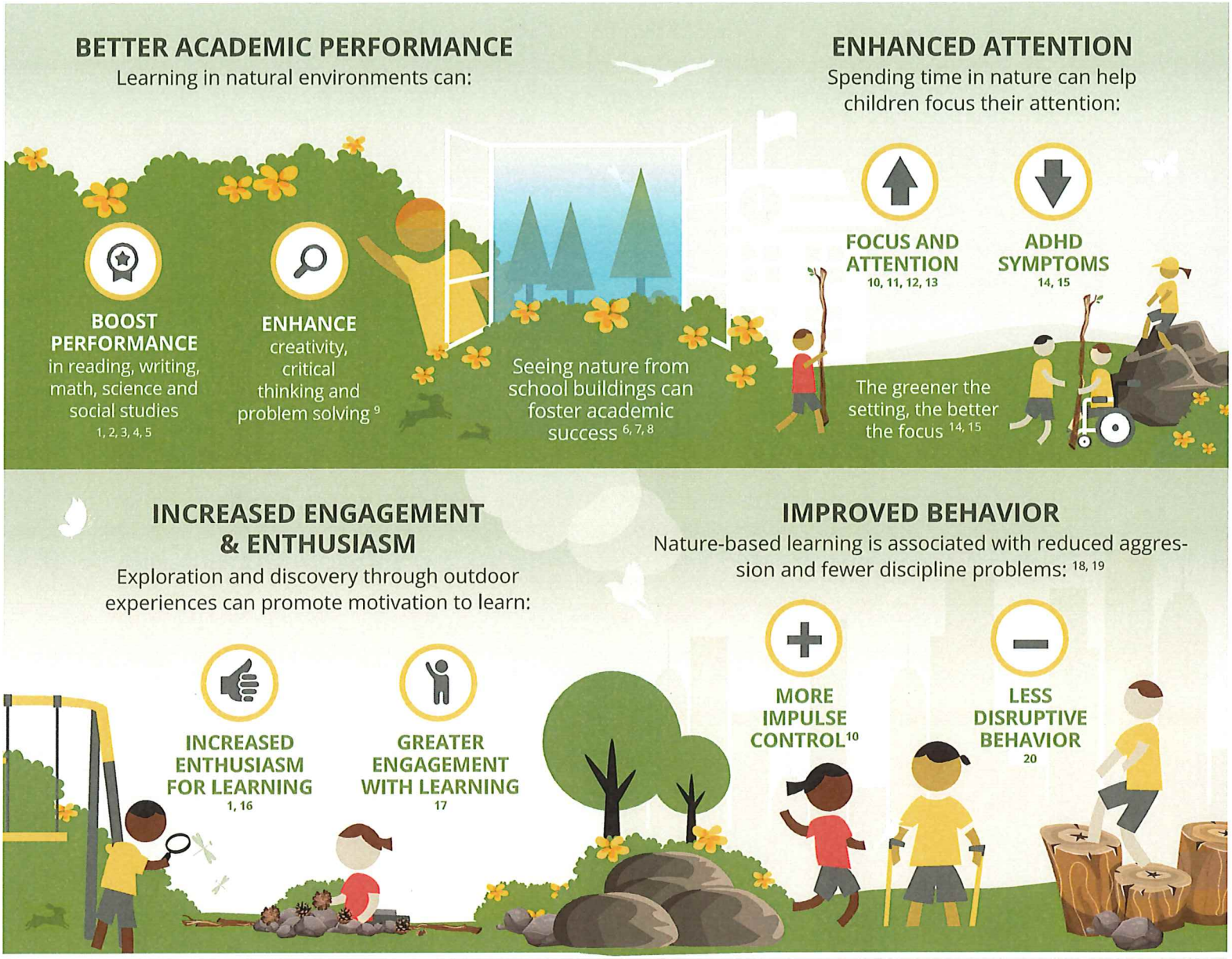
[1]www.cdc.gov/physicalactivity/data/facts.htm [2]Dyment & Bell (2008). Grounds for movement: Green school grounds as sites for promoting physical activity. *Health Educ Res* , 23(6), 952-962. [3]Barton et al. (2015). The effect of playground- and nature-based playtime interventions on physical activity and self-esteem in UK school children. *Int J Environ Health Res* , 25(2), 196-206. [4]Dyment et al. (2009). The relationship between school ground design and intensity of physical activity. *Child Geogr* , 7(3), 261-276. [5]Brink et al. (2010). Influence of schoolyard renovations on children's physical activity: The Learning Landscapes Program. *Am J Public Health* , 100(9), 1672-1678. [6]Mårtensson et al. (2014). The role of greenery for physical activity play at school grounds. *Urban For Urban Gree* , 13(1), 103-113. [7]Pagels et al. (2014). A repeated measurement study investigating the impact of school outdoor environment upon physical activity across ages and seasons in Swedish second, fifth and eighth graders. *BMC Public Health* , 14(1), 803.

ADDITIONAL RESEARCH USED FOR THIS INFOGRAPHIC AVAILABLE AT research.childrenandnature.org

C&NN recognizes that not all studies support causal statements.

NATURE CAN IMPROVE ACADEMIC OUTCOMES

Spending time in nature enhances educational outcomes by improving children's academic performance, focus, behavior and love of learning.



Children & Nature Network

NLC NATIONAL LEAGUE OF CITIES CITIES STRONG TOGETHER

THE JPB FOUNDATION

ADDITIONAL RESEARCH ON THE BENEFITS OF NATURE AVAILABLE AT research.childrenandnature.org

SUPPORTING RESEARCH

[1]Lieberman & Hoody (1998). Closing the achievement gap: Using the environment as an integrating context for learning. Results of a Nationwide Study. *San Diego: SEER.* [2] Chawla (2015). Benefits of nature contact for children. *J Plan Lit,* 30(4), 433–452. [3] Berezowitz et al. (2015). School gardens enhance academic performance and dietary outcomes in children. *J School Health*, 85(8), 508-518. [4] Williams & Dixon (2012). Impact of garden-based learning on academic outcomes in schools: Synthesis of research between 1990 and 2010. *Rev Educ Res*, 83(2), 211–235. [5] Wells et al. (2015). The effects of school gardens on children's science knowledge: A randomized controlled trial of low-income elementary schools. *Int J Sci Edu*, 37(17), 2858-2878. [6] Li & Sullivan (2016). Impact of views to school landscapes on recovery from stress and mental fatigue. *Landscape Urban Plan*, 148, 149-158. [7] Wu et al. (2014) Linking student performance in Massachusetts elementary schools with the "greenness" of school surroundings using remote sensing. *PLoS ONE* 9(10): e108548. [8] Matsuoka, R. H. 2010. Student performance and high school landscapes. *Landscape and Urban Planning* 97 (4), 273-282. [9] Moore & Wong (1997). Natural Learning: Rediscovering Nature's Way of Teaching. *Berkeley, CA: MIG Communications*. [10] Faber Taylor et al. (2002). Views of nature and self-discipline: Evidence from inner-city children. *J Environ Psy*, 22, 49-63. [11] Mårtensson et al. (2009). Outdoor environmental assessment of attention promoting settings for preschool children. *Health Place*, 15(4), 1149-1157. [12] Wells (2000). At home with nature effects of "greenness" on children's cognitive functioning. *Environ Behav*, 32(6), 775-795. [13] Berto et al. (2015). How does psychological restoration work in children? An exploratory study. *J Child Adolesc Behav* 3(3). [14] Faber Taylor et al. (2001). Coping with ADD: The surprising connection to green play settings. *Environ Behav*, 33(1), 54-77. [15] Amoly et al. (2014). Green and blue spaces and behavioral development in Barcelona schoolchildren: The BREATHE Project. *Environ Health Perspect*, 122,1351–1358. [16] Blair (2009) The child in the garden: An evaluative review of the benefits of school gardening. *J Environ Educ*, 40(2), 15-38. [17] Rios & Brewer (2014). Outdoor education and science achievement. *Appl Environ Educ Commun*, 13(4), 234–240. [18] Bell & Dyment (2008). Grounds for health: The intersection of green school grounds and health-promoting schools. *Environ Educ Res*, 14(1), 77-90. [19] Nedovic & Morrissey (2013). Calm, active and focused: Children's responses to an organic outdoor learning environment. *Learn Environ Res*, 16(2), 281–295. [20] Ruiz-Gallardo & Valdés (2013). Garden-based learning: An experience with "at risk" secondary education students. *J Environ Educ*, 44(4), 252-270.

C&NN recognizes that not all studies support causal statements.

Children & Nature Network

GREEN SCHOOLYARDS ENCOURAGE BENEFICIAL PLAY

THE ISSUE

8-18 year olds in the U.S. spend an average of 7.5 hrs per day using entertainment media.[1]

KIDS NEED TO PLAY: PLAY SUPPORTS PHYSICAL, SOCIAL & EMOTIONAL WELL-BEING.

Natural areas promote child-directed free play that is imaginative, constructive, sensory rich and cooperative.

ENCOURAGING IMAGINATIVE, COOPERATIVE FREE PLAY

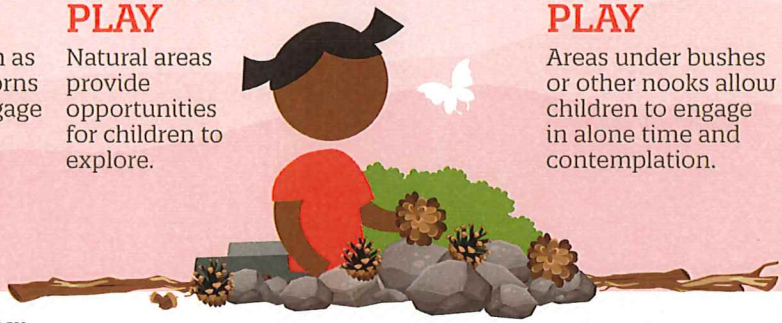
GREEN SCHOOLYARDS CAN SUPPORT DIFFERENT TYPES OF PLAY [2,4,7,8]

DRAMATIC PLAY

Loose parts—such as sticks, stones, acorns & pinecones—engage the imagination.

EXPLORATORY PLAY

Natural areas provide opportunities for children to explore.



SOLITARY PLAY

Areas under bushes or other nooks allow children to engage in alone time and contemplation.

CONSTRUCTIVE PLAY

Building things out of natural materials helps children learn hands-on skills.

LOCOMOTOR PLAY

Natural items such as logs and rocks can be carried. Looping paths allow walking, running and biking.

SUPPORTING RESEARCH

[1]Rideout et al. (2010). Generation M2: Media in the lives of 8-18 year olds. Kaiser Family Foundation https://kaiserfamilyfoundation.files.wordpress.com/2013/01/8010.pdf [2]Dyment & Bell (2008). Grounds for movement: Green school grounds as sites for promoting physical activity. *Health Educ Res* , 23(6), 952-962. [3]Stanley (2011). The place of outdoor play in a school community: A case study of recess values. *Child Youth Environ*, 21(1), 185-211. [4]Dennis et al. (2014). A post-occupancy study of nature-based outdoor classrooms in early childhood education. *Child Youth Environ* , 24(2), 35-52. [5]Luchs & Fikus (2013). A comparative study of active play on differently designed playgrounds. *J Adven Educ & Outd Learn* , 13(3), 206-222. [6]Acar & Torquati (2015). The power of nature: Developing pro-social behavior towards nature and peers through nature-based activities. *Young Children* , 70(5), 62-71. [7]Chawla (2015). Benefits of nature contact for children. *J Plan Lit* , 30(4), 433-452. [8]Cloward Drown & Christenson (2014). Dramatic play affordances of natural and manufactured outdoor settings for preschool-aged children. *Child Youth Environ, 24(2), 53-77.*

ADDITIONAL RESEARCH USED FOR THIS INFOGRAPHIC AVAILABLE AT research.childrenandnature.org

C&NN recognizes that not all studies support causal statements.

NATURE PLAY CAN ENCOURAGE CARE FOR THE EARTH

THE ISSUE

Childhood has moved indoors, leaving kids disconnected from the natural world.

MEANINGFUL OUTDOOR EXPERIENCES BENEFIT CHILDREN AND INSPIRE THEM TO LOVE AND CARE FOR NATURE.

Children who are connected to nature have better health, higher satisfaction with life, and pro-environment behaviors. [2, 13]

THE BENEFITS OF TIME IN NATURE:

Time outdoors in nature contributes to children's care for nature while supporting their healthy development. [2, 10, 13]

BETTER SOCIAL SKILLS [2, 13]

ENHANCED HEALTH [2, 13]

INCREASED SELF ESTEEM [2, 13]

IMPROVED GRADES [10, 11]

PRO-ENVIRONMENT BEHAVIORS [1, 2, 3, 4, 5, 10, 13]

STRONGER EMOTIONAL CONNECTIONS TO PEOPLE AND NATURE [6, 7, 8, 12]

Children & Nature Network

#NATURE FOR ALL

ADDITIONAL RESEARCH ON THE BENEFITS OF NATURE AVAILABLE AT research.childrenandnature.org

SUPPORTING RESEARCH

Studies cited here are from the report Home to Us All: How Connecting with Nature Helps Us Care for Ourselves and the Earth (Charles, C., et al. 2018. Children & Nature Network) and its summary, Connecting with Nature to Care for Ourselves and the Earth: Recommendations for Decision Makers (2018.) Both documents are downloadable from childrenandnature.org and natureforall.global. 1. Otto, S.; & Pensini, P. (2017). Nature-based environmental education of children: Environmental knowledge and connectedness to nature, together, are related to ecological behaviour. Global Environmental Change, 47, 88-94. 2. Richardson, M.; Sheffield, D.; Harvey, C.; & Petronzi (2016). A Report for the Royal Society for the Protection of Birds (RSPB): The Impact of Children's Connection to Nature. Derby: College of Life and Natural Sciences, University of Derby. 3. Zylstra, M.J.; Knight, A.T.; Esler, K.J.; & Le Grange, L.L.L. (2014). Connectedness as a core conservation concern: An interdisciplinary review of theory and a call for practice. Springer Science Reviews, 2(1), 119-143. 4Chawla, L.; & Derr, V. (2012). The development of conservation behaviors in childhood and youth. In Clayton, C. (Ed) The Oxford Handbook of Environmental and Conservation Psychology. 5.Chawla, L.; & Cushing, D.F. (2007). Education for strategic environmental behaviour. Environmental Education Research, 13:4, 437-452. 6.Richardson, M. & Sheffield, D. (2017). Three good things in nature: Noticing nearby nature brings sustained increases in connection with nature. Psyecology, 8(1), 1-32. 7. Richardson, M., Hallam, J. & Lumber, R. (2015). One thousand good things in nature: The aspects of nature that lead to increased nature connectedness. Environmental Values, 24 (5), 603-619. 8. D'Amore, C.; & Chawla, L. (2017). Many children in the woods: Applying principles of community-based social marketing to a family nature club. Ecopsychology, Vol. 9; No. 4. 9. Giusti et al.(2018). A framework to assess where and how children connect to nature. Frontiers in Psychology 8 (January). https://doi.org/10.3389/fpsyg.2017.02283 10. Kuo, M.; Barnes, M.; & Jordan, C. (2019). Do experiences with nature promote learning? Converging evidence of a cause-and-effect relationship. Frontiers in Psychology. 10:305. doi: 10.3389/fpsyg.2019.00305. 11. Williams & Dixon (2013). Impact of garden-based learning on academic outcomes in schools: Synthesis of research between 1990 and 2010. Rev Educ Res, 83(2), 211-235. 12. D'Amore, C. (2015). Family nature clubs: Creating the conditions for social and environmental connection and care. Proquest. 13. Pritchard, A., Richardson, M., Sheffield, D., & McEwan, K. (2019). The relationship between nature connectedness and eudaimonic well-being: A meta-analysis. Journal of Happiness Studies, 1-23.

C&NN recognizes that not all studies support causal statements.

Nature as a Pathway for Healing from Adverse Childhood Experiences (ACEs)

ACEs ENCOUNTERED by children and families, include:

- Poverty
- Neglect
- Violence
- Abuse
- Mental health issues
- Substance use

Children who experience **ACEs MAY STRUGGLE WITH:**

- Chronic health problems
- Mental health issues
- Substance use
- Poor nutrition and health
- Academic difficulty and truancy
- Disconnection from the natural world

RESEARCH INDICATES that nature-based interventions can play a vital role in improving:

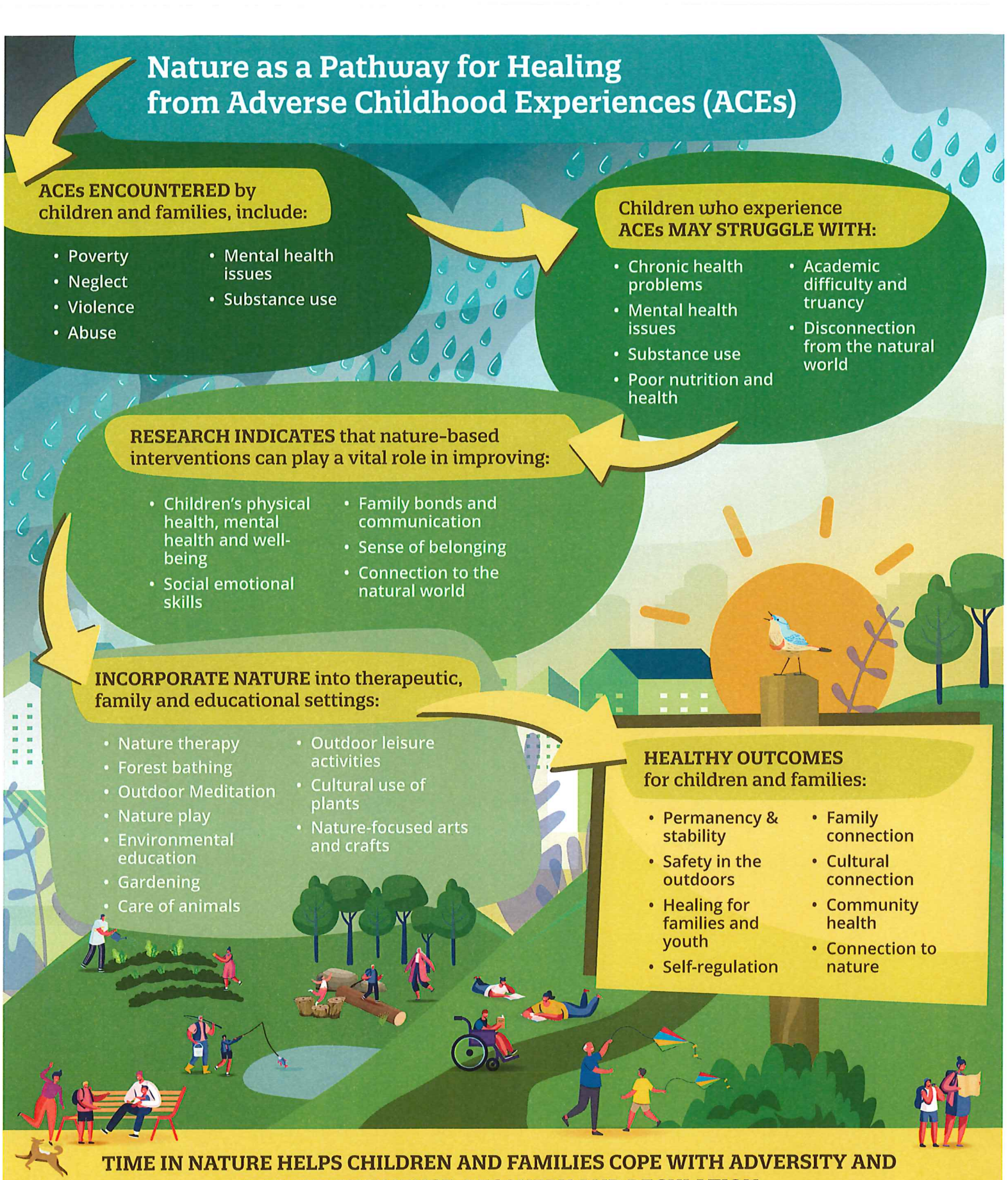
- Children's physical health, mental health and well-being
- Social emotional skills
- Family bonds and communication
- Sense of belonging
- Connection to the natural world

INCORPORATE NATURE into therapeutic, family and educational settings:

- Nature therapy
- Forest bathing
- Outdoor Meditation
- Nature play
- Environmental education
- Gardening
- Care of animals
- Outdoor leisure activities
- Cultural use of plants
- Nature-focused arts and crafts

HEALTHY OUTCOMES for children and families:

- Permanency & stability
- Safety in the outdoors
- Healing for families and youth
- Self-regulation
- Family connection
- Cultural connection
- Community health
- Connection to nature

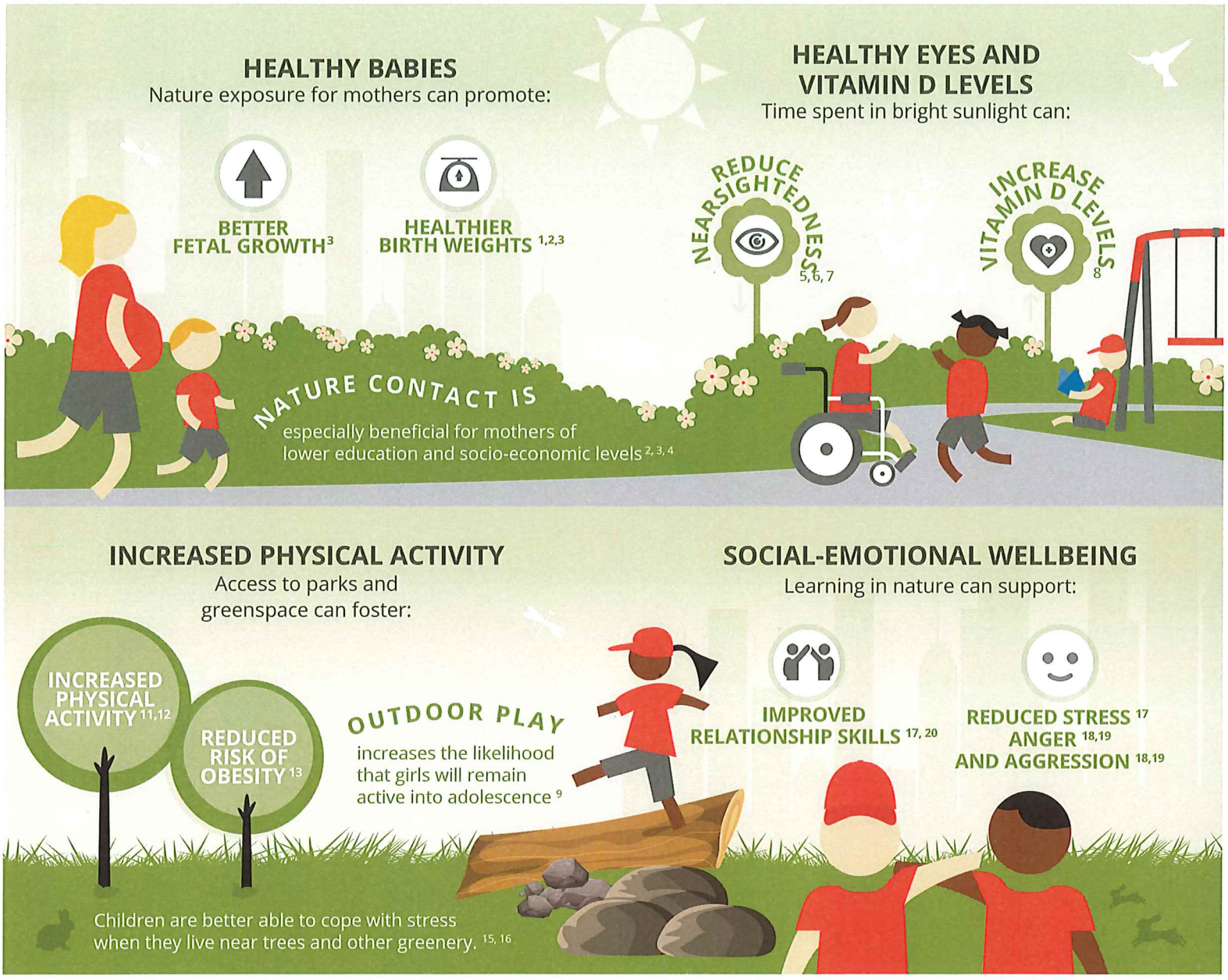


TIME IN NATURE HELPS CHILDREN AND FAMILIES COPE WITH ADVERSITY AND ACHIEVE RESILIENCE, RECOVERY AND REGULATION

PRODUCED IN PARTNERSHIP WITH: Children & Nature Network · casey family programs

NATURE CAN IMPROVE HEALTH AND WELLBEING

Spending time in nature provides children with a wide range of health benefits.



Children & Nature Network | NLC NATIONAL LEAGUE OF CITIES CITIES STRONG TOGETHER | THE JPB FOUNDATION

ADDITIONAL RESEARCH ON THE BENEFITS OF NATURE AVAILABLE AT
research.childrenandnature.org

SUPPORTING RESEARCH

[1]Dzhambov et al. (2014). Association between residential greenness and birth weight: Systematic review and meta-analysis. *Urban For Urban Gree*, 13(4), 621-629. [2] Markevych et al. (2014). Surrounding greenness and birth weight: Results from the GINIplus and LISAplus birth cohorts in Munich. *Health Place*, 26, 39-46. [3] Dadvand et al. (2014). Inequality, green spaces, and pregnant women: Roles of ethnicity and individual and neighbourhood socioeconomic status. *Environ Inter*, 71, 101-108. [4] Agay-Shay et al. (2014). Green spaces and adverse pregnancy outcomes. *Occup Environ Med*, 71(8), 562-9. [5] French et al. (2013). Time outdoors and the prevention of myopia. *Exp Eye Res*, 114, 58-68. [6] He et al. (2015). Effect of time spent outdoors at school on the development of myopia among children in China. *JAMA*, 314(11),1142-1148. [7] Dolgin (2015). The myopia boom: Short-sidedness is reaching epidemic proportions. Some scientists think they have found a reason why. *Nature*, 519, 276 - 278. [8] McCurdy et al. (2010). Using nature and outdoor activity to improve children's health. *Curr Prob Pediatr Adolesc Health Care*, 40(5), 102-117. [9] Pagels et al. (2014). A repeated measurement study investigating the impact of school outdoor environment upon physical activity across ages and seasons in Swedish second, fifth and eighth graders. *BMC Public Health*, 14(1), 803. [10] Almanza et al. (2012). A study of community design, greenness, and physical activity in children using satellite, GPS and accelerometer data. *Health Place*, 18(1), 46-54. [11] Hartig et al. (2014). Nature and health. *Annul Rev Publ Health*, 35, 207-28. [12] Christian et al. (2015). The influence of the neighborhood physical environment on early child health and development: A review and call for research. *Health Place*, 33, 25-36. [13] Wolch et al. (2011). Childhood obesity and proximity to urban parks and recreational resources: A longitudinal cohort study. *Health Place*, 17(1), 207-214. [14] Duncan et al. (2014). The effect of green exercise on blood pressure, heart rate and mood state in primary school children. *Int J Environ Res Public Health*, 11(4), 3678-3688. [15] Wells & Evans (2003). Nearby nature: A buffer of life stress among rural children. *Environ Behav*, 35(3), 311-330. [16] Corraliza et al. (2012). Nature as a moderator of stress in urban children. *Procedia - Soc Behav Sci*, 38, 253-263. [17] Chawla et al. (2014). Green schoolyards as havens from stress and resources for resilience in childhood and adolescence. *Health Place*, 28, 1-13. [18] Roe & Aspinall (2011). The restorative outcomes of forest school and conventional school in young people with good and poor behavior. *Urban For Urban Gree*, 10, 205-212. [19] Younan et al. (2016). Environmental determinants of aggression in adolescents: Role of neighborhood green space, *J Am Acad Child Adolesc Psychiatry*, 55(7), 591-601. [20] Chawla (2015). Benefits of nature contact for children. *J Plan Lit*, 30(4), 433–452.

C&NN recognizes that not all studies support causal statements.

PATHWAYS TO PLAY: OVERCOMING NATURE PLAY BARRIERS

FAMILY BARRIERS

Time
Make nature play a priority like any other scheduled event and use the time for quality family bonding too.

Dirt
It's natural for kids to explore the world around them, so be prepared with a change of clothes and let 'em make mud pies.

Access
Nature play can happen almost anywhere, from a single puddle to a day at the zoo or aquarium and beyond.

Difficulty "Unplugging"
Bring your smart phone to learn more about wildlife and plants along the way.

Safety
Nature play fosters awareness and self-confidence as kids grow and learn outside.

Injuries
Nature play allows kids to learn their own boundaries and take calculated risks.

Stranger Danger
Join or start a Family Nature Club for fun and safety in numbers.

Weather
No such thing as bad weather if you're well-prepared, so bundle up and feel invincible!

PROGRAMMING BARRIERS

Staffing
Integrate into programs with existing staff and engage volunteers or Family Nature Clubs.

Space
Small areas can be used for "micro-hikes" or mini-gardens while partners can provide larger outdoor spaces.

Cost
Collect natural and reusable materials and utilize volunteer resources. Explore opportunities for partnership and sponsorships.

Upkeep
Nature spaces are low-maintenance areas where creativity abounds. Messy means children are learning, and guests stay longer when having fun!

Liability
Institutions are built for safety in mind and include staff trained in First Aid.

Accessibility
Exploration is a universal activity. Zoos and aquariums help guests connect to the natural world.

Priority
Nature play augments zoo and aquarium missions, supplements attendance, membership, and donations, and fosters engaged conservation stewards.

Disney WORLDWIDE CONSERVATION FUND

Children & Nature Network

ASSOCIATION OF ZOOS & AQUARIUMS