

ChildArt

**Your
brain
on art**



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Guest editor's corner

It is a privilege to serve as guest editor of the Arts + Mind edition of *ChildArt* Magazine. For more than 20 years the International Child Art Foundation (ICAF) has been an essential organization recognizing and valuing the power and dignity of the arts for children around the world.

This issue of *ChildArt* shares the marriage of the arts and brain research, a newly emerging field of study called neuroaesthetics. Neuroaesthetics explores the impact of the arts, architecture and music on the human brain and behavior. The applications for neuroaesthetics research are limitless. While there is so much about the brain we don't understand, it is an exciting time to be thinking about what is going on at the intersection of the arts and brain research. I hope the stories in health, wellbeing and learning will open your mind to the possibilities for the arts, architecture and design as solutions for intractable problems, approaches to enhance your life and answers to questions long asked.

We are all makers, designers and creators regardless of our age, interests, studies or career paths. The evolution of the human species revolves around the stories we create and share, the ways we communicate, environments we build and language we use.

Understanding how our brains work and how they are sculpted and changed through art making and aesthetic experiences enables us to build a better world. When we decide to create a new product, design a shopping center, home or park, paint a room, or a million other actions, we have the ability to use what we know about how the brain works to create smarter, more productive, creative, healing and learning solutions. The benefits to people everywhere are beyond measure, transcending class, gender, race and culture.

The arts, in all forms, are not just "nice to have" but are who we are. The field of neuroaesthetics is at the heart of unleashing humanity's greatest potential.

Susan Magsamen

Executive Director

International Arts + Mind Lab

Brain Science Institute

Johns Hopkins University School of Medicine



INTERNATIONAL
CHILD ART
FOUNDATION

Published since 1997, *ChildArt* is a commercial-free arts learning, self-discovery, and global education periodical

expressly written for 10 to 14 year-olds, but useful as a teaching tool for educators and inspirational for creative individuals of all ages. Subscribe to *ChildArt* online at www.icafe.org.

When a child's creativity is ignored, it could be lost forever. Tax-deductible donations support children's creative and empathic development. You can donate online at www.icafe.org or make your check to ICAF and mail it to: ICAF, P. O. Box 58133, Washington, DC 20037.

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WHO WE ARE

International Arts + Mind Lab (IAM Lab) is a multidisciplinary research-to-practice initiative from the Brain Science Institute at Johns Hopkins University accelerating the field of neuroaesthetics. Our mission is to amplify human potential.



WHAT WE DO

IAM Lab is pioneering impact-based thinking, an outside-in approach to health, well-being and learning.

HOW WE DO IT

IAM Lab brings together brain scientists and practitioners in architecture, music and the arts to collaborate in multidisciplinary research, foster dialogue and spur continued innovation by sharing these findings with a broader community.

Join the neuroaesthetics conversation.
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What is neuroaesthetics?

What if we told you that the way a room or building is designed can help you recover from an illness or heal more quickly? What if we told you that you could be more productive and creative simply by listening to a certain type of music?



What if you could solve conflicts or understand another person's perspective by creating art? And what if you could get better grades just by taking a walk in the woods every once in a while? Well, it's true!

We are constantly interacting with the world around us. Our five senses—hearing, sight, touch, smell and taste—are working all the time. Our senses help us understand and identify color, an item we hold, a sound we hear. They orient us when we enter a new room or a new space.

Our senses directly inform our brains so we can learn, heal and grow.

Since the beginning of humanity, we have been making or experiencing the arts, creating environments and communicating our unique stories of culture and self. The arts affect our emotions and feelings—they help to shape our brains. The arts cover a broad spectrum of things including natural and human-made environments, architecture, music, dance, visual design, theatre, digital media, creative writing and poetry. At

their essence, the arts engage the senses to create aesthetic experiences. And the term "aesthetics" doesn't just mean that something is beautiful, it refers to the physical world that surrounds us.

This interaction between our brains and the arts is what neuroaesthetics is all about. Specifically, neuroaesthetics uses brain science to understand aesthetic experiences at the neurological level.

How does the brain interpret aesthetic experiences?

How does our knowledge of basic brain mechanisms inform our understanding of these experiences?

These questions are at the heart of neuroaesthetics, an emerging discipline focused on exploring the neural processes underlying our appreciation and production of beautiful objects and artwork and the experiences that include perception, interpretation, emotion and action.

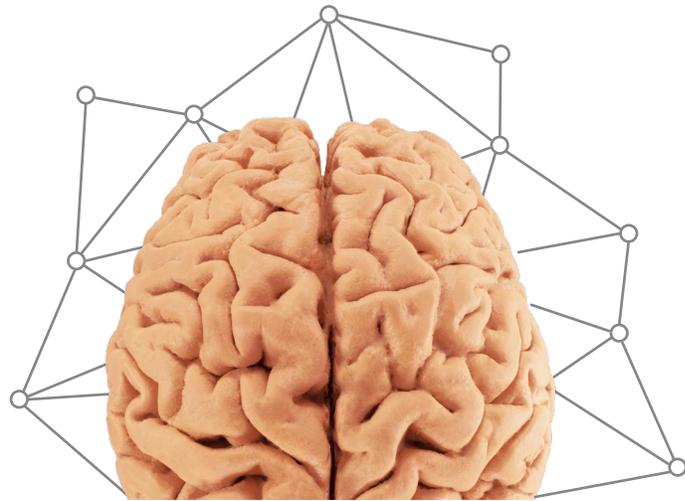
The field attracts scholars from many disciplines, including neuro and cognitive scientists, architects, artists, designers, psychologists, philosophers, educators and others. Neuroaesthetics received its formal definition in 2002 as the scientific study of the neural bases for the contemplation and creation of a work of art.

Many scholars and institutions around the world have studied and continue to study the intersection of the arts and mind.

The Arts



Architecture, music, visual arts, digital media, writing, dance, theatre



Mind

=

Impact

Sight, touch, smell, taste, hearing

Health, wellbeing, learning

Neuroscientist Semir Zeki and cognitive psychologist Vilayanur Ramachandrian are credited with the elevation of this field in the late 1990s. Nobel Prize winner Eric Kandel has also further contributed through his work and book *The Age of Insight: The Quest to Understand the Unconscious on Art, Mind and Brain*. Anjan Chatterjee has expanded the conversation with his book *The Aesthetic Brain: How We Evolved to Desire Beauty and Enjoy Art*. In 2003, The Academy of Neuroscience for Architecture was launched to advance knowledge that links neuroscience and architecture. The International Neuroaesthetic Network has been extremely productive guiding the development of the empirical research

community since 2009. In recent years, the National Endowment of the Arts (NEA) has worked to investigate the value of the impact of the arts as it pertains to social and emotional development but also to creativity, cognition, and learning. In 2016, the Brain Science Institute at Johns Hopkins School of Medicine embarked on an initiative to further accelerate the field of neuroaesthetics through the creation of the International Arts + Mind Lab.

Fueling the growth of neuroaesthetics are tools and technologies that support the exploration of how our brains work that are assessable, mobile and more affordable. From molecular research and EEG, fMRI, and PET brain imaging to virtual reality and

video games, this interdisciplinary field is now beginning to be able to provide insights and research.

Over time, this new knowledge will provide an important understanding of neural basis, universal principles and evolutionary rationale of aesthetics. These findings will also support rigorous approaches to develop evidence-based arts, design and architectural solutions, interventions and programs.

Neuroaesthetics offers an innovative approach to better understand and amplify the way we live. There's so much to learn about the intricate intersections of the arts and our human brain. Join us as we explore this exciting new field!

Your brain on the arts

The arts have a profound and often instantaneous impact on sculpting our brains. When you are creating the arts (the maker) or experiencing the arts (the beholder), your brain is running at full speed receiving and processing new information.

Try to imagine a clear sky on a cool summer night. The sky is filled with an infinite number of stars above you in many configurations. Your brain is just like that. It is the most complex and agile structure known to humans. At birth, a baby's brain contains all the neurons he or she will ever have. In the first year of life, that child's brain will double in size and by age three, the brain will have reached 80 percent of its adult size.

The human brain contains 100 billion neurons. Each one of those 100 billion neurons can connect to up to 10,000 other neurons. Synapses enable these connections to happen—they are small gaps between neurons that allow information to flow from one neuron to another neuron. In the process, synapses form billions of neuronal circuits.

Neurotransmitters help carry information across the synapses from one neuron to another. Neurotransmitters are made up of very specific chemicals that are involved in different brain functions. A person's brain is constantly changing how it passes information between its neurons (its neural pathways). This process is called brain plasticity and it happens because the brain

is constantly responding to its internal and external environment and experiences.

The fact that the human brain can literally change neural pathways based on experiences means it is never too late to sculpt and heal your brain (though early childhood is still essential for building foundational systems). This agility of the brain underlies our ability to learn, remember and heal.

As you will read in the stories throughout this Arts + Mind edition of *ChildArt* Magazine, you'll discover that interacting

FRONTAL LOBE

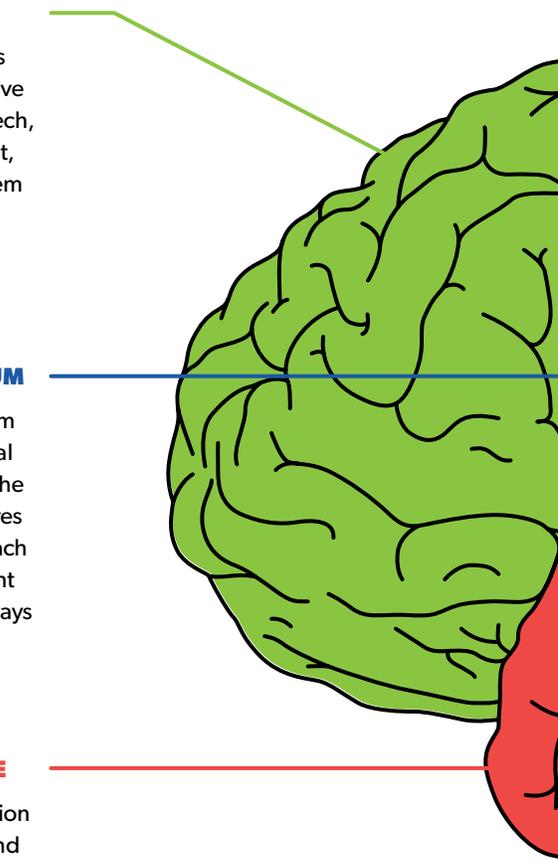
Cognitive functions of reasoning, executive function, parts of speech, voluntary movement, emotions and problem solving

CORPUS CALLOSUM

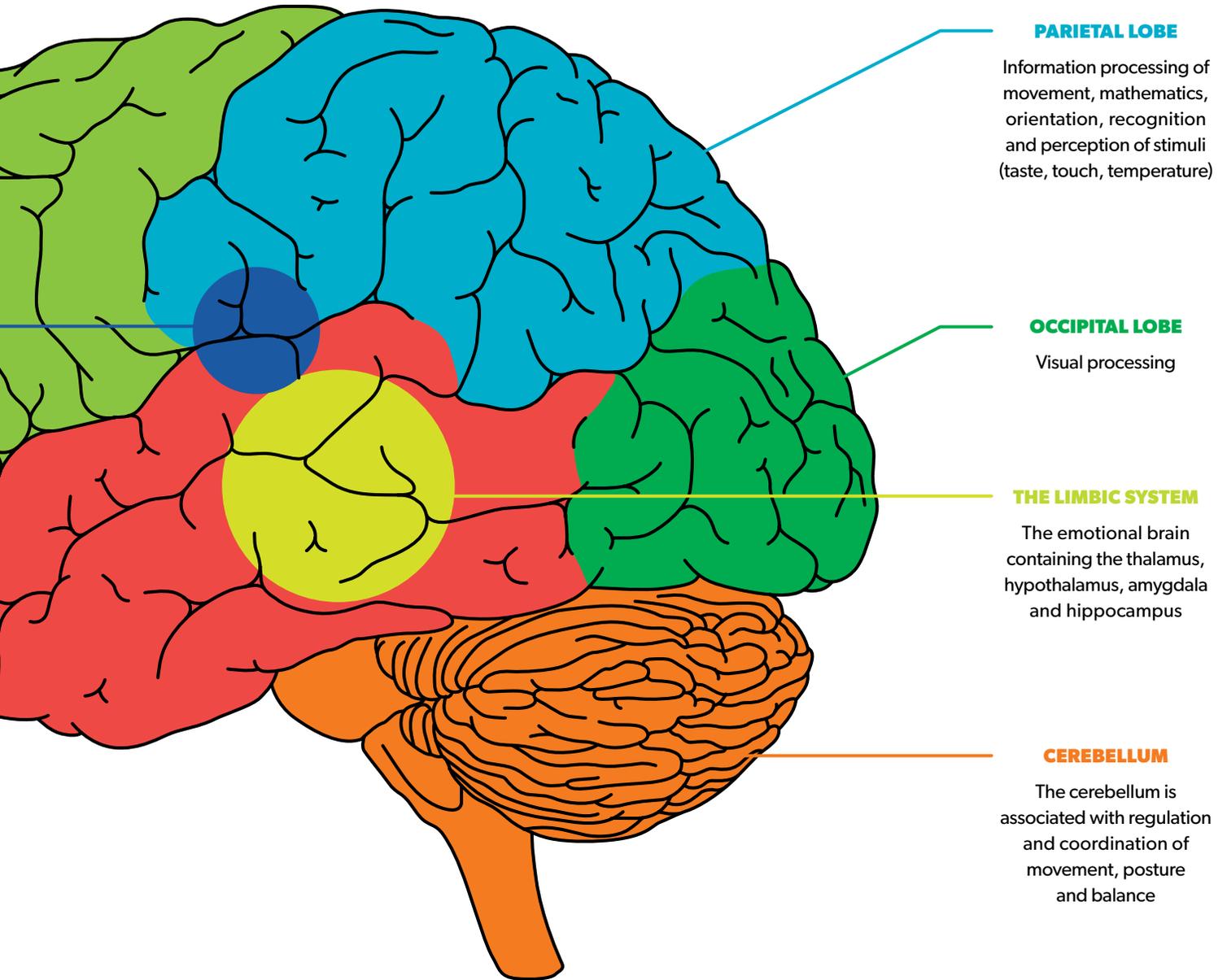
The corpus callosum is made up of neural tissue, and it helps the two brain hemispheres communicate with each other via signals sent through neural pathways

TEMPORAL LOBE

Memory and perception as well as speech and auditory functions (pitch, tone, selective listening)



Emotions are an important part of brain development and learning. Researchers have recently discovered that emotions, related to reward and pleasure, are productive for higher level learning.



with the arts – either as beholder or maker – provides powerful experiences. These experiences help to build this complex and vast neural network and help to maintain the foundational circuitry needed for healthy brain function.

Brain researchers are also beginning to better understand that exposure to the arts, including the visual arts, creative writing and poetry, music, architecture, dance and theatre, create interconnectivity between different areas of the brain. Brain regions do not work in isolation—the strengths

of the connections build cognitive skills, predict long-term outcomes in resiliency, social-emotional health, executive function, learning and memory. The arts engage the whole brain.

The brain is comprised of many important neurotransmitters including serotonin, oxytocin and dopamine. These help regulate emotion, motivation and rewards which are intrinsically tied to brain development.

Emotion is an important part of brain development and learning. Researchers

have discovered that emotions, related to reward and pleasure, are productive for higher level learning. The neurotransmitter dopamine helps control the brain's pleasure and reward systems. Dopamine also helps regulate movement and emotional responses. It enables us not only to feel rewards but to take action and move towards them. Dopamine-driven experiences help foster critical behaviors for learning—a thirst for knowledge or a desire to discover information.





HEALTH

— *the arts heal us* —

**“The main thing is to be
moved, to love, to hope,
to tremble, to live.”**

Auguste Rodin
French Impressionist and sculptor

A safe space to be a kid

HEART – SAVE THE CHILDREN

Sometimes it can be hard to watch the news. When scenes of war and uncertainty from around the world make you feel sad and helpless, take heart: there is always something you can do. Eglantyne Jebb founded Save the Children in 1919 after her experiences with the devastating effects of World War I on the basic health and wellness of children and families in war zones. The organization is dedicated to giving children a healthy start, the opportunity to learn and protect them from harm.

Save the Children's HEART program (Healing and Education through the Arts) uses an arts-based approach to provide support for children ages 4 to 18 that are living with daily uncertainty or worry because of lack of a safe place to live, enough food to eat or doctors to help them when they are sick or disabled. These conditions are most likely to occur in countries or regions where there is war, conflict and poverty. Currently, HEART is offered in the nations of Jordan, Occupied Palestinian Territories, Egypt, Lebanon, Turkey, Bosnia Herzegovina, Ukraine, Malawi, Uganda, Tanzania, Haiti, El Salvador, Mexico, China, Armenia, Albania and Georgia.

Through HEART, the healing process begins when a child shares his or her memories and feelings. Sometimes, it can be hard to talk about difficult feelings or worries. Stress lives in the brain and can actually act as a wall between the part of the brain that holds our worries and fears and the part that helps us to talk about them. Creating a piece of art, like a drawing or a sculpture, can help to break down that wall and express those worries. In the HEART program, children can use art to express their worries and fears with a trusted adult or peer in a safe space. As

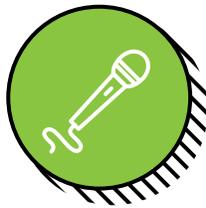
a result, they feel more connected to the people around them. This is because of the unique ways that arts activities change the brain for language development and emotional learning.

HEART takes place in community centers, pre-schools, primary schools and after-school programs. As children become healthier and more engaged with their peers, adults and family members, they are better able to enjoy the full set of HEART activities like using drama to teach history; sculpture and physical modeling to teach geography; music to reinforce concepts of math; and book making and storytelling to support literacy.

Arts-based activities can help young people succeed in their school subjects and their relationships with friends and adults, too. When compared to similar young people who do not participate in the HEART program, HEART participants make greater gains in literacy, math, social-emotional development and motor skills. In short, they do better in their school subjects and are less likely to have behavior issues that limit their relationships and potential. This is because of the unique ways that arts activities change the brain for language development and emotional learning.

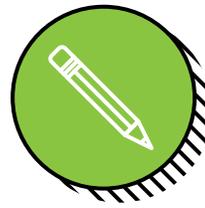
In the last five years, the global HEART program has given more than 150,000 young people the opportunity to heal, learn, explore and thrive through arts-based activities. During times of chaos and uncertainty, something as simple as a safe, friendly space to draw can be life-changing for young people living with chronic stress.

Try this:



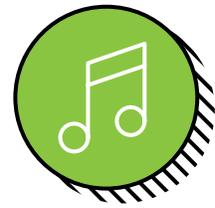
SING

Sing your favorite song loud and clear. How do you feel?



DRAW

Draw a picture of a feeling. What did you draw?



DANCE

Play your favorite music and dance around. Do you feel less stressed?

Science of the arts



Some causes of toxic stress: poverty, violence, illness, natural disasters, abandonment and conflict.



Chronic stress when we are young can have negative effects on health as adults.



The amygdala (center of the brain for emotions) in young kids is changed by stress.



Artistic expression reduces levels of cortisol, the stress hormone.



Touch, mold, create – playing with clay stimulates neural sensory inputs.

Read about it

Beautiful Oops
Barney Saltzberg

Chill and Spill Art Journal
Art with a Heart
(Seattle, WA)

High-tech healing

BLAM – BRAIN, LEARNING, ANIMATION + MOVEMENT

John Krakauer, M.A., M.D., directs the Brain, Learning, Animation and Movement Lab at the Johns Hopkins University School of Medicine. Dr. Krakauer's research explores the use of immersive video games in stroke recovery.

How does your work fit into the field of neuroaesthetics?

JK: A stroke is a brain injury, and right after an injury, the brain is what we call "plastic." That means it is able to change and adapt as a result of that experience. So, it's important to get patients moving quickly and meaningfully after a stroke to take advantage of that "plasticity." We believe that beautiful and rewarding experiences can motivate people to move, and therefore help people to recover faster. People enjoy certain kinds of movements more than others. That's why people like to play sports and dance, because they enjoy the movement itself. It's like when you put your hand out of the car window to feel the air. You enjoy that movement of the air over your arm.

How are you using reward and motivation in your work at BLAM?

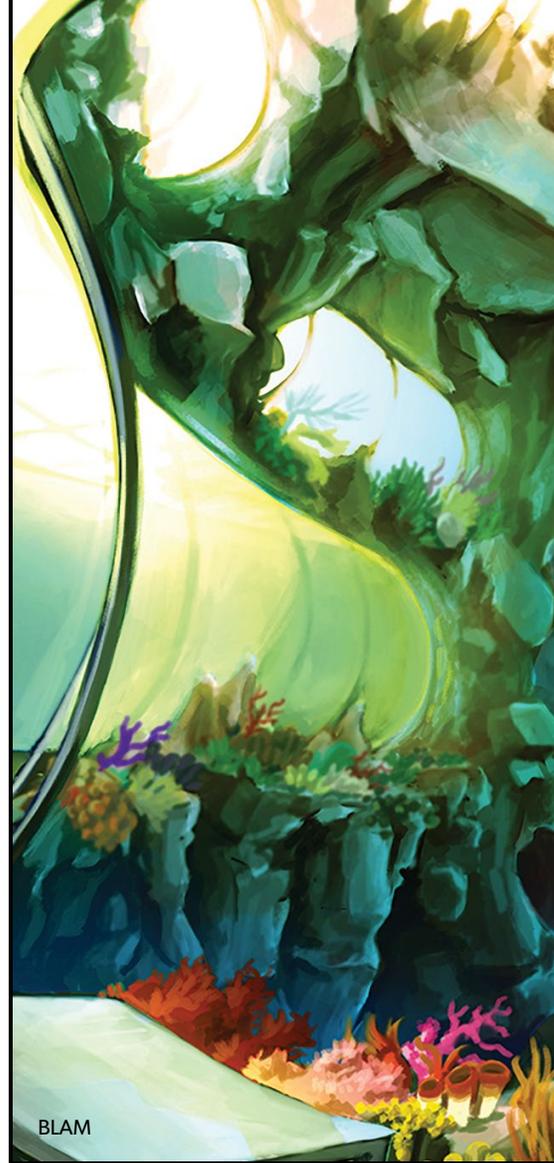
JK: People are more motivated to move when they get enjoyment out of the movement, and many of our physical therapy and rehabilitation exercises and

settings today just aren't motivating or rewarding. We're combining what we know about learning and brain plasticity with what we know about what people love to watch for fun, like Pixar movies for example, to promote faster recovery for stroke patients.

Our research is based on the notion that swimming, oceans, the color blue and dolphins would all be appealing to most people in an immersive game world. Someone might want a killer whale or dragon instead of a dolphin, but the underlying concept is similar. We're currently conducting what's known as a trial, or a first study. Patients who have recently had a stroke, and therefore have limited movement in their

"We're combining what we know about learning and brain plasticity with what we know about what people love to watch for fun, like Pixar movies for example, to promote faster recovery for stroke patients."

John Krakauer



arms, get to "become" a dolphin in three weeks of training in our immersive video world. We have an exoskeleton, a kind of simulator, and the patients put their arms in it and use it to power the dolphin in the virtual world. It helps them move their arms much more than they normally would to encourage exploration when their brain is plastic. We have about 21 patients enrolled at this point. Hopefully we'll have about 30 patients by the end of the year.

How are you dreaming big about neuroaesthetics?

JK: Imagine there was science behind the art you see in schools and offices, or the music and design of a hospital room. In those environments, you'd do better work. You'd have better outcomes. That's what neuroaesthetics is all about.



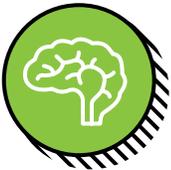
Read about it

- ***The MindShift Guide to Games and Learning***
Jordan Shapiro
- ***Virtual World Design and Creation for Teens***
Charles Ryan Hardnett

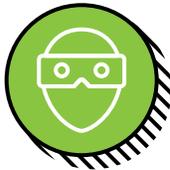
Try this

Play your favorite animated movie and dance to the move with the characters. How does this feel?

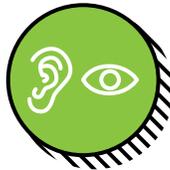
Science of the arts



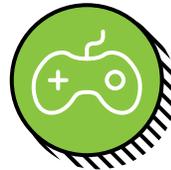
fMRI brain scans show reductions in pain-related brain activity with patients who use virtual reality.



Virtual reality therapy has been shown to evoke changes in the limbic and visceral brain circuitry.



When your brain receives an audio-visual stimulus, the sensory information travels to the thalamus (the relay station) that forwards the information for processing.



Playing an animated video game can improve the ability to take on more tasks by increasing attention and focus in the game.



Some brain-machine interfaces (BMI) can help increase cortical and spinal cord plasticity for disabled patients.

Coloring outside the battle lines

—
CREATIVE FORCES



When most of us get sick, we go to the doctor and get medicine. But what if pills and syrups couldn't make you better? Your doctor might prescribe something totally unexpected: art.

For many military service members coming home from overseas deployments, the joyful reunions we see on the news are just the first step in a very difficult journey of trying to adjust to life at home after experiencing the traumas of war. Although they may look healthy on the outside, many service members come home with invisible wounds.

"Very often there are very small tears in a brain that you can't even see unless you have a magnified brain scan," said Bill O'Brien, senior adviser for innovation at the National Endowment for the Arts. "It makes it hard for them to remember things. They are fearful or angry for no reason, and it really impacts the family."

Creative Forces: NEA Military Healing Arts Network is a partnership of the National Endowment for the Arts, the Department of Defense and the Department of Veterans Affairs that includes a creative arts therapist as part of a team approach to helping heal service members and veterans who are confronting the wounds of war. Service members, most of who have been on multiple deployments overseas, take their daily dose of art therapy (writing, mask making, music) right alongside other therapies like acupuncture and K-9 therapy. The program is also offered to family members who are learning to deal with the effects of the injuries on themselves and their loved ones.

A popular TED Talk with Melissa Walker, art therapist at the National Intrepid Center of Excellence, one

of the Creative Forces clinical sites, paints a vivid picture of the mask-making process and how it unlocks traumatic experiences. Walker says mask making has been a particularly powerful therapy for post-traumatic stress disorder, helping service members turn their private nightmares and painful memories into something that can be shared and, hopefully, released. One service member shares how he was finally able to let go of trauma that he had kept bottled up inside for 23 years.

Creative Forces is also turning to technology to reach and appeal to a broader audience, working with the University of Florida on a new "telehealth" program that can bring art and music therapy into homes through the power of technology. Building on an initial in-person meeting, the telehealth program will use specially designed tablet computers for virtual therapy sessions designed to feel just like being in the room together. Creative Forces knows integrating technology is critical to its success in other ways, too.

"How a person pursues art in the 21st Century is changing," O'Brien says. "Many service members are interested in producing their own music, for example."

Digital technology used for photography, videos and music recording provides Creative Forces a scalable way to bring the healing powers of the arts and creative expression to all service members, veterans and families who need it.

Science of the arts

The brain becomes intensely engaged when creating art.



Doodle away – it activates the prefrontal lobe and helps short-term memory.

Visual arts can lower amygdala activity resulting in stress reduction.



Art activities can help soothe your alert system and enable the prefrontal cortex to focus on thinking and planning.

The arts help the brain focus and avoid distractions.



Read about it

Drawing is Thinking
Milton Glazer

Secret Garden: An Inky Treasure Hunt and Coloring Book
Johanna Basford

Try this

Doodle while listening to music.

Create a mask of yourself.

Draw a self-portrait and describe what you created to a friend.

Art + architecture as medicine

JOHNS HOPKINS HOSPITAL

Most images of hospitals are of sterile white hallways and fluorescent lights. But when Johns Hopkins Hospital set out to add 1.6 million square feet of new state-of-the-art facilities across a five-acre site, they put art and aesthetics at the forefront of healing. The Hospital's Facilities staff worked with Perkins+Will, architects, landscape designers, engineers and artists to design a set of buildings that combine patient experience and medical care, taking into account the healing benefits of aesthetics, such as color, open spaces, green spaces and a lot of natural light.

The two new facilities, the Charlotte R. Bloomberg Children's Center and the Sheikh Zayed Tower, can be seen from miles away. To create a welcoming exterior, artist Spencer Finch took inspiration from French Impressionist artist Claude Monet's famed painting of waterlilies and his own observations of light and color at Giverny, creating a new alphabet of 26 shades of colored glass (greens for the Zayed Tower and blues for Children's Center) to project the serenity of nature onto the East Baltimore skyline. Finch drew from Monet's brushstrokes to create his own pattern that is fused onto the building's curtain wall, reflecting light and mimicking the rippling effect of water.

Inside, both buildings are filled with art and intentional design features meant to

enhance the patient and visitor experience. Just beyond the Children's Center entrance is a gigantic rhino sculpture with a baby rhino standing on its back. Floating above the main entry stair of the lobby is a school of puffer fish. A purple winged cow, heading towards a ring of the 28 phases of the moon, flies above the visitor's information desk at the main entry. Such whimsy and fun can make a hospital stay or visit feel more like a trip to the museum.

To further stimulate the imagination and curiosity of pediatric patients, more than 140 of the works of art created for the Bloomberg Children's Center are inspired by children's books, including seven dioramas found throughout the hospital. These displays include artist Jennifer Strunge's whacky cloth creatures, all reading or being read to. The dioramas serve a dual purpose, providing location clues to navigate the hospital and encouraging patients, their families and the rest of the hospital community to find and explore the other works of art in the building that were inspired by the books on display.

More than 50 artists shared their personal perspectives on nature and the garden for the art in the Zayed Tower. Some focused on the delicate details of petals and rocks, and others took a broader view of landscape. Outdoors, the gardens

serve as places to meet, rest and relax. Many of the plantings, including varieties of lavender, rosemary, barberry, rose and magnolia, were chosen for their ancient associations with healing. The landscape architect, OLIN, developed the design so that patients, families and visitors looking down from the building could enjoy the patterns and colors of the courtyard gardens. The meditation garden, intended as a place of calm and quiet, is graced with gentle water features, sculptural trees and patterned stonework.

By combining art and architecture with medicine, Johns Hopkins Hospital is taking care of patients—mind, body and spirit.

Portions of this article were excerpted with permission from the Johns Hopkins Hospital's *Art + Architecture* book.

Read about it

- ***The Story of Buildings: From the Pyramids to the Sydney Opera House and Beyond***
Patrick Dillon and Stephen Biesty
- ***Healing Architecture***
Christine Nickl-Weller and Hans Nickl



(c) 2012, James Steinkamp, Steinkamp Photography

Science of the arts

- Meditation areas in buildings help keep you calm by activating the lateral prefrontal cortex in the brain supporting rational thought.
- Patterns in brain activity vary when viewing different types of interior spaces.
- Cortisol levels drop in low light. Natural light helps decrease stress.
- Viewing the outdoors is linked to improved mental and physical health in terms of heart rate and stress levels.
- When spaces are designed to increase physical activity, the environment can actually increase brain neurons and improve brain function.



Eduard Hueber



Eduard Hueber



Try this

- Visit three of your favorite places. Observe how they make you feel.
- Where did you feel the most calm?
- Which one felt the most stressful?
- How did the colors in the space make you feel?





WELLBEING

— *the arts keep us healthy* —

**“The broader one’s
understanding of the human
experience, the better design
we will have.”**

Steve Jobs
Co-founder of Apple

Use your hidden superpowers!

Richard Louv

Did you know you have supersenses – or superpowers?

Scientists who study human perception no longer assume we have only five senses: taste, touch, smell, sight and hearing. They now estimate that humans have, conservatively, 10 senses, and some scientists believe we have as many as 30 senses, including proprioception (awareness of our body's position in space), echolocation and a more acute sense of smell. Spending more time outdoors can activate or tune underused senses, including ones that many of us don't realize we have. Here are 10 ways you can build your senses – your superpowers:

1 PICK A "SIT SPOT." Jon Young, one of the world's preeminent nature educators and coauthor of *Coyote's Guide*, advises children and adults to find a special place in nature, whether it's under a tree at the end of the yard, a hidden bend of a creek or a rooftop garden. "Know it by day; know it by night; know it in the rain and in the snow, in the depth of winter and in the heat of summer," he writes. "Know the birds that live there, know the trees they live in. Get to know these things as if they were your relatives."

2 CLIMB A TREE. A tree, like any good friend, can teach us how to know the world, and even how to be safer. A tree can stimulate your vestibular (balance) senses and offers a natural touch experience.

By listening to the languages of the birds in the tree, you can stimulate spatial awareness, hearing and sight.

3 GO ON A MICRO-HIKE. Inch along on your belly, covering just a few feet, and view "such natural wonders as grass blades bent by rainbow dewdrops, colorful beetles sprinkled with flower pollen and powerful-jawed eight-eyed spiders," suggests Joseph Cornell in his book, *Sharing Nature with Children*.

4 ROTATE THE SENSES. Don't fixate; vary your sensory awareness. "If you pay rapt attention to one thing, it will dull your senses ('highway hypnosis')," according to Princeton University's Outdoor Action initiative. "Flash back and forth through your various senses."

5 BE A BAREFOOT EXPLORER. In 2010, Britain's *The Guardian* newspaper reported "a growing belief among experts" that "the best shoe may be no shoe at all." Some podiatrists contend that walking barefoot develops foot muscles, ligaments and arch strength and (where sharp objects aren't present) can actually be safer than wearing shoes, especially flip-flops. One reason is that going barefoot improves proprioception — awareness of where we are in relation to the space around us. Barefoot walkers are more likely to look down, to take

care where they step and are less likely to fall. Walking barefoot also enhances awareness of texture and terrain.

6 FIND YOUR INNER BLOODHOUND. Researchers at the University of California, Berkeley, wondered if human beings could follow a scent trail with their ears and eyes covered. The researchers found that not only are humans capable of scent tracking, but they intuitively mimic the tracking pattern of other mammals that make their living with their noses. Simply wetting one's nose can stimulate the sense

"There is a sixth sense ... that is the sense of wonder."

D.H. Lawrence

of smell. Here's another way: walk through the woods or a field, or along a creek, and report what you smell — list and describe these smells in a nature journal.

7 LEARN TO USE A SNAKE TONGUE, DEER EARS OR OWL EYES. Heather Stephenson, in an essay for the Children & Nature Network, suggests using your "snake tongue." She writes,



Richard Louv

“try tasting the air, seeing which way the wind is blowing, and sensing the temperature....Cup your hands around your ears to listen to what’s in front of you, or cup them backward to hear what’s behind you better, imitating the way deer shift their ears to hear....Then look with ‘owl eyes,’ forming binoculars with . . . your hands to imitate owls’ fixed, forward-facing eyes, and turning all around.”

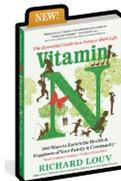
8 TAKE THE TRAIL LESS SEEN. Blindfold your friends and follow a rope (placed in advance) through varied terrain in which they can smell, hear and feel things. Retrace your steps without the blindfold to see how much more you notice. Or, while on a walk, stop and close your eyes. Ask yourself and your friends, “What direction are the clouds moving?” and “Were there any birds in the tree we just passed?”

9 BE A BATWOMAN OR BATMAN. Echolocation is the system bats use to navigate in the dark. In 2009, researchers at Madrid’s University of Alcalá de Henares showed how people, like bats, can identify objects without needing to see them, through the echoes of human tongue clicks. According to the lead researcher, echoes are also perceived through vibrations in the ears and bones.

10 GO ON AN AWARENESS WALK. The practice of an “awareness walk” is similar to Jon Young’s sit spot, but with more emphasis on walking meditation. Jini Reddy, in an article for the Telegraph, writes about walking through the dunes of a national nature reserve: “Ordinarily on such an outing, I’d be chattering away with friends, loaded down with beach gear. But today I’m light-footed and as silent as a ghost. I can see my companions, as we’re all

walking in single file, a discreet distance from each other. Have we dramatically fallen out? Perish the thought: we’ve all signed up for a day of mindful walking.”

These are just a few of the ways you can stop, look, listen and know the natural world and yourself. You can use your rediscovered superpowers to feel more alive, and to give more art, thoughtfulness, and peace to the world.



Richard Louv is the author of *Vitamin N: The Essential Guide To A Nature-Rich Life*, from which this essay is adapted, *The Nature Principle*, and *Last Child In The Woods: Saving Our Children from Nature-Deficit Disorder*. He is co-founder

and chairman emeritus of the Children & Nature Network. Follow Richard Louv on Facebook and @RichLouv on Twitter.

Developing empathy

Ashfaq Ishaq

How do you develop empathy among 9 to 12 year olds from more than 70 countries in just three days? Bring them to the World Children's Festival (WCF) on the National Mall.

The WCF is a three-day experience for 2,000 creative young people and the public in Washington, D.C., organized by the International Child Art Foundation (ICAF). I founded ICAF after learning that creativity is critical for success in business, yet many adults lack it. If all children start out creative, where does it go? I found a scientific explanation in the studies of E. Paul Torrance who discovered the "4th-grade slump" in children's creativity. I believe this slump is a roadblock to human creative development and an impediment to sustainable prosperity and peace-building.

To optimize a child's creative potential, we developed the Arts Olympiad, a global program with a four-year cycle like the Olympics. In the first year, students produce original artworks on themes as part of a school art contest. In the second year, regional or national exhibitions of local winners' masterpieces provide communities an opportunity to celebrate

their children's creativity. In the third year, the WCF provides a setting of global community to celebrate creativity, diversity and unity. In the fourth and final year, the International Arts Olympiad Exhibition travels to host cities to grow public awareness of the importance of children's creative education.

While the Arts Olympiad fosters creativity, the WCF develops empathy. Intercultural empathy does not come easily and yet it is more essential today than ever before. Here's how we do it:

DAY ONE: DISRUPT BIASES

All children are faced with cultural biases, whether living in a war zone or a peaceful country. On this first "Health & Environment Day," delegates from around the world get to meet, paint and draw together, testing art as a universal language, often surprised at the concerns they share together. By the day's end, they realize they have much in common, despite their apparent differences.

DAY TWO: DEVELOP TRUST

On "Creativity & Imagination Day," professionals of all kinds from architects and animators to Olympians and yoga masters host workshops and activities. Children come to understand their own creativity and learn how to grow their imagination and enhance their potential. By the end of the day, they feel more confident in themselves, realizing that their personal creativity can be applied to any field or domain, be it in business, government or science.

DAY THREE: BE THE CHANGE-MAKERS

On "Peace & Leadership Day," all workshops and activities focus on interpersonal relations, peaceful resolution of conflicts and leadership training. The delegates become prepared as global citizens, collectively participating in activities such as mural-making to co-create masterpieces. From the host of activities and workshops, delegates learn that creativity and empathy are key attributes of successful learners and leaders. After attending the WCF, children feel more equipped to bring about positive social change in their respective communities.

Following three days of educational festivities on the National Mall, the delegates are honored at an Awards Banquet, where youth leadership shines.

Ashfaq Ishaq is ICAF chairman and WCF producer. He is planning the 6th WCF to take place on the National Mall in June 2019.

Read about it

The Creativity Revolution
Ashfaq Ishaq

www.WorldChildrensFestival.org

<http://scholarship.claremont.edu/steam/>

Try this

Close your eyes and imagine a peaceful world. What would it look and feel like? Create a picture of your world using markers, collage or paint.



Science of the arts

1

Part of the cerebral cortex, the right supramarginal gyrus, helps us act with empathy.

2

The activation of mirror neurons fire both when we perform an empathetic action and when we see that action being performed by others.

3

The inferior frontal gyrus in the brain is responsible for emotional empathy – “I feel what you feel.”

4

The ventromedial prefrontal gyrus in the brain is responsible for cognitive empathy – “I understand what you feel.”

5

Empathy can be cultivated and developed through all art activities and experiences.



World Children's Festival



World Children's Festival



Vlad Tchompalov / unsplash.com

Signs of the times

Erin Cooper

On November 8th, 2016, my sister, mother and I donned white pantsuits in a nod to the suffragettes who fought nearly a century ago for a woman's right to vote. We put on the earrings, bracelets and brooches of my grandmothers and great-grandmothers, wearing with us generations of women who never got the chance to vote for a female President of the United States as we went to the voting booth together.

Hours later, the results of the 2016 election shocked the nation, even those who supported Donald Trump. To me, a high school junior, it felt impossible to understand a nation that once said "give me your tired, your poor, your huddled masses yearning to break free," now seemingly shutting its doors.

In the months following the election, I was overwhelmed by the steady stream

of grim headlines. When I heard about the Women's March on Washington, I latched onto the idea. Protesting in defense of human rights and dignity felt like a meaningful and tangible action—a way to tell the incoming administration that we would not be displaced from our values.

I petitioned my school to organize a trip for students to attend the march and received approval along with a 60-seat school bus for the five-hour trip from New York to D.C. I plastered the school with posters and promoted the trip to students and teachers. The sign-up sheets filled up, and on January 21, we arrived at school at 4:00am, boarded the yellow school bus and took off.

As we emerged from the metro in Washington, D.C., the streets pulsed with life and passionate energy, worlds away

Read about it

The Day the Crayons Quit
Drew Daywalt

It's Our World, Too!: Young People Who Are Making a Difference: How They Do It - How You Can, Too!
Phillip M Hoose

"I believe we all have a role to play, that our passion, voices and efforts to be heard—whether attending town halls, protesting or engaging in other ways—are all incredibly important to the future of our country."

Erin Cooper

from the negativity of the past months. Marchers championed LGBTQ rights, women, refugees, immigrants, racial



Make your own signs!

What would you say?
 What do you want to communicate?
 Where would you use them?
 What pictures best illustrate your message?

justice, the environment and access to healthcare. Chants of “We want a leader not a creepy tweeter” and “The people united will never be defeated...el pueblo unido jamás será vencido” reverberated against the surrounding buildings. I had never felt more at home in a crowd of strangers.

The witty hand-drawn signs and the original music written for the march (check out MILCK’s performance of her song “Quiet” at the march) were emblematic of the passion so many people feel for preserving human rights and the wellbeing of the planet. After a full day, we found our way to our school bus and drove home to New York, talking about our favorite moments of the day and thinking ahead to what we could do next.

We learned that 500,000 people marched in Washington, D.C., and a total

of 5 million people joined 673 marches in 81 countries worldwide across every continent. It was the largest single-day protest in U.S. history.

I believe we all have a role to play, that our passion, voices and efforts to be heard—whether attending town halls, protesting or engaging in other ways—are all incredibly important to the future of our country. Resistance comes from a place of creativity and refusal to give in to the powers that be. The road ahead is long, but we are in it together.

Erin Cooper is a Junior at Riverdale Country School. Devout feminist, she takes her nose out of Gloria Steinem chronicles for long enough to attend a soccer practice (or six) each week. Erin is an aspiring artist and engineer.

Science of the arts

- 1 More than emotion - speaking out activates sections of the brain related to logic and reasoning.
- 2 Like minds, when people work together their brains have neural synchrony.
- 3 Speaking out or expressing fears lessens negative arousal in the brain.
- 4 Use rhymes with prosodic patterns and people will remember your message.
- 5 Advocacy and activism can make you feel happier by taking action.

The art + science of architecture

Fred Marks

Have you looked at a round building such as yurt or tepee and wondered what it would be like inside? How do you hang cabinets on a curved wall made of mud and grass or buffalo hide? Where would the furniture go to accommodate various purposes? Would you be comfortable in a shape that had no square corners? Different designs stimulate emotional centers in the brain and change how we perceive or react to being in the space. Our past memories of seeing and experiencing many types of buildings also influence how we feel about something new. In understanding how the brain operates, architects may soon change the way they approach their design to our benefit.

FORM AND FUNCTION

Architecture is the art or practice of designing and constructing buildings. It is unique among art forms because it has both aesthetic and practical purposes, also known as “form” and “function.” That means a building can be a beautiful and moving sight to see as well as a necessary place to stay warm or cool.

There are many factors, both artistic and scientific, that influence how a building is designed and constructed. In recent years, there has also been a growing interest in designing buildings that will contribute to the health and wellness of the people who live and work in them or visit them. After all,

modern people spend most of their time indoors. Such designs may enable hospital patients to recover faster, students to learn better or office workers to be less tired and more focused.

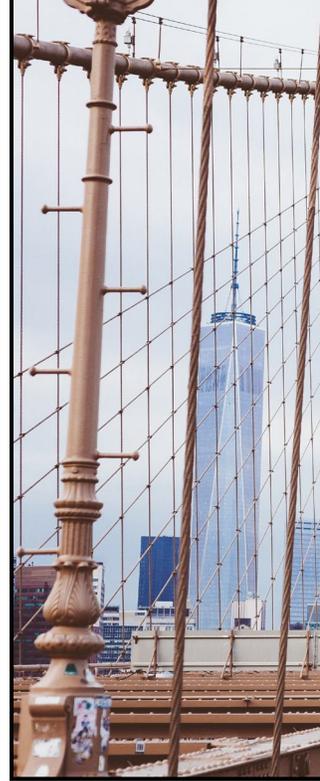
While painters, sculptors, musicians and dancers have a lot of control over how their art looks when finished, architects must work with a number of collaborators, including multiple engineers, designers, public officials, citizens and even banks who all have a say in the final design. While a sculptor might need to understand a little chemistry to get the right mix of materials for a mold, architects must follow strict laws of physics, chemistry and mathematics just to make sure we are safe and protected. Combined, those principles ensure that a building can stand up and stay dry from the weather, among many other things.

Architects also rely heavily on function in determining their design. How a building comes to be one size and shape often depends on what activities will take place inside and how many people will use it. A sports stadium, for example, needs a large common space with a playing field, seats for spectators and many pathways for walking in and out. A family home, on the other hand, is likely to be much smaller and tailored to a family’s needs to eat, relax and sleep in one building. Before an architect can start working on a design, he or she must identify and describe a problem to be

solved. Without this definition, a focus on the form (the way the building looks), might be the enemy of the function (how it works).

AESTHETICS AND CULTURE

In the best cases, the function and form of a building work hand in hand. With a clearly defined function in mind, an architect can work with his/her partners to achieve an appealing form through techniques that tap into our natural preferences and instincts as humans. For example, our brains and eyes prefer to see rhythmic repetitions, simple forms and orderly patterns found in nature, such as leaves. Without patterns, we may become uneasy and disoriented. Repeating patterns in tile and stone work, consistent ceiling heights and symmetry in windows and doors are all examples of how architecture adheres to this principle. Still,



Read about it

The Future Architect's Handbook

Barbara Beck

Iggy Peck, Architect

Andrea Beaty and David Roberts



Brandon Day / unsplash.com

there is room for the element of surprise and wonder in design. Imagine an all-white building with a single red door. That door could both entice your interest and help you know where to enter a building.

All cultures have sought to express themselves through their buildings, and buildings have in turn helped shape social attitudes. Throughout history, architecture has changed in style based on the availability of materials and technology and the customs and tastes of the time. Western civilization lists Greek, Roman, Byzantine, Romanesque, Gothic, Renaissance, Baroque, Neo-Classical and Modern as distinct examples of artistic expression. Middle Eastern and Asian countries developed other approaches to dressing their buildings based on their beliefs about religion and the human role in nature.

More recently in the United States, we have found that we don't need to tear down old buildings from earlier centuries just because their original purpose is no longer needed. We can practice sustainable development by finding new uses. By expanding the meaning of what is possible and acceptable a canning factory may become residential apartments, a train depot may serve as a museum or a school building may be converted to business offices. In accepting the design change, our brain will be in harmony with what the architect most likely intended.

Frederick Marks, AIA, LEED AP BD+C, Six Sigma Green Belt; Visiting Scholar, Salk Institute for Biological Studies; President-elect, Academy of Neuroscience for Architecture

The mission of the Academy of Neuroscience for Architecture is to promote and advance knowledge that links neuroscience research to a growing understanding of human responses to the built environment.

The Academy benefits from the expanding body of research that has evolved within the neuroscience community in the last two decades, and the promise of even more in the coming century. Some observers have characterized what is happening in neuroscience as the most exciting frontier of human knowledge since the Renaissance. All humanity stands to benefit from this research in countless ways still to be determined. The profession of architecture has become a partner in developing the application of this knowledge base in order to increase its ability to be of service to society.

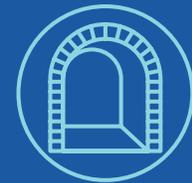
Try this

- What are two things you can adjust in your room to help you relax and sleep better?
- Make a list of five of your favorite places. List how each of these spaces make you feel.

Science of the arts



Look up! High ceilings activate structures in the brain related to our visual-spatial perception.



Don't box me in. Studies show more positive responses when people are in places with curvy versus linear space.



Our perception of a place, whether we like it there or not, is related to what we see, smell, touch, hear and feel when we are there.



What we learn from neuroscience (exploring the brain) and neuroaesthetics (how art affects the brain) helps us create places where people will love to work, live and play.



Hush! Light and noise levels affect an infant's critical sensory development.



WideAngle Youth Media

A new lens on high school

WIDE ANGLE YOUTH MEDIA

The high schoolers in the Mentoring Video Project (MVP) program at Wide Angle Youth Media in Baltimore aren't afraid to take on difficult topics. In fact, that's their job. This year, the student filmmakers discussed a long list of issues facing teens and their community as they considered the direction for their

documentary film projects. In the end, violence and teen depression rose to the top as the most pressing issues to tackle.

With a goal to educate and change the hearts and minds of their families, friends, city leaders and school counselors, they split into two teams to begin their interviews. From the start, MVP filmmakers

knew that teens would relate most to the perspective of other teens and that serious topics would require expert voices to lend credibility to their stories.

In some cases, the filmmakers interviewed fellow MVP students about their personal experiences with violence and depression, often touching on private and



painful experiences. In post-production, those tearful and honest stories replayed again and again as student editors worked to piece together the video’s narrative. The

The safety of relationships at MVP opens up the doors to learning a number of unique skills, like using cameras, lights, sound equipment and digital editing tools. MVP students learn research and interview skills. They also write, a lot, and transcribe and edit their interview scripts into cohesive and compelling stories.

degree of openness and understanding among MVP students is surprising given that they just met at the beginning of this school year.

They credit the comfort and respect they feel to their first assignment: telling their personal stories. Students were asked to create videos that responded to three prompts: the hardest lesson they learned as a child, the most difficult obstacle from the past year and their proudest accomplishment. They screened their stories for their families and friends. They surprised even themselves with how much they were willing to share.

“I’m usually reserved, but I wasn’t afraid to be myself,” said 11th grader Michelle White. “It’s important to be honest.”

It wasn’t just sharing and hearing their personal stories that made them feel safe in the program.

“Without Ms. Kellie, I wouldn’t have gone that deep,” says Michelle. Her peers in the program are quick to agree that the staff at MVP is caring and encouraging. “The best part is that the people here will listen to you if you’ve had a bad day,” said 10th grader Marc Cruise.

The safety of relationships at MVP opens up the doors to learning a number of unique skills, like using cameras, lights, sound equipment and digital editing tools. MVP students learn research and interview skills. They also write, a lot, and transcribe and edit their interview scripts into cohesive and compelling stories.

They’ve learned a lot about teen depression and violence and say there are many misconceptions about both. Depression is serious. It’s not just having a bad day or being tired. It’s not something that just passes. And violence in inner cities is not always about drugs. In fact, it’s often about anger, about not knowing how to cope with a difficult or hurtful situation.

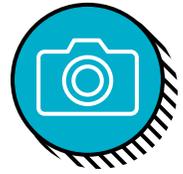
Their newfound expertise might come with one downside. “My mom hates watching movies with me now,” says 9th grader Ayanna White. “I am always pointing out the issues with continuity.” Still, it’s safe to say the program has had unexpected benefits. By turning the lens on others, MVP filmmakers have gained important insights into themselves.



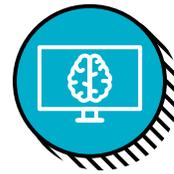
Science of the arts



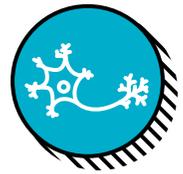
Self-expression for teens positively affects the hippocampus, prefrontal cortex and amygdala parts of the brain.



Mentally challenging activities, such as digital photography, improve memory and enhance neural efficiency.



Neurocinematics, a term coined by Uri Hasson, investigates how the brain responds to movies using an fMRI brain scanner.



Movies trick our brains to reacting as if events were real by activating “mirror neurons.”

Try this

- Everyone has a story to tell.
- Use a camera, a smartphone or tablet to create a digital storyboard or video of your point of view.
- What do you want to say?
- What is the best way to communicate?
- Share with friends and family and ask for their impressions.

Tools for any trade

ART WITH A HEART

Sarah Pitcock

Walking into the Art with a Heart store and workshop space is like opening up the windows for the first time after a long winter. The airy, light-filled former police stable is decorated from floor to ceiling with handmade crafts and works of art. Dozens of mirrored mosaics bounce bright colors from wall to wall. It's easy to see how the time spent here can be so restorative. Art with a Heart is more than a place to learn art and crafting skills, though its 11,000 community classes are certainly popular. It's a place where many young people come to make a major change.

"Antonio and me, we're woe," said Ashley Knofski, a recent graduate of Art with a Heart's jobs program, using a slang term for "best friend." "He wants this as much as I do." What is "this?" I ask. "A life," she says.

Ashley is 21 years old and experiencing homelessness. She and Antonio know each other through their connection to Youth Empowered Society (YES), a nonprofit that provides youth experiencing homelessness with a comprehensive set of health, education, housing and employment services. Art with a Heart works with groups like YES, providing jobs and training to their clients.

"The first week's paycheck felt so good," she said. "I have a job, something to wake up to and look forward to."

Ashley tells me she likes meeting new people. She's the funny one, and she's great with foreigners. It hardly sounds like the person who walked in the first day of the program.

"Youth come in very angry at where they are in life," says Christina Ralls, director of workforce development and social enterprise for Art with a Heart.

Art with a Heart is more than a place to learn art and crafting skills, though its 11,000 community classes are certainly popular. It's a place where many young people come to make a major change.

Sarah Pitcock

Ashley shows me the Dr. Seuss-themed table and chair set she's working on for a customer. This project has tested her patience. She is having a hard time painting the lines straight. She tells me she has come close to throwing the chair at the wall a number of times. But, she hasn't. Christina says Ashley might not have been so successful at the beginning of the six-week program. Art therapy has opened the door for Ashley to build deeper relationships and essential coping, communication, workplace and life skills, which are also part of the jobs program.

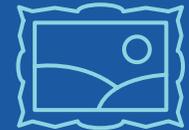
Ashley and Antonio earned the coveted apprentice spots at the end of their jobs program, gaining eight additional weeks of employment and a percentage of the sales of all of the art they make. Ashley is studying for her GED diploma and thinking about careers, perhaps something in the culinary arts. Though she's not interested in becoming a professional artist, the skills she's learned can be applied anywhere.



Science of the arts



Feeling good - when you produce art you increase the neurotransmitter, dopamine.



Visiting an art gallery can reduce production of cortisol known as our stress hormone.



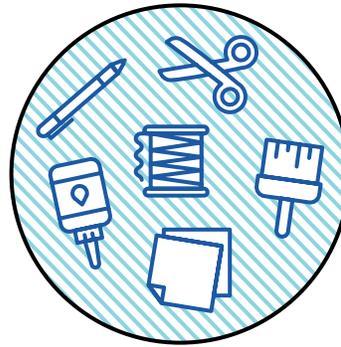
Involvement with the arts can help you get better grades!



When you focus on the type of art you love, you strengthen your brain's attention networks.



Art heals – it helps us to produce healthy levels of cytokines, helping to boost our immune system.



Perhaps most importantly, the relationships and trust she has developed have given her the confidence to believe she deserves something better.

"I've had jobs before where you had to work hard to make your family," Ashley says. "Here, you're family when you walk in the door. It brings out my best side. You can trust people if you put your mind to it."

Read about it

Do You Know Who You Are?
Megan Kaye and Allison Singer

Between Shades of Gray
Ruta Sepetys

Try this

- Think of someone you want to make a gift for. Imagine what you might create.
- What would you need?
- What are the steps for making the gift?
- It could be simple or complex.
- How do you want the person to feel that you are designing it for?
- Making and sharing boosts positive self-image and connection.



The art of good ideas

MICA

For seventh grader Alira Abdullai, it was an open and shut case. She was no artist. “I don’t draw. I’m not artistic. I’m not good at any of that,” she said.

She figured she had no place in an art school, until she was introduced to a program at the Center for Social Design at the Maryland Institute College of Art (MICA).

“I learned you don’t have to be an artist to use the arts to inspire people,” she said.

Students from St. James and John School spend their Tuesdays after school studying design and activism at MICA. Their charge? Design solutions for the problem of underage drinking.

Before digging into their own issue, students studied and met activists who addressed other issues in their communities. De Nichols, a social designer from St. Louis, shared her Sticky Note to Self, Mirror Casket and Design Serves projects. Will Watson, a local artist, shared his mural projects designed to bring hope to communities. For Alira, learning about the power of one person to make a change was inspiring.

Funded by Behavioral Health System of Baltimore, the program introduces seventh and eighth graders to the social design process, giving them the tools to think critically about complex social problems and inclusive solutions for change.

“It’s not enough to say we’re teaching design to make the world a better place,” said project lead Diamond James. “We’re saying these disparities are not accidents. Someone designed this. How can we un-design this?”

Social design requires imagination and creativity, but you don’t have to be an “artist” in a traditional sense. It also requires listening, observing, plenty of team work and the confidence to speak up.

“It’s not enough to say we’re teaching design to make the world a better place. We’re saying these disparities are not accidents. Someone designed this. How can we un-design this?”

Diamond James

Students decided that liquor stores were a major contributor to the issue of underage drinking. According to their research, they attract crowds of loiterers on the sidewalk; often don’t enforce laws or check IDs and sell snacks and candy that attract young people. Still, liquor stores serve a purpose, too. They needed a solution that worked for teens, adults and communities.

Students explored underage drinking a number of ways, visiting local businesses, neighborhoods and government officials; designing cardboard models of community centers and liquor stores and using

improvisational acting techniques to tell stories collaboratively.

They decided to produce a video to educate and inform the community about positive changes liquor stores can make to limit underage drinking, using a combination of text, music, graphic elements and narration to inspire and influence residents and city leaders to take action. Their story will bring problems to life while focusing on solutions when screened at an upcoming town hall meeting.

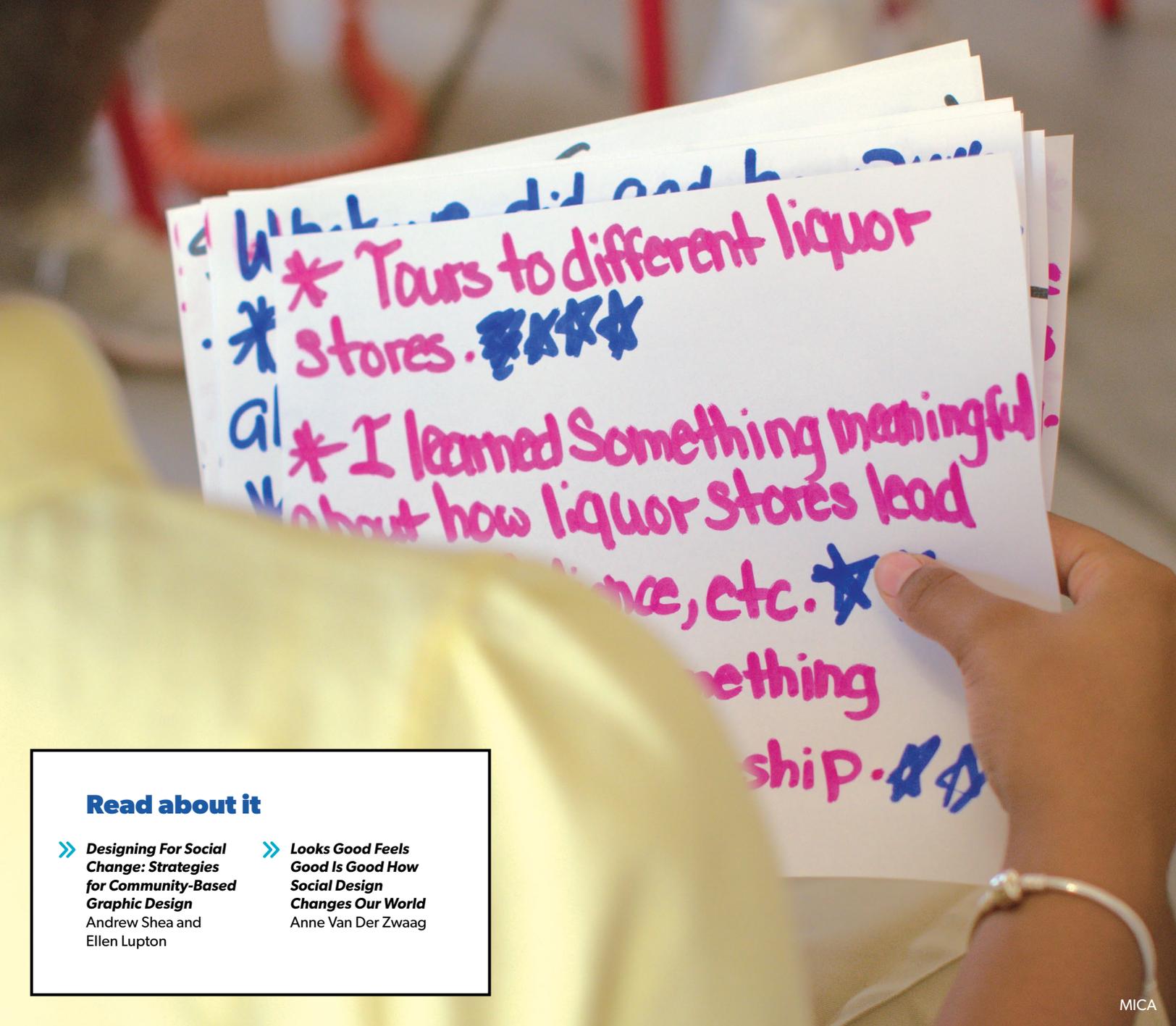
Participants are also working with the Baltimore Good Neighbors Coalition to advocate changes to city law such as the zoning requirements for liquor stores. They’ve learned it won’t be easy to build consensus, but they’ve got the social design tools and experience to stay the course.

Alira offers sage advice for others interested in social design. “If you have a good idea, don’t just keep it in your head. Make it something people can see.”

Try this

Think about something you believe needs to be changed in your community. Safer streets? Better lighting? Consistent quality schools?

Define the problem and create a list of ways you would address it.



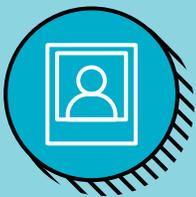
MICA

Read about it

» *Designing For Social Change: Strategies for Community-Based Graphic Design*
Andrew Shea and Ellen Lupton

» *Looks Good Feels Good Is Good How Social Design Changes Our World*
Anne Van Der Zwaag

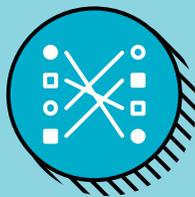
Science of the arts



Images matter. The psychological effect of a direct gaze in a photograph makes the viewer more responsive.



The colors red and blue are linked to enhanced cognitive performance.



We process visual stimuli entering the brain (i.e. faces and words) through pattern matching.



Warning labels can evoke visceral avoidance responses in the brain.



Design thinking is a model for clearly identifying social, education and economic problems and creating solutions.



LEARNING

— *the arts teach us* —

“We do not need magic to change the world. We carry all the power we need inside ourselves already. We have the power to imagine better.”

J.K. Rowling

Novelist, screenwriter, film producer

Going "pro" in beats

ORCHKIDS

Like many middle schoolers, seventh grader Khamani Lewis wanted to be a professional athlete. He was focused on football until an injury forced a pause in his plans. Lewis had at least one lucky break—his school was home to one of six OrchKids programs throughout the city.

"My family and friends are jealous and proud at the same time," Khamani said.

OrchKids is not your old-fashioned band program. The program was created by the Baltimore Symphony Orchestra to bring the love of music into the school day and the high-risk afterschool hours. Starting as early as three years old, more than 1,000 young people across six Baltimore City Public Schools participate in a program that connects them to music and instruments and provides opportunities to compose music and perform alongside professional musicians

through innovative collaborations.

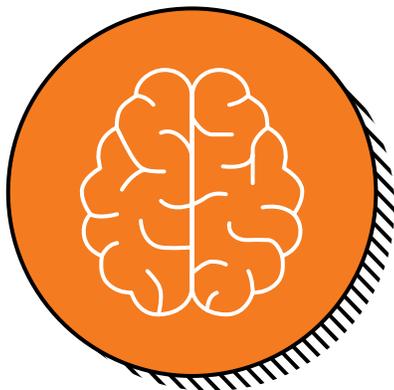
"Young people are the driving force in this program," says OrchKids Artistic Director Daniel Trahey. "Instead of coming in and saying, 'this is the type of music we're going to play,' we ask them what they are interested in to represent their communities and their cultures. The OrchKids program has a more urban feel with elements of hip hop, classical and jazz music," Trahey said.

Traveling to different schools, states and countries to perform and meet other musicians is a big part of the program's goal to grow educated musicians. Students often play side-by-side with professional musicians and write and perform their own original music with their friends. Khamani's brass ensemble is known for playing its remix of "We Got That Fire," a traditional New Orleans second line song that the

group re-interpreted while on a workshop residency at the King School in Connecticut. Trahey recently visited New Orleans to research brass bands for inspiration and authentic sounds for his students.

It's hard to believe, but Khamani has only been playing the drums for two years and has already performed at the Baltimore Symphony Orchestra, written music with musicians from England and performed his first solo under the direction of a professional percussionist. He spends his Saturdays rehearsing with a concert band and taking lessons at the famed "Tuned In" program at The Peabody Institute. He loves the chance to get out of the house and meet new people. He says OrchKids has helped him feel more confident. "Music energizes me," he says. "Sometimes it's hard to stop playing."

Science of the arts



- Music impacts areas of the brain that affect how we pay attention and make predictions.
- Don't forget! Music helps your memory, stimulating neural networks that help sustain attention and cognitive control.
- Keep fit! Music during dinner soothes brain activity and helps you eat less.
- The beat goes on! Slow the beat and the brain goes into meditative state or speed it up and the brain is more alert.
- Heart healthy—music causes tissue in the inner lining of blood vessels to dilate to increase blood flow.

Try this:



Create unique playlists for the things you do – studying, eating, working out and more. Have other family members do the same and share.



Make a homemade instrument to play when you want to change your mood – drum from a bucket or maracas from beads in a water bottle.



Read about it

- » ***The Mysteries of Beethoven's Hair***
Russell Martin and Lydia Nibley
- » ***Story of the Orchestra- Listen While You Learn About the Instruments, the Music and the Composers Who Wrote the Music***
Robert Levine
Meredith Hamilton

OrchKids

Khamani isn't the only one feeling more confident. OrchKids provides near-peer mentoring as early as third grade, with older students serving as mentors for younger students, building confidence and leadership skills. OrchKids participants attend school an average of 10 days more than the average student in Baltimore City Public Schools. Students are motivated to play music with their friends every day and meet report card, behavior

and attendance requirements for the program's travel opportunities.

OrchKids also helps power the brain to handle academic classes and other stressors. "Music promotes flexibility in thinking and abstract thinking because there isn't one right answer," says Trahey. OrchKids is offered in some of Baltimore's most at-risk neighborhoods, where crime and instability can create stress. Trahey says the program creates a space for peace and passion.

Khamani is making the most of the opportunity. He's set his sights on Baltimore School for the Arts for high school, and he'll be practicing and playing every chance he gets. You might not find Khamani catching a football to the sounds of a thunderous crowd, but there's a great chance he'll be creating the thunder in a concert hall near you.

Architecture of learning

LEARNING LANDSCAPES

What does that mean when you hear the statement, “learning is everywhere?” We hope that learning occurs in schools, but did you know kids only spend about 20 percent of their waking time in formal learning settings such as school? What happens the rest of the time? Think about when you play a video game. Are you learning? What about when you figure out the train schedule into the city or the discount at a store? Are you learning then?

A community of researchers over the past 20 years have found that children learn best through play and practice in environments where learning occurs in meaningful context, where children can make choices and are encouraged to follow their interests. They have also found that guided play, where parents and caregivers take advantage of their children’s natural abilities, supports learning within prepared environments that encourage exploration and action. Most of this play and learning happens outside of a school setting.

How do we create informal learning environments for all children? One example is Too Small to Fail’s and Tulsa Educare’s “Talking is Teaching” campaign. The program uses visual images, compelling graphics and engaging art to help parents and caregivers change their interactions with children during everyday events – describing objects seen during a walk or bus ride, singing songs while playing in a park or counting while in the supermarket. These materials are placed throughout the city to build awareness around the benefits of playful learning.

Another innovative approach is Urban Thinkscape. As part of the Learning Landscapes initiative at the Brookings Institution, Urban Thinkscape is one among a number of changes that cities can champion to change parks and other public places into learning environments. The first Urban Thinkscape is being developed in Philadelphia’s Belmont neighborhood. The idea is to marry architectural design with the evidence-based knowledge

designed by architect Itali Palti help caregivers and children talk about what they see happening and help develop curiosity as they play.

The goal of Learning Landscapes is to transform city and public spaces into venues for learning through interaction. “Once we change the lens on how we view everyday environments, we can begin to see the learning potential there. We can design environments that foster

The goal of Learning Landscapes is to transform city and public spaces into venues for learning through interaction.

Roberta Golinkoff

from the science of how people learn. The proposed space will promote curiosity and playful learning and encourage families to engage rather than merely observe.

Imagine a streetlight where when you turn the wheel it projects an animation on the ground and you need to figure out how it works, or playing on footprints embedded in the ground to challenge children to experiment with jumping patterns. These inventive structures



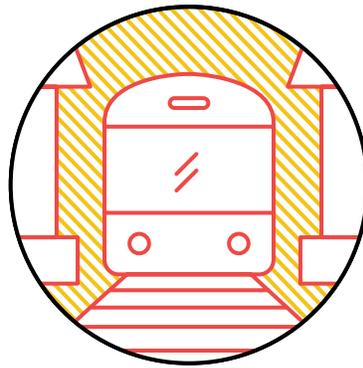
Read about it

- » **Becoming Brilliant: What Science Tells us About Raising Successful Children**
 Roberta Michnick Golinkoff PhD and
 Kathy Hirsh-Pasek PhD
- » **How Children Succeed: Grit, Curiosity, and the Hidden Power of Character**
 Paul Tough

Try this

- Change your lens: Visit three of your favorite places, the laundry mat, the supermarket, the trainstation, your kitchen.
- What knowledge or information in science, math and engineering could you learn at each place?

a breadth of skills—from communication, to collaboration, to critical thinking—on our everyday walks and in our everyday neighborhoods,” said Kathy Hirsh-Pasek, director of Temple University’s Infant Language Laboratory, Stanley and Debra Lefkowitz faculty fellow in the Department of Psychology at Temple University and senior fellow at the Brookings Institution.



Science of the arts



Play changes neuron connections in your brain.



Placing signage in supermarkets increases conversation among families and boosts language development.



Enjoyable play generates dopamine which is made by cells in the brain’s core.



Physical activity activates the brain by creating neural networks throughout the body and making the entire body a tool for learning.



Play has to be nurtured to grow and develop neural pathways essential for deep learning.

The Hokey Pokey: What it's really all about

TOO SMALL TO FAIL

Have you ever wondered why we sing the ABCs? Or why your teacher might set historical facts or state capitals to a tune or rap instead of just writing them on flash cards? It's because music is a wonderful tool for learning and memory. Our brains love the repetition and the rhyming, and they especially love it when we put moves to those grooves.

If you can't get a song out of your head, or can't help dancing when your favorite tune comes on, it's not a bad thing! Researchers have found that music is important, especially for babies and

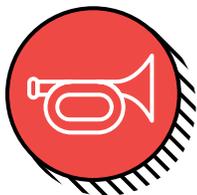
toddlers, because it helps to activate different parts of the brain to form new connections. Our brains are like a 3-D map, with parts in the east, west, north and south that all help us in different ways. Often, these parts of our brain work all by themselves to solve a problem or store a memory. The best activities get the different parts to talk to each other and work together, such as the parts that help us sing and clap, or, put your right hand in and shake it all about.

For babies and toddlers, early and frequent exposure to music improves

vocabulary and understanding of language. While simply listening to music is good for the mind, the best kind of music for young children is the kind that they can actively participate in with actions like marching, clapping or swaying. Parents and older brothers and sisters can show little ones the way by dancing and keeping the rhythm themselves. As you probably know, incorporating objects like pots, drums or maracas into the singalong also motivates movement and activity.

Too Small to Fail, a joint initiative of the Clinton Foundation and The

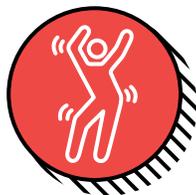
Science of the arts



Keep playing an instrument because this process improves your memory.



Your auditory system connects the ear to the brain. Musical training improves our ability to distinguish tones and pitch.



Dancing increases our cognitive acuity by rewiring the neural pathways as we use them.



Dancing and listening to the same music with others decreases pain and increases social bonding.



Sing out loud. Singing helps connect the left and right hemispheres of the brain.



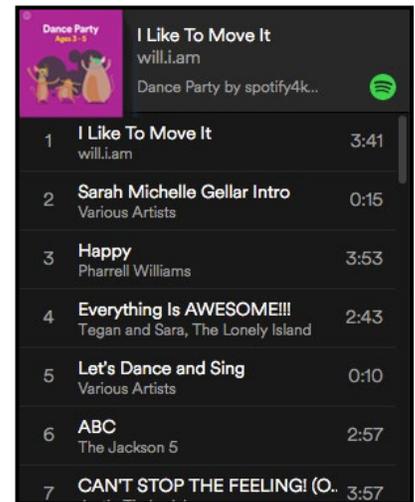
Monkey Business Images / Shutterstock.com

Opportunity Institute, is a nonprofit organization providing information and tools to help parents understand the importance of early brain and language development. The organization says you can also encourage a child to enjoy music and build their vocabulary by teaching them the words to your favorite songs, or making up new lyrics together. Young children benefit most from music—and many other activities—when they experience them with loved ones.

To promote meaningful interactions among children and their loved ones anytime and anywhere, Too Small to Fail worked with the music streaming service Spotify to create playlists for families that apply this important brain research. The playlists compile classic favorite tunes with

new popular music for a unique listening experience for all ages. The playlists are themed for everyday activities, like bath time, driving in the car, meal time, dance parties and bed time. There are even breaks in between songs where a voice will suggest an activity or conversation starter of some sort that encourages interaction. Who is behind those voices? Some of your favorite celebrities like Fantasia, Sarah Michelle Gellar, Wiz Khalifa, Tyler Perry, Juanes, Diego Torres, Frankie J, Laurie Berkner, Busy Philipps and Ashley Williams.

The voiceovers and playlists are available in both English and Spanish. Find them in the Kids and Family section of the Spotify app or web site. And, don't forget to shake it all about.



Literacy playlist on Spotify

For babies and toddlers, early and frequent exposure to music improves vocabulary and understanding of language.

Try this

- Sing often, everywhere and as loud as you want--In the shower, in the car, when you are taking a walking. How does it make you feel?
- Create a playlist of the songs you love for listening, dancing to or sharing with friends.
- Share your playlists with friends and rate the most listened to songs.

Read about it

Imperfect Harmony: Finding Happiness Singing with Others
Stacy Horn

This Is Your Brain on Music: The Science of a Human Obsession
Daniel J. Levitin

STEAMing up learning

DESTINATION IMAGINATION



What does it take to make it to the Global Finals? Just a team of your friends and your best imagination.

Every year, Destination Imagination challenges more than 150,000 students in 48 states and 30 countries to combine science, technology, engineering, art and mathematics with a little drama, storytelling and 21st Century skills to solve a problem. This year, students had seven challenges to choose from. They could build a stage to move a team member; encrypt and decrypt secret messages; tell a story about a color that disappears; build multiple load-bearing structures; create three different improvisational skits while using a box of props; address a real-life community need or build a complex machine.

Depending on the challenge they choose, students spend two to four months developing and practicing their solutions. Teams have the opportunity to showcase their solutions at local tournaments where the excitement builds throughout the year. When a team qualifies at the state level, they are invited to compete at Global Finals—the world’s largest celebration of student creativity, held in May of each year.

The challenges are built around the creative process of recognizing a challenge

or problem, imagining what the solutions could be, initiating the work and collaborating with others, assessing results along the way and finally, evaluating and celebrating the results.

Yale Shaw is a former longtime participant in Destination Imagination. “Without the eight years of Destination Imagination that allowed me to conceptualize and build in a completely raw and creative environment, I don’t believe I’d be accomplishing the things I am today,” he said.

Yale is now an industrial designer and earned his master’s degree in industrial and product design at the Academy of Art University in San Francisco, California. In 2015, he won an international award for his design of a life-saving epinephrine auto-injector. In addition to creating a smaller, sleeker design to help eliminate social stigma, his innovative device can trigger its smartphone-integrated application to notify 911 emergency services of the user’s exact location, allergy susceptibility and personal information.

There are many stories like Yale’s –kids who build confidence and get creative through working with other kids and taking on a Destination Imagination Challenge. While using their brains and ingenuity, young people develop their creative skills and critical thinking, explore their curiosity, build on their unique strengths, learn how to design and manage a project and gain skills needed for the 21st Century workforce.

Who knew learning could be so much fun!

Science of the arts

- Where the jobs are - The number of STEAM jobs recently increased by more than 16 % and are projected to continue to rapidly grow.
- Childhood involvement in the arts can help you build essential creative and innovative skills important for success in school and life.
- That “AHA!” moment you feel when you solve a problem is both emotional and biological.
- Competition and team activities often drive learning better than going it alone.

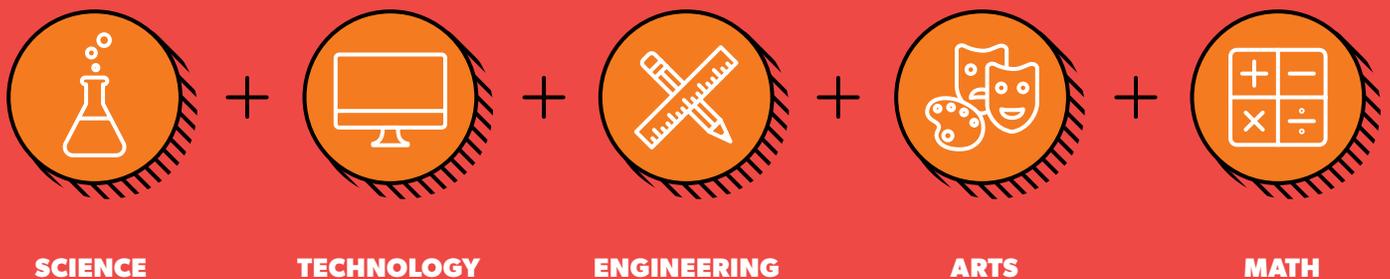
Read about it

- **The Way Things Work**
+
The Way We Work
David Macaulay
- **STEAM Kids**
Anne Carey

Try this

Invent a whole new solution to a problem. Using the materials found around your house, create a new tool, contraption or device. The sky’s the limit.

STEAM =





Science of the arts

- Plasticity causes the brain to change with experience and is essential to learning.
- Soothe your amygdala. It is your reaction center and you are more able to learn when you reduce negative reactions.
- The prefrontal cortex of the brain affects how you make decisions, known as executive function.
- Creativity uses both the right and left brain.
- The limbic system of the brain is your emotional center.

The ABCs of you + me

NEW WORLD KIDS

Susan Marcus

The Sensory Alphabet describes the building blocks for everything on planet Earth. Try out each element and see where it takes you. These are key clues to discovering your best ways of thinking, learning and creating.

LINE

Lines, essential to words and numbers, permeate our culture. Consider story lines, lines of code, timelines, lines on a map and lines of traffic. Try writing, drawing, making electrical circuits, creating lines with mazes or ballet.

SHAPE

Shapes shape other shapes, like the doughnut and the hole. Putting puzzles together is playing around with shape. Shape makers include builders, sculptors, geologists and masons. Make shapes with modeling clay, cookie dough or building materials. Make collages with cut-out shapes.

COLOR

Color is the visual language of emotion. Think about “green with envy,” “seeing red,” “feeling blue.” Painters use color to evoke our senses. Color is also important to biologists, florists, interior designers, chemists and chefs. Play with mixing colors and then consider what mood each has.

SOUND

Sound gets our attention. When we listen, we are present for an argument, a song, a whisper or a bird call. Ecologists, birdwatchers, linguists and physicians all use sound to diagnose, distinguish and define. Make an instrument with recycled materials or use an app for composing.

LIGHT

Light creates contour or mood: the sea sparkles, pearls have luster, silk shimmers. We “see the light.” Stage designers, cinematographers, photographers and architects are masters of light and shadow. But so are physicists, glass artists, poets and urban planners. Take photos to play with light and shadow.

SPACE

Space is everywhere. With space, what isn’t is as important as what is: the inside of a cup, the silences between the notes or the room inside the walls. Mechanical engineers, cartoonists, architects, dancers, cartographers and chess players all use space. Play with Google Earth, build interesting spaces or re-design your room.

MOVEMENT

Movement is about change, getting from here to there, from up to down, from then to now. We talk about how ideas

move us, how responsibility keeps us tied down, how our imaginations run away. Movers include explorers, meteorologists, dancers, athletes and construction workers. See how many ways you can move across a room or sit in a chair.

RHYTHM

Rhythm is the heartbeat element, holding things together in big and little patterns. Rhythm can be audible: drumbeats, footsteps, finger taps, or visible: stripes, dots, dashes, zigzags. Without rhythm, who could be a pianist, a poet, an actor, a video editor, a basketball player or a juggler? Create a rap or percussion piece.

TEXTURE

Tactile information is right at our fingertips. It’s smooth, woven, slippery, shiny. We see texture, too, and hear it in a voice or song. Days are rough or smooth, moods are even or edgy. Surgeons, weavers, gardeners, designers and chefs all value texture. Do you remember exploring texture through a microscope, squishing toes in mud, or eating smooth, cold ice cream?

Feed your imagination every day by using the Sensory Alphabet as a lens for people watching, tinkering, interacting with friends, singing or dancing. Soon you’ll have ideas for a project or an invention. Keep going—there’s a big future to invent!

The Sensory Alphabet is the foundation of New World Kids, a suite of programs for pre-K through third graders that focuses on building creative thinkers through a focus on current research in neuroscience and cognition. New World Kids is powered by sensory-based diagnostic tools and strategies for teachers that zero in on each child’s natural resources and individual learning strengths. Find out more in *The Missing Alphabet*.

Read about it

- ***The Missing Alphabet***
Susan Marcus, Susan Monday and Cynthia Herbert
- ***Mind in the Making: The Seven Essential Life Skills Every Child Needs***
Ellen Galinsky

Learning resources

WHAT IS NEUROAESTHETICS?

- The Arts and Mind Lab
www.artsandmindlab.org
- Your Brain and Art
www.philosophytalk.org/blog/neuroaesthetics-your-brain-art
- International Network for Neuroaesthetics
www.neuroaesthetics.net/neuroaesthetics/
- Art and the Brain, Semir Zeki
www.vislab.ucl.ac.uk/pdf/Daedalus.pdf
- Brain Facts – Explore the Brain and Mind
<http://www.brainfacts.org/>
- The Arts and Early Childhood (A NEA literature review, as part of the Interagency Task Force on the Arts & Human Development)
www.arts.gov/sites/default/files/arts-in-early-childhood-dec2015-rev.pdf
- How Creativity Works in the Brain
www.arts.gov/sites/default/files/how-creativity-works-in-the-brain-report.pdf

HEALTH: THE ARTS HEAL US

- Healing Arts Program of the International Child Art Foundation
www.icaaf.org
- Creative Forces, National Endowment for the Arts
www.arts.gov/partnerships/creative-forces
- Melissa Walker TED talk
www.ted.com/talks/melissa_walker_art_can_heal_ptsd_s_invisible_wounds
- The Therapeutic Science of Coloring
www.medicaldaily.com/therapeutic-science-adult-coloring-books-how-childhood-pastime-helps-adults-356280
- American Art Therapy Association
www.arttherapy.org
- Brain, Learning, Animation and Movement Lab
www.blam-lab.org/
- Save the Children – HEART
www.savethechildren.org/atf/cf/%7B9def2ebe-10ae-432c-9bd0-df91d2eba74a%7D/HEART.PDF
- Early-life Stress
www.sciencedirect.com/science/article/pii/S1878929315300451
- Can Art Reduce Stress?
www.arts.gov/art-works/2013/can-arts-reduce-stress-children
- Johns Hopkins Hospital Healing Design
www.archdaily.com/243120/the-johns-hopkins-hospital-perkinswill
- A Mind in Architecture
www.anfarch.org/news/a-must-read-mind-in-architecture/

WELLBEING: THE ARTS KEEP US HEALTHY

- Children and Nature
www.childrenandnature.org
- Vitamin N
www.richardlouv.com/blog
- Children and Architecture
www.architectureandchildren.com/index.php/about/designers-of-the-mind
- Young Architects Explore
www.youngarchitect.com
- Art with a Heart
<https://artwithaheart.net/>
- Be Brain Fit – Art Supports Everyone
www.bebraintfit.com/the-health-benefits-of-art-are-for-everyone
- How Does the Brain Process Art?
www.smithsonianmag.com/science-nature/how-does-the-brain-process-art-80541420/
- Inspiration for Your Signs
www.qz.com/888554/a-linguist-explains-how-to-write-protest-signs-that-everyone-will-remember
- Young Activists
www.youthactivismproject.org/success-stories
- Wide Angle Youth Media
www.wideanglemedia.org
- The Stress Response and the Teenage Brain
www.ncbi.nlm.nih.gov/pmc/articles/PMC4274618/
- MICA Social Design
<http://designawards.core77.com/Design-for-Social-Impact/33075/BARF-Beer-and-Alcohol-Ruin-Futures>
- Making a Difference Through Design
<https://design.ncsu.edu/designlife/making-difference-design/>
- Arts Olympiad of the International Child Art Foundation
www.icaaf.org/ArtsOlympiad

LEARNING: THE ARTS TEACH US

- OrchKids through the Baltimore Symphony Orchestra
www.bsomusic.org/education-community/young-musicians/orchkids/
- Music For All – Quick facts on benefits of music
www.musicforall.org/who-we-are/advocacy/quick-facts
- NAMM Foundation – supporting research on the impact of music
www.nammfoundation.org
- Learning Landscapes
www.brookings.edu/blog/education-plus-development/2017/01/05/urban-thinkscapes-using-the-city-as-an-agent-of-change
- Supermarket Speak
http://www.kathyhirshpasek.com/wp-content/uploads/2015/08/Supermarket_Ridge-et-al.-2015.pdf
- The Ultimate Block Party
www.ultimateblockparty.org
- Too Small To Fail
www.toosmall.org/blog/the-power-of-music
- Use it or Lose It! – Dancing and Your Brain
<https://socialdance.stanford.edu/syllabi/smarter.htm>
- Society for Music Perception and Cognition
www.musicperception.org
- New World Kids
www.newworldkids.org
- Partnership for 21st Century Learning
www.p21.org
- Destination Imagination STEAM Challenges
www.destinationimagination.org
- STEM to STEAM
www.stemtosteam.org
- Virtual Reality and Learning
www.baltivirtual.com
- HOLO TATS
www.holotats.com
- AEMS
www.aems-edu.org
- Girl Approved
www.girlapproved.us
- Out of Eden Walk – Harvard School of Graduation
<http://learn.outofedenwalk.com/>
- World Bank
<http://www.worldbank.org/en/topic/edutech/brief/evoke-an-online-alternate-reality-game-supporting-social-innovation-among-young-people-around-the-world>

Front cover, back cover + *What is neuroaesthetics* images: **Shutterstock.com** Girl, guitar, palette, dancer, brain, man smiling, fireworks illustration. **Unsplash.com** Roses, yellow leaf, banana, pizza, frog, sydney opera, red flower, empire state building, video camera, polaroids, music sheet, paintbrush, ballerina. **Pexels.com** Camera, green leaf, fish, puppy, electric guitar, buildings.

Credits

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Ashfaq Ishaq is the founder and chair of the International Child Art Foundation (ICAF) established in 1997. He is an experienced entrepreneur, educator, manager, researcher, and civil-sector leader. He holds a Ph.D. in economics from the George Washington University, where he later served as adjunct associate professor of economics. Ashfaq is spearheading a children's revolution that treats children as creators (not merely pupils or consumers), takes their imagination as seedbed for invention and innovation, and respects their art as the most honest and purest form of human creative expression. The past two decades we have been fostering children's creativity and empathy, since creativity and empathy are key attributes of successful learners and leaders. These two are also preconditions for sustainable prosperity and peace.

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SPECIAL THANKS

INTERNATIONAL ARTS & MIND LAB (IAM)

A multidisciplinary research-to-practice initiative with the goal of amplifying human potential and accelerating the field of neuroaesthetics.

Join the neuroaesthetics conversation.
www.artsandmindlab.org
facebook.com/artsandmindlab
twitter.com/artsandmindlab



WILL GEE AND HIS TEAM AT BALTI
VIRTUAL AND WWW.HOLOTATS.COM

A virtual and augmented reality experience design studio that created the playful holotats on the front and back covers.



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Signs of the times

SUSAN MARCUS, New World Kids

The ABCs of you and me



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