

HOW PLANTS AND GARDENS HEAL:

Plants and gardens inside and outside hospitals, schools and the workplace are essential for human health and wellbeing.



Students and teachers
feel better and
more relaxed
with plants in
classrooms.^{11,12,26}

Plants that are
**healthy and
green** are
restorative.^{2, 18, 21, 12}

Plants can increase
room humidity by **30%**
under bright lighting
conditions.^{5,6,14,16,23}



Plants encourage
**relaxation
response** in both
body and mind.^{4, 7, 24}



Symptoms
of ADD are
reduced when
a child's
play area
is filled
with green
plants.^{9, 26}



Plants inside
and outdoors
psychologically



link us to nature.^{13, 15}

Plants in patients'
rooms **decrease
hospital stay
length.**²⁴



Having **house plants**
indoors benefit human
health with beneficial
bacteria and an increase
in microbial diversity.²⁰



Hospital patients looking outside
from their room into **rich,
green nature** decreased their
use of pain medication.^{28, 11}

Plants inside hospital
interiors **reduce
stress** for both patients
and staff.^{3, 19, 22}

Test scores improved
by **10%** or more
with plants inside of
classrooms.^{1, 8, 26}



Plants in the
classroom **reduce
the number of
sick days** for
both teachers and
students.²⁷

There is less student
disruptive behavior
in a classroom with
plants.^{10, 17, 29}



REFERENCES:

1. Berman, M.6., J. Jonides, and S.Kaplan, (2008). "The Cognitive Benefits of interacting with Nature", *Psychological Science* 19,12:1207-1212.
2. Burchett, M., et al. (2010). "Greening the great indoors for human health and wellbeing." Sydney: Plants and Indoor Environmental Quality Group, Centre for Environmental Sustainability (CEoS).
3. Beukeboom, C. J., et al. (2012). "Stress-reducing effects of real and artificial nature in a hospital waiting room." *The Journal of Alternative and Complementary Medicine* 18(4): 329-333.
4. Bringslimark, T., et al. (2009). "The psychological benefits of indoor plants: A critical review of the experimental literature." *Journal of Environmental Psychology* 29(4): 422-433.
5. Claudio, L. (2011). "Planting healthier indoor air." *Environmental Health Perspectives* 119(10): 426-427.
6. Dela Cruz, M., et al. (2014). "Can ornamental potted plants remove volatile organic compounds from indoor air? — a review." *Environmental Science and Pollution Research* 21(24): 13909-13928.
7. Dijkstra, K., et al. (2008). "Stress-reducing effects of indoor plants in the built healthcare environment: The mediating role of perceived attractiveness." *Preventive Medicine* 47(3): 279-283.
8. Doxey, J. S. and T. M. Waliezek (2009). "The impact of interior plants in university classrooms on student course performance and on student perceptions of the course and instructor." *Hort-Science*, 44 (384 391).
9. Faber, A., et. al. (2001) "Coping with ADD: The Surprising Connection to Green Play Settings." *Environment and Behavior* 33 (1): 54-77.
10. Faber, A., et. al. (2002) "Views of Nature and Self-Discipline: Evidence from Inner City Children." *Journal of Environmental Psychology* 22 (1-2): 49-63.
11. Fjeld T, (2002). "The effects of plants and artificial daylight on the well being and health of office workers, school children and health care personnel." *Proceedings of International Plants for People Symposium*, Floriade, Amsterdam, NL.
12. Han, K. T. (2008). "Influence of Limitedly Visible Leafy IndoorPlants on the Psychology, Behavior, and Health of Students at a Junior High School in Taiwan." *Environment and Behavior* 41(5): 658-692.
13. Hartig, T., G.W. Evans, L.D.Jammer, D.5. Davis, and T.Gärting. (2003). *Tracking Restoration in Natural and Urban Field Settings.* *Journal of Environmental Psychology* 23 :109-123.
14. Jumeno, D. and H. Matsumoto (2016). "The Effects of Indoor Foliage Plants on Perceived Air Quality, Mood, Attention, and Productivity." *Journal of Civil Engineering and Architecture Research* 3(4):1359-1370.
15. Kaplan, R., & Kaplan, S. (1990) "Restorative experience: the healing power of nearby nature." In: M. Francis & R.T. Hester Jr. (eds).
16. Kerschen, E. W., et al. (2016). "Evapotranspiration from Spider and Jade Plants Can Improve Relative Humidity in an Interior Environment." *HortTechnology* 26(6): 803-810.
17. Kim, H., et al. (2016). "Evaluation of Self-Assessed Ocular Discomfort among Students in Classrooms According to Indoor Plant Intervention." *HortTechnology* 26(4) 386-393.
18. Kjellgren, A, and H, Buhrkall' (2010). A Comparison of the Restorative Effect of a Natural Environment with a Simulated Natural Environment, *Journal of Environmental Psychology* 30, 4: 464-472.
19. Lohr, V. I. and C. H. Pearson Mims (2000). "Physical discomfort may be reduced in the presence of interior plants." *HortTechnology*. 10(1), 53-58.
20. Mahnert, A., et al. (2015). "Microbiome interplay: plants alter microbial abundance and diversity within the built environment." *Frontiers in Microbiology* 6(887).
21. Ottosson, J., and P. Grahn. (2005). A Comparison of Leisure Time Spent in a Garden with leisure Time Spent indoors: On Measures of Restoration in Residents in Geriatric Care. *Landscape Research* 30, 1:23-55.
22. Park, S. A., et al. (2016). "Foliage Plants Cause Physiological and Psychological Relaxation as Evidenced by Measurements of Prefrontal Cortex Activity and Profile of Mood States." *Hort-Science* 51(10): 1308-1312.
23. Pegas, P., et al. (2012). "Could houseplants improve indoor air quality in schools?" *Journal of Toxicology and Environmental Health, Part A* 75(22-23):1371-1380.
24. Sherman, S.4., J.W, Varni, et al, (2005), Post-Occupancy Evaluation of Healing Gardens in a Pediatric Cancer Center, *Landscape and Urban Planning* 7 3, 2-3: 167 -L83.
25. Shibata, S. and N. Suzuki (2004). "Effects of an indoor plant on creative task performance and mood." *Scandinavian Journal of Psychology* 45(5): 373-381.
26. Taylor, A.F, and F.E. Kuo (2009) Children with Attention Deficits Concentrate Better After Walk in the Park. *Journal of Attention Disorders* 12, 5: 402-409.
27. The benefits of plants in classroom Retrieved on Oct. 24, 2018 from <https://www.phsgreenleaf.co.uk/the-benefits-of-plants-in-schools-and-educational-facilities/>
28. Ulrich, Roger. (1984). View Through a Window May Influence Recovery from Surgery. *Science (New York, N.Y.)*. 224. 420-1. 10.1126/science.6143402.
29. Van den Berg, A,E. and M.H.G. Custers. (2011). Gardening Promotes Neuroendocrine and Affective Restoration from Stress, *Journal of Health Psychology* 16: 3-11.