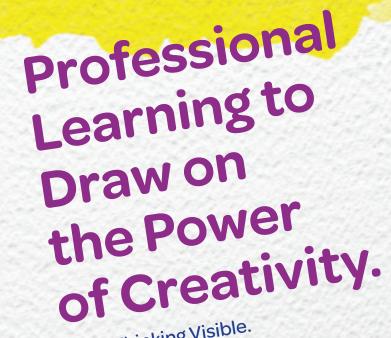
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Cover: Powder Springs Elementary School, Powder Springs, Georgia; photo credit: Wanda Gray

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Dear Friends:

Principals have chosen a profession of promise. What other career provides the opportunity to make daily decisions that impact the futures of so many? This year's Champion Creatively Alive Children grant-winning principals' stories demonstrate how art integration impacts students and unleashes their potential.

As Darren Walker, president of the Ford Foundation and former lawyer and investment banker, states: "Art is not a privilege. Art is the soul of our civilization, the beating heart of our humanity, a miracle to which we all should bear witness, over and over again, in every home ... and every school." Walker tells his story of growing up poor in rural Texas, and his mesmerizing first exposures to art when his grandmother, a maid for a wealthy family in Houston, got permission to bring him their discarded art magazines. Walker asks us to imagine the power of art to change every child's life. Access to art is truly essential to a high-quality education.

As young Walker used art to reimagine his life, it is important to use a vision of the future to reimagine your students' lives. Futurists tell us that in just a few decades, work will focus on humans collaboratively and creatively designing the work machines will accomplish. As leaders of two national organizations, we think about current and future workforce needs. When machines excel at retaining and retrieving information, manipulating numbers, even driving people and products to destinations, it forces us to reprioritize how we prepare today's and tomorrow's workers for success—with a focus on 21st century skills—the four Cs: Creativity, Collaboration, Critical Thinking, and Communication.

The stories in this supplement address the decisions you as principals make daily: wise investments in educational excellence, transforming schools with creative leadership, energizing STEM with art for STEAM, and engaging community stakeholders in your school's success.

As education thought leaders, you shape millions of students' futures. You know why regimented routines from the past must be replaced with more student-led, collaborative problem-solving. Reimagine learning environments that help students explore new ideas and create original solutions, instead of memorizing others' answers. We share your passion for leveraging teacher leaders' creativity and sharing promising practices. Thank you for building awareness of the essential role art plays in pedagogy—and for delivering on the promise to spark the joy of learning in every child.

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Principal (ISSN 0271-6062) is published in September, November, January, March, and May by the National Association of Elementary School Principals Annual membership dues in the Association are \$235 (institutional subscription \$150), of which \$35 are for a year's subscription to Principal. (Subscriptions available only as part of membership.) Periodicals postage paid at Alexandria, VA. and at additional mailing offices. NAESP Executive and Editorial Offices 1615 Duke St., Alexandria, VA 22314-3483. 703-684-3345. Copyright 2017 National Association of Elementary School Principals. All rights reserved

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Art Integration: Worth the Investment

Promising practices and improved outcomes

eturn on investment is an accountability metric, evidence that decision-makers are wise stewards of public funds who spend resources for results. Educators focus on investing in the programs and strategies that have a tangible impact on students.

Every investment involves risk; not only the uncertainty of outcomes, but also the risk of an intervention being misunderstood or devalued in the process. Eric Booth, author, Broadway performer, and business leader, recalled how arts integration was once considered a risky experiment. According to Booth, advocates worried that the arts would get used as "a handmaiden to merely prop up boring curriculum. Or if we link the importance of the arts to higher test scores, and then scores drop for any of a hundred other reasons, we have damaged the already tenuous place the arts hold in U.S. education."

Yet, as Booth and educators across the nation have found, arts integration is an investment that pays back in multiple areas—enhancing school culture, increasing engagement, and improving teacher retention and recruitment, as well as elevating students' test scores. Art serves a catalytic role in education because art inherently involves creating. Art requires learners to see with a new lens and add a bit of oneself to what is created. The artistic process activates learning in all disciplines.



Vandyke Elementary School, Colerain, Minnesota

Know What Art Creates

Take Powder Springs Elementary, outside Atlanta, as an example. Signs on classroom doors inform visitors: "Warning! This is an Art-Integrated Classroom. Look out for episodes of explosive creativity and intense exploration and experimentation. Exposure to this classroom will result in a relentless passion for learning!"

The explosive energy and passion are palpable. Principal Debbie Broadnax said the spark started three years ago when she and a small team of teacher leaders decided to make significant pedagogical changes. According to Broadnax, they wanted to teach in a livelier, more child-centric way. They knew that a change in teaching strategy could put the bounce back into the steps of students and teachers. The more the teacher leaders read about arts integration, the closer they felt aligned to their plan. Broadnax asked for volunteers from

their faculty with a simple message:

If you're comfortable being

uncomfortable;

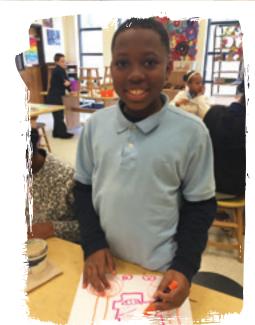
If you tend to think outside of the box instead of coloring inside lines;

If you want high levels of engagement in your classroom and to feel more engaged yourself;

If you accept that a new journey involves taking risks, and you're willing to learn from mistakes ...

Then join us in this new artsintegration initiative.

That first year, 17 out of 70 teachers volunteered to embark on their arts-integration journey. During the past three years, the number of arts-integration classes has grown steadily. "Our first wave of growth was from teachers saying, 'I want my students to be able to do those rigorous projects. I want my students to understand in-depth material,' as they saw how arts integration increased learning," Broadnax explained.



Powder Springs Elementary School, Powder Springs, Georgia

The next wave of growth was driven by students' families. "Students would pause in front of the arts-integration classes and look in longingly," Broadnax recalled. "I'd get calls from parents saying, 'I don't care which teacher my child gets next year, as long as it is one of the arts-integration teachers.' The drive toward more effective approaches came from both teachers and learners."

Pathways for Success

Broadnax knew that to integrate the arts schoolwide she needed to create and support pathways for success. She noted three essentials for effective implementation, and reminds other principals that they are wise investments.

Professional Development. When teachers are asked to try new approaches, they need to learn how and practice with each other in a professional learning session. For ongoing support, the school needs a creative leadership team—colleagues who help teachers reflect on learning experiences.

"Not all PD is equal. Arts integration PD isn't about sitting and listening. By its nature it is handson, with active application of new ideas," explained Broadnax. "We brought a team of teachers to the Crayola PD and sketched designs of our creative leadership team. We reimagined our school vision by making a three-dimensional mobile. That creative, interactive process helped make our thinking visible as we articulated priorities."

Peer Observations. Teachers who volunteer to be part of the

Vandyke Elementary School, Colerain, Minnesota

arts-integration initiative conduct observational rounds to help others implement arts-integration teaching strategies. They collaboratively plan the observation, watch one another teach, then reflect and debrief as a group. "It's a collaborative, safe way to help each other grow," Broadnax said.

Protocols. Broadnax and Kathleen Bender, an academic coach, prepared reflection sheets to support teachers' observational rounds. This openended form helps capture observation notes and document growth of teachers and students. Colleagues sketch or jot notes on the purpose of a project, standards addressed, techniques observed, the learning environment, and instructional practices.

Return on Investment

Every plan has challenges. Broadnax found that her school's biggest one is finding the number of substitutes she needs so her arts-integration teachers can attend professional development sessions together. Now, in their third year of being an arts-integration school, nearly all teachers are part of a cohort group, and each cohort's professional development session means more subs are needed.



We know the training is successful at Powder Springs Elementary School in Powder Springs, Georgia, when teachers move from doing a weekly arts-integration lesson to instead weaving these strategies into all lessons.

was 131.2.

Despite that one main challenge, the investment is paying off. Teachers are now making better pedagogical decisions. Bender noted that teachers used to feel challenged whenever students had difficulty making inferences from written text. Now teachers are using more visually rich ways to teach students to observe and infer.

Powder Springs Elementary teachers attended a Crayola PD and learned about SEEK, a method of reading art that teaches students to explain what they see and cite evidence for their inferences. "Students decode art as if it were text, and use evidence-based strategies," Broadnax explained. "They infer context and character roles just like we ask them to do in language arts. The skills are directly transferable to reading."

The impact on student outcomes is tangible. The school monitors students' reading inventory/Lexile and math inventory/Quantile scores. Between August 2016 and May 2017, they expect scores to rise by 100 points.

The principal is proud of every grade level's scores, which at midyear (December 2016 tests) already exceeded the 50-point increase desired. At midyear, the average reading inventory/Lexile increase was 94.5, and the average

to instead weaving these strategies into all lessons.

math inventory/Quantile increase

Broadnax said the school's second-grade team has the highest frequency and level of authentic arts integration. As a result, that grade level also has had the most outstanding increases in reading and math scores—178 and 155, respectively—which Broadnax noted are impressive increases for midyear tests.

What excites Bender is not only seeing those scores, but also observing students using arts-integration strategies when they take the tests. "They are making visual sketches and tapping out tunes on their desks or moving their hands in ways they have done during arts-integration

lessons," Bender explained.

In addition to test scores, there are other demonstrable results of arts integration that Broadnax is proud of. Upon her return from a job fair, she credited the school's artsintegration program with helping her recruit new teachers who are eager to join this creatively alive school. The school leader has learned that arts integration impacts teachers at every stage of their careers. The principal said she was touched by a veteran teacher who, in her retirement letter, thanked Broadnax for making the last two years of her career so colorful and joyous with arts integration.

"Arts integration has rebranded our school," Broadnax shared. "It now defines who we are. Art shapes the way we teach and learn."

Why and How to Invest in Arts Integration

Far across the nation, in rural northern Minnesota, Vandyke Elementary is also investing in arts integration. Principal Sue Hoeft said her school's journey began two years ago, when the professional learning community formed a book club and read Eric Jensen's *Teaching with Poverty in Mind.* The book "was highly relevant" because Vandyke is a Title I school where 61 percent of students receive free or reduced-price lunches. "Many of our students have



Art requires active engagement. It sparks intrinsic curiosity that is required to ignite learning at Vandyke Elementary School in Coleraine, Minnesota.

experienced significant trauma in their young lives," Hoeft explained. "Many of Jensen's chapters recommend art as a way to reach these kids and create more sensitive classrooms."

Hoeft offers this valuable advice for principals:

Look for creativity champions. Who is passionate about teaching in ways that give students more voice? Identify and support their leadership roles. Vandyke started with a

kindergarten teacher and a grandparent. Both intuitively knew that art would reach students in ways that textbooks never could.

Start small, then reach out to partners. Vandyke started inexpensively with a book club. Then the school looked for community partners and alternative funding streams to help. "We were able to use a special fund that is available to a few school districts in northeastern Minnesota's mining region, the

Powder Springs Elementary School, Powder Springs, Georgia

iron ore or taconite tax, to support this," Hoeft reported.

Be intentional. Arts integration won't happen just because it's fun and people like it. It takes knowledge and skills to integrate art into other disciplines in meaningful ways. It requires an investment of time and talent. Vandyke's professional learning communities have early release every Wednesday, during which they focus on how to address the art standards as well as other disciplines in each integrated lesson.

Celebrate successes. Teachers already have a lot on their plates. Arts integration must be a solution, not a burden. Recognize their efforts. Try not to single out any individual, but instead honor the collaboration that makes arts integration work.

Get district leaders' support.

District Superintendent David Pace is one of the strongest champions of Vandyke's arts-integration program. His advice to principals is simple: "Get district leaders into your schools to see how arts integration is everything they have been looking for and how this level of energy around learning has been missing. Once they see how lively and impactful this teaching approach is, they will never advocate for more passive approaches."

Pace proudly reported that the district is investing in Vandyke's program. "I come from a vocational ed background. Arts integration reminds me of what we see there—hands-on experiences that make deep learning connections," he said. "When students create something, they get personally invested in learning. Isn't that what we ultimately want—students to be invested in their learning?"

their learning?" Cheri Sterman is the director of education at Crayola and vice-chair of the Partnership for 21st Century Learning.



Building Creative Capacity Transforms Schools

Practical tips for getting started

ublic discourse on the topic of school reform quickly fills with assumptions of broken institutions awaiting external intervention to be fixed, rather than the reality that good schools continuously strive to serve students better. Strength-based school transformations occur when excellence is recognized, celebrated, and built upon. Creative teaching and learning is a powerful strategy for taking schools from good to great, from great to exemplary, and every other journey along the continuum of excellence.

In School Reform with a Brain: The Neuropsychological Foundations for

Arts Integration, William Stixrud and Bruce Marlowe wrote, "Reformers who view the arts as unnecessary, or peripheral at best, ignore the empirical evidence regarding how vital creativity and artistic expression are to the developing human brain—and how important they are for learning and development."

An increasing number of principals are convinced by the compelling evidence that arts integration improves learning. School leaders who want to embrace this instructional strategy often ask, "How should we get started?" Having conversations with faculty, parents, and students within your learning



Monett Intermediate School, Monett, Missouri

community is often the best place to start. Conducting this sort of needs assessment helps gauge interest and identifies the specific strengths of these stakeholders.

Kaiser Elementary, in Oakland, California, started with a listening tour. School staff found a strong desire to make sure "art is woven into the fabric of the identity of our school," explained principal Dennis Guikema. As a 20-year veteran of the Oakland Unified School District, but new to this school, Guikema identified arts integration as a priority and met with stakeholders to hear their ideas for how art would elevate their achievements. They also made a conscious effort to engage fathers. The president of the Kaiser Dad's Club informed Guikema that its members voted to partially match the Crayola Champion Creatively Alive Children grant to support arts integration.

Insights from other schools help identify pathways for this transformational journey. Professional development is key to schoolwide transformation, according to Melrose Elementary School principal Tammy Rasmussen. According to Rasmussen, this Title I school in Roseburg, Oregon, is "exploding with creative learning, for both adults and children."

Everyone at Melrose Elementary—whether a teacher, parent, or student—has access to art-infused, active learning that deepens understanding. After teachers experience



hands-on workshops, they plan weekly focal time for art-infused learning in their classrooms. The creative leadership team credits its successful transformation to the principal's commitment to professional learning and making sure the ideas are applied to classroom lessons. Parent Stephanie Poellot said, "Tammy's enthusiasm and encouragement for arts integration radiates energy throughout the building. Teachers are learning about this approach and taking ideas directly into their classrooms."

Ultimately, an educator's goal is to help students learn how to navigate life. Art-infused, project-based learning provides that preparation and practice. Creative experiences give learners experiences that parallel many of life's

challenges. The iterative creative process requires problem finding, being open to new ideas, exploring, creating, presenting, responding, evaluating, and revising. Just when students think their work is done, they hear feedback and see new inspiration that influences how they want to revise their work to make it better. When decision-making is put into the hands of students, they exceed expectations.

Sheridan Arts Spanish Dual Immersion School in Minneapolis became an arts-integration school to empower students to express their thinking in unique and powerful ways. According to principal Yajaira Guzman, "Our students each have a unique situation, [and] art allows them a pathway to shine with a different light." Sheridan's faculty

suggest these practical tips to help other schools begin integrating the arts into their curriculum:

Build teachers' creative confidence and artistic knowledge. Last year, 20 percent of Sheridan teachers had been trained in arts integration; now, 100 percent of teachers have received arts-integration training. They have become resources to each other, sharing lessons and insights. "When teachers have questions about the lessons or techniques, they can reach out directly to teachers within our school," said assistant principal Sonrisa Shaw.

Compile a directory of expertise. Every faculty member has talents and expertise that can be shared with others. Develop a simple way for teachers to indicate their interests/

expertise and, magically, hidden talents surface. "It is amazing to see who plays guitar or has special bookmaking techniques they can share with others," Shaw added.

Address scheduling challenges. Ideally, classroom teachers have collaborative planning and reflection time with arts specialists. Administrators have a tough juggling act getting schedules aligned so specialists can co-teach artsintegration lessons with classroom teachers. While that is an aspiration, at least be sure to carve out time for them to align on topics so they are aware of how their approaches build as students transition between them.

Be open to what works and needs *improvement*. Sheridan faculty have been honest about what parts of their plans are working and what hasn't worked. Their culture enables reflective practice and aspires to continuous improvement. "What has not been done before allows our staff to see the possibilities of what can be done and what we will be able to do," Guzman explained.

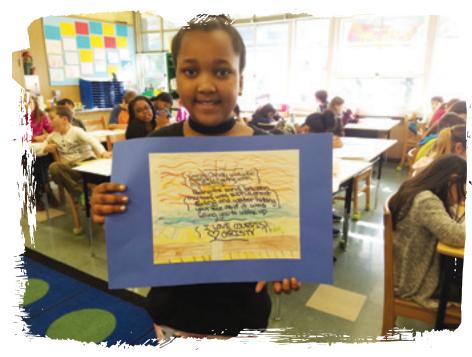
Both Guzman and Rasmussen agree that establishing a creative leadership team, evaluating the school's strengths, and developing a mission are key in starting arts integration as a schoolwide strategy. Additionally, they urge other principals to leverage teacher leaders from within their schools rather than assuming that bringing in outside expertise is the place to start.

School reform has no magic bullets. No single strategy is an inoculation with guaranteed results. Yet the child-centered, hands-on, inquiry-based approach that arts integration provides is a method that has transformed many schools and holds promise for others eager to embark on this journey of continuous improvement.

Kelly Schofield is principal of Hanawalt Elementary School in Des Moines, Iowa.



Melrose Elementary School, Roseburg, Oregon



Henry Kaiser Elementary, Oakland, California

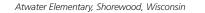
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Sheridan Arts Spanish Dual Immersion, Minneapolis, Minnesota

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rts education does not need to stay within school walls. Learning is sparked by curiosity and rooted in exploration, and communities that surround schools can fill students with awe, inspire deep inquiry, and provide a wealth of authentic exploration opportunities. Local institutions, ranging from design agencies to universities and after-school programs, can become invaluable partners that enrich students' experiences.

Community Partners

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Community partners have become a cornerstone in teaching and learning at Roosevelt Elementary in Keego Harbor, Michigan. Principal Dennis Rapal said he's seen a

the past three years. "Traditionally, teachers tell students what to do and follow up to make sure students get the right answer. We flipped that," he explained. "Students tell us what they're interested in. Students are now the architects of their inquiryrich learning process. They design their learning pathways with our community partners and go deeper than we've ever gone before."

paradigm shift at his school during

Because they use design thinking as the iterative process to solve problems, Roosevelt Elementary staff reached out to neighboring Sundberg-Ferar, a globally renowned design firm whose clients include Coca-Cola vending machines, Kenmore appliances,

Delta showerheads, and numerous medical device firms. Jeff DeBoer, the agency's chief innovation officer, comes to Roosevelt Elementary and talks with students about product design and redesign. "He makes sure kids know that problem-solving in the real world isn't a race to the finish line. Designers keep reimagining improvements," Rapal said. "DeBoer treats the students like co-designers, sketching their ideas as they collaboratively brainstorm new vacuums, toothbrushes, and sponge handles."

The partnership also involves students getting out of the school and visiting the Sundberg-Ferar headquarters. "The depth of questions our students asked the designers was significantly above their grade level—not only in their vocabulary, but in their conceptual understanding of what it means to design solutions with an aesthetic in mind," Rapal observed.

Students see similarities between the work of designers and architects in their architecture classes, taught by Lawrence Technological University students, who visit the school twice each month. Hands-on lessons about form and function, scale, and perspective are tangible as students experiment with folded paper and 3-D printed structural



Roosevelt Elementary, Keego Harbor, Michigan

Principal ■ September/October 2017



Los Berros Elementary School, Lompoc, California

supports. Walls in Roosevelt Elementary are covered with sticky notes, where students write the similarities among artists', designers', engineers', and architects' work. The key parallels students see between these fields include the steps of asking questions, sketching ideas, and exploring others' points of view. Another wall features students' notes on how art is essential in many careers and industries, such as doctors, industrial designers, graphic designers, entertainment, and publishing. Students at Roosevelt Elementary have come to realize that anyone who creates anything is an artist.

Student initiative is seen in each of their community partnerships. When Lowe's awarded a grant

to the school, students asked for help in managing the project the home improvement store funded. A Lowe's project manager comes to Roosevelt Elementary to help students understand project management-focusing on their plan, preparation, problem-solving, and steps to project completion. "There is a wealth of experience in every community—just step outside of your building and connect with them," Rapal recommended.

Step Into the Community

Just as at Roosevelt Elementary, stepping outside of the school building to engage the community is a key to success at Creedmoor Elementary in Creedmoor, North Carolina. "We used to struggle with family engagement until we decided to step out of our building and meet parents in the community," admitted principal Nancy Russell. "Many of our parents fear school or have unpleasant memories."

According to the principal, 36 percent of students' parents don't speak English fluently and find classic school-based parent events intimidating. "When we take our art program off campus, it levels the playing field. Art is a way parents can communicate with us. And they get excited to create art with their kids." Russell noted.

The results are stunning, with tenfold increases in participation. For example, for years the Math and Literacy Family Nights held at the school averaged only about 15 participants. But the most recent Create Night, which was held in the community center, attracted more than 150 participants. During this colorful family event, teachers talked with parents about the power of creativity. The success at this venue led to their next community partnership. The manager of the apartment complex where many Creedmoor students live was so inspired by Create Night that she offered to frame and display student artwork throughout the building's

lobby. As a result, Russell explained,

students "feel like they're famous art-

ists and that our community cares."

Seeing teachers in their community center and their apartment complex has helped parents develop deeper relationships with educators. Stephanie Layton, a Creedmoor kindergarten teacher, reflects on the realities of their community and the personal insights she gained: "Life is tough here due to poverty. Only four of my 24 kindergarteners' parents have jobs. Our Create Night helped parents see that I'm not judgmental." During Create Night, Layton worked with parents to complete the Crayola Visions of a Child's Future exercise,

during which families had engaging conversations with their kids about how creativity can shape their future. "The parents are really proud of their children, just like I am," Layton continued. "The art gave me the opportunity to see parents' passions for their children. I'm honored that they shared so much with me. I'm touched by how much closer we have become."

Russell understands the need to reach out to families beyond the school walls and continues to look for new ways to get into the community. "It is a challenge for families, especially those without cars, to get back to school in the evening. Now we ask ourselves what we can do to make it more convenient for them," she said. Next stop—the trailer park where two full busloads of students board each day. "Why not ask the trailer park managers if we can set up tents and bring art and dinner to the families?" Russell has pondered. "Just ask" has become her motto. She's also approached the health clinic—which said yes—so the school will set up a tent and hold a Create Night there, too.

Give and Receive

Successful community partnerships are about giving as well

Bush Elementary School, Idaho Falls, Idaho as receiving. When Los Berros Elementary in Santa Barbara, California, decided to embrace arts integration, staff knew sharing this pedagogy with others would help embed the approach

beyond their school.

So the school connected with the local YMCA, which provides afterschool care in the building, and invited their staff to all its professional development workshops. "We eliminated classic homework this year, looking for more meaningful learning experiences. We knew that shift would impact the after-school care program," said principal Heather Anderson. "Traditionally, their programming focused on helping students do homework. Those worksheets were not as rigorous as the hands-on art that our

teachers and the YMCA staff now do with students."

Including the child care program staff in arts-integration professional learning has increased continuity for students. The emphasis on creative thinking instead of rote worksheets has enriched the learning experiences and raised expectations for original thought.

Partnering with community organizations helps embed art-rich instructional practices during the school day, family events, and afterschool programs. The impact of integrating art is seen within and beyond school.

Cheri Sterman is the director of education at Crayola and vice-chair of the Partnership for 21st Century Learning.



Roosevelt
Elementary
Design Thinking
Protocols Students at Roosevelt Elementary in Keego Harbor, Michigan, actively engage and collaborate together during Chalk Talk.

To embed the design-thinking process schoolwide, Roosevelt **Elementary faculty created a** series of protocols that are being adopted by the district's larger community of learners.

CHALK TALK. This visually rich brainstorming process builds communication and collaboration skills. Ideas are written or sketched—with no talking. Small groups use poster boards or sidewalk chalk on the playground to draw a problem and visually

brainstorm solutions. Every few minutes the groups rotate. New eyes see each group's work and build upon it with more sketches. The rotation continues until the groups return to their original ideas. They discuss solutions, including others' contributions.

CAROUSEL SHARES. At any point in the design or creating process, students or teachers can call for a collaborative "carousel share." Students take responsibility for helping each other reflect and

redesign. The work is set on display, and students walk around it. Keeping eyes on the work, they critique it and offer feedback.

I-CENTER. The school's library has been transformed into a learning hub focused on information, integration, and innovation. One of the favorite statements in the I-center is, "I used to think. ... Now I think. ..." Having each student reflect on how they see problems and solutions differently is intentional in the I-center.

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STEAM Ignites Learners' Energy

TEAM-fired schools are surfacing across the nation with palpable energy. This educational approach has deep roots in child development (children learn through active engagement, exploration, and discovery) and parallels the way professionals in the fields of science, technology, engineering, art, and mathematics address real-world problems. STEAM takes learning "off the printed page" and intentionally transforms students from content memorizers to innovators who contribute original ideas and solve

STEAM on the FAST Track

problems collaboratively.

Debra McLaren, principal of Wolf Canyon Elementary School in Chula Vista, California, came to the field of education after her career as a performing artist. She knows firsthand the power of art to blend cognition and aesthetics. She refers to STEAM as the renaissance attitude that is shifting education from being content-driven to child-driven.

"STEAM schools experience a rebirth by focusing on what's really important," McLaren explained. "Children understand the purpose of each project and what it means to be an innovator and entrepreneur. STEAM moves schools away from the traditional assembly-line mentality and prepares students to be leaders." Students at Wolf Canyon Elementary are on the FAST track (fine arts, science, and

technology)—an acronym McLaren came up with when the district asked her to open a new school for pioneers, a team of innovative early adopters. She said California's system of Local Control Accountability Plans has helped establish its intentional use of arts integration. "We embedded the commitment to the arts in all 46 schools in our five-year plans." Professional development and teacher collaboration were pillars of their STEAM plan.

At Wolf Canyon Elementary, design thinking comes alive as students reimagine an "object of the day." Five protocols are employed to make ordinary objects extraordinary: engage, explore, explain,

evaluate, and extend. Students record their research and sketch their ideas in engineering notebooks. The interaction of form and function is debated as teams plan innovative improvements to basic objects. Some of the common objects students selected for this iterative design-thinking process include chairs, candles, writing tools, vacuums, glue sticks, and salt. They use a "think tank" collaborative approach in choosing the object by looking at what's happening in the world and why it matters to them. After identifying problems and possible solutions, students engage in the evaluation protocol. They assess artistic qualities of



Art adds powerful processes to STEAM



Bagdad Elementary School, Milton, Florida

their ideas as well as the structural aspects of each new proposed solution. Students contribute to the rubrics used to assess ideas.

"Children come to us as creative, curious beings eager to interact with their environment," McLaren noted. "Asking them to sit quietly and memorize answers is not consistent with everything we know about how children learn—nor are those practical skills for the real world. How many jobs ask workers to just listen and memorize? We must employ strategies that prepare kids for their future."

Igniting Exciting Learning

Bagdad Elementary School in Milton, Florida, is also a STEAM school with a unique acronym for its program: Project LITE—Lightbulbs Ignite. Teachers Excite.

What sparked the school's LITE program? Principal Daniel Baxley said teachers were feeling pressured by test scores and frustrated by mandates that seemed to pull the joy out of learning. He saw how excited teachers got while attending professional development on design thinking, and soon after, the LITE acronym came to him. "We want

to ignite students and excite teachers. We want to invigorate teachers, not burden them," Baxley shared. He already is seeing results from the school's STEAM program: Test scores are up, discipline referrals are down, and there's been a 100 percent increase in parent involvement.

Students are using the designthinking process to collaboratively brainstorm and reach consensus at Bagdad Elementary. Their projects focus on civic responsibility and community service. Students are designing robots, building energy-efficient greenhouses, and cultivating community gardens. They're also creating design challenges for each other as they explore the magic of flight. Baxley sums up the benefit he's most excited about: "Student leadership. Students conceive, design, and manage these projects. STEAM has built a sense of community that has elevated the role of learners as leaders."

Innovation and Invention

School leaders who have been implementing STEAM programs for several years are now being asked to share insights with others. Karin Kelly, principal of PS 174 in Rego Park, New



CHAMPION

Acmetonia Primary School, Cheswick, Pennsylvania

York, reported, "Since the new Every Student Succeeds Act mentions art should be integrated into STEM, we get calls every day from other schools who want to know how we do it. I explain you can't really teach science without art and that all inventors are artists. I urge them to start with Leonardo da Vinci and think about the role of art and science in his work."

In Kelly's school, students understand that design is important in making lives better—fulfilling a

12 Principal ■ September/October 2017 www.naesp.org www.naesp.org Principal ■ September/October 2017 13 function and doing that in ways that look and feel right. They have designed new backpacks, drinking cups, chairs, desks, and even a waterpowered oven with the help of partners at Con Edison power company.

Every year, PS 174 hosts an invention convention, which is a fun feedback program, similar to the Shark Tank show, in which students try to convince mock investors to fund their ideas. A recent favorite design solution was Doctor Robot, a nimble technology-driven first responder that would arrive at a scene quickly, assess injuries, and communicate to hospitals so the wounded would get immediate help before an ambulance could arrive. Students use a six-step designthinking process to prepare for the invention convention:

- 1. Define the problem;
- 2. Brainstorm solutions;
- 3. Create prototypes;
- 4. Conduct an eco-review and assess design/functionality;
- 5. Refine based on assessment; and
- 6. Plan commercialization (determine name, logo, patents/trademarks, and pricing).



Public School 174 – William Sydney Mount, Rego Park, New York

Beyond their schoolwide event, several grade levels have begun to enter into national and regional design competitions, including the Edison Challenge and ExploraVision. Kelly noted that other schools have asked her how PS 174 makes time for all this. "I explain, this is what we

do," she said. "This is how we teach every core subject and content area. STEAM ... is how we inspire this generation of learners."

Cheri Sterman is director of education at Crayola and vice-chair of the Partnership for 21st Century Learning.



Public School 174 – William Sydney Mount, Rego Park, New York

What Is STEAM and Why Does It Matter?

the integration of science, technology, engineering, and mathematics—is an acronym credited to Judith Ramaley more than a decade ago when she worked at the National Science Foundation. She defined it not in the literal merging of these disciplines, but by describing the intent: "An educational inquiry where learning is placed in context; where students solve real-world problems and create opportunities—the pursuit of innovation."

Educators, led by John Maeda at the Rhode Island School of Design, urged the insertion of art into this pedagogy, pointing to the importance of creative problem-solving and aesthetics in creating innovative solutions. Key elements in most educators' definitions of STEAM include not only the merging of these disciplines, but also the critical learning processes: student-centered, project-based, interdisciplinary, iterative, and inquiry-driven. STEAM is more than a lesson or class; it is a culture focused on engaging students to solve real-world problems.

Science. The blending of art and science is not an unusual phenomenon. Prominent scientists are almost twice as likely to be engaged in sustained artistic practices as the general population. And 94 percent of Nobel laureates engage in significant artistic practices.

Art requires observation skills and practice, which are also key to science. Visually representing data is essential in science and math. Skills taught in a rigorous art education program—abstracting, analyzing, imaging, empathizing, modeling, recognizing patterns, playing with ideas and objects, synthesizing, and transforming—are also used by professional scientists.

Technology. Technology and art have always been linked in a symbiotic relationship. From prehistoric airbrush technology to the printing press and today's digital cameras and 3-D printers—art is tied to the technology used to make it.

Engineering. Engineering and art share iterative processes of pre-visualizing, creating and refining, and using additive and subtractive constructive processes. Both disciplines are rooted in inquiry, imagination, design, building, evaluation, and refinement—all steps in solving problems.

Math. Math and art share content, habits of mind, and vocabulary. Think of how line, shape, and



Bagdad Elementary School, Milton, Florida

measurement are at the core of both fields. Ancient Greeks were inspired by the golden ratio and Fibonacci numbers. Tessellations and geometric forms have been used by ancient and modern civilizations. And coding—a hot field today—uses mathematical thinking and visual patterns to convey meaning.

So, what can educators do to authentically integrate art into STEM? Consider these suggestions:

- Collaboratively engage students in open-ended problems that are relevant to their lives;
- Address standards from each of the cross-curricular disciplines; and
- Have students practice the iterative design process, which includes multiple assessments, redesigns, and communications for continuous improvement.

Traditional teaching usually starts with adults deciding what students need to know. But STEAM problem-based learning starts with an interesting challenge that inspires students to figure out what they need to know and how to solve problems.

To more deeply engage in STEAM practices, attend the National Art Education 2018 Conference, March 22–24, 2018, in Seattle.

Andrew Watson is the fine arts instructional specialist for the Alexandria City Public Schools in Virginia and chairperson of the 2018 National Art Education Association conference.

Bridge the Gaps With Ant

Enhance knowledge transfer

ducators are bridge builders. We help others bridge gaps between what is wondered and what is known. Many speak of the achievement gap, while others refer to it as the opportunity gap. Either way, moving students from here to there and helping them make personal connections with content and context requires us to build bridges.

Storytelling Links Life Lessons to Imagination

Storytelling is an ancient tradition that connects tale-tellers and audiences. New methods of storytelling incorporate animation, images, music, and technology, bringing this art form to life with mixed media. Acmetonia Primary School in Cheswick, Pennsylvania, developed its Kaleidoscope storytelling program, which infuses visual art with language arts and video production. Deeply embedded in the school's approach to storytelling are four bridging principles:

- **Collaboration**—bridge unique points of view into consensus;
- **Cross-curricular**—arts integration bridges multiple subjects;
- Community of learners bridge between current K-3 students and Acmetonia Primary School alumni, who serve as coaches; and

 Culture of respect for student voice—storytelling unfolds a bridge between students (the experts on their stories) and adults who learn from them.

The Kaleidoscope projects kick off by spurring imaginations and culminate in a film festival in which parents, teachers, and members of the broader community see the storytelling videos debut. Principal Gregory Heavner described the school's commitment to multimodal learning: "It starts with students visualizing who is in their story and what happens to them. They draw storyboards to make the characters and plots more tangible. They use the Crayola Easy Animator studio as the tool to teach animation and prepare for their filming."

The production struggles are the most memorable lessons; students resolve issues collaboratively. "Self-assessment has become a routine practice throughout the production cycle. Students use rubrics to determine whether their artifacts—the sketches, backgrounds, writing, and audio—are what they need to bring the stories to life. They narrate and illustrate prose and poetry, then watch video clips to decide if they met the expectations," Heavner explained.

Teachers' roles include stimulating



Acmetonia Primary School, Cheswick, Pennsylvania

inquiry and helping students form their own flexible groupings based on interests and prior knowledge. While teachers help link creative writing, art, and technology, it's the students who drive the production. A third-grader has risen to the role of production leader, with a team that supports him. "It's almost like we have our own Apple Genius Bar," said art teacher Lauren Hanlon. The

team of third-graders runs a tech support operation at the iPad station, helping everyone from teachers to kindergarteners learn how to run the equipment. In addition, other students help teams evaluate and polish their stories.

Art Bridges Science and Language Arts

There is a natural rhythm in science. Similarly, there's a natural rhythm in written and spoken words. Educators at Dover Sherborn Middle School in Dover, Massachusetts, have found that art bridges gaps between those worlds. Headmaster Scott Kellett explained that his middle schoolers use art to connect nonfiction writing with nature, authors, and mentor text. Students use Skype to connect with award-winning poet Joyce Sidman, and they have on-site visits with nonfiction author Loree Griffin Burns.

English teacher Laura Mullen, says that both authors "made it abundantly clear to our students that they can be, and already are, writers."

Seventh-graders spent a full day with

Scientists and Beetle Busters. Through these discussions, students learned how observation skills are essential in both science and art. "They bridged the concepts of ecosystems, biological fragility, and advocacy—allowing them to connect seemingly disparate pieces of information together," Mullen said. "Within collaborative teams, they dove into projects, valuing their personal and peers' perspectives on how to protect

our environment and alert others to

Powder Springs Elementary School, Powder Springs, Georgia

Burns to discuss her books Citizen

Visualization as a Learning Strategy

their concerns, as advocates."

Dover Sherborn Middle School's approach, based on visualization, is evidence-based. Researchers Claudia Leopold and Detlev Leutner's 2012 study, published in the *Learning and Instruction Journal*, found that when reading scientific texts, having readers construct or draw an image was "superior to other reading comprehension strategies (i.e., main idea selection, summarizing)." Visualization efficacy has also



Acmetonia Primary School, Cheswick, Pennsylvania

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Dover Sherborn Middle School, Dover, Massachusetts

been reported by the What Works Clearinghouse: Timothy Shanahan wrote that "visualizing is a useful component of multiple-strategy instruction," in the 2010 report *Improving Reading Comprehension in Kindergarten–3rd Grade*, published by the Institute of Education Sciences.

Commenting on this finding, the President's Committee on the Arts and the Humanities described visualization as "clearly a skill that could be supported by helping students draw or paint pictures ... of what they imagine" from what is read.

Art, and the power of an image to be read as reliable text, offers insights that enrich student writing. Connecting with authors, exploring the visuals in their books, and creating original visuals serve to activate neuro-visual processing pathways and deepen learning. "The artistic view disclosed literary and scientific understandings that [students] did not previously possess," Mullen observed.

Most exciting to the team of teachers was the impact on students in

their special education program.
"This bridged students and deepened their respect for each other," said Andrea Moran, special education teacher. Arts integration
"enables students who struggle with the traditional academic presentation of the world to forge a new

pathway to learning through

artistic processing."

Promising Practices

Recommendations for other educators interested in bridging gaps in their learning communities include the following.

Reach out to authors. Writing books should not be mysterious to students. Nor should they feel pressured to pick one career path while in middle school. Hearing Burns explain that after receiving a doctorate in biology she changed careers to become a writer inspired students at Dover Sherborn.

Focus on observation. One skill that crosses all disciplines is observation. Building awareness is key to everything students will encounter—from self-awareness to collegial awareness, to awareness of their roles as citizens. To build this skill, Dover Sherborn art teacher Cathy Simino requires students to go beyond typical, runof-the-mill drawings. "When they draw a lollipop or cotton ball tree or a V-shaped bird, I challenge them to really see, not assume. Stereotypes and presumptions permeate many areas of our lives. When we require evidence-based work and ask them to look more closely, they go deeper," she explained. "Their art reflects a more accurate understanding of nature, and they attend to important details in the ecosystem."



Dover Sherborn Middle School, Dover, Massachusetts



Sheridan Arts Spanish Dual Immersion, Minneapolis, Minnesota

Give students agency. When students are empowered to do something phenomenal, they do. Students go beyond the core assignment and awaken their passion for being contributors, building awareness in others as active citizens. For example, middle schoolers transformed their outrage about environmental problems into motivation to come up with solutions. Kellett said he urges students to "be the change you want to see." Learners will find the problems and also find effective ways to address them when educators trust them enough to drive their own solutions.

Kellett said this approach is especially important in middle school because at that age, "students are very perceptive; their insights are right on the mark. They can take on broad and varied lenses. They investigate their own thinking closely. It's a critical time to embed the growth mindset that enables them to embrace new ideas and learn from unexpected results—without stigma of being wrong."

Teachers and students in arts-rich schools find many examples where they are bridging gaps—between stereotypical roles of who teaches and who learns, discovering what it means to find unexpected results, and learning how to see something with a new lens. There is a tangible transfer of knowledge across those bridges.

Cheri Sterman is the director of education for Crayola and vice-chair of the Partnership for 21st Century Learning.



Make Thinking Wilseless Make Thinking Wil

Art helps learners see multiple perspectives

ow can visualizing a situation from another's perspective change the story? How does illustrating historical events increase relevance and engagement? What moves students from memorizing facts to connecting big ideas that enable them to see how historical patterns pertain to current civics issues? Educators should challenge traditional approaches and reimagine the role of art in helping students see other perspectives.

Breaking the Master Narrative

"Historical facts can be perceived very differently depending on whose lens is used," said Jennifer Bond, principal of Ocean Knoll Elementary in Encinitas, California. Art-infused social studies projects help the school's fifth-graders visualize the American Revolution from the perspective of soldiers starving at Valley Forge. This adds a depth of understanding students do not have when they focus on the commander, sitting tall upon a horse. "We want to go beyond conventional approaches and ask students to re-explore history by looking at how others might see the story," Bond explained.

Art educator Lissa Corona noted that "sketching a different picture

than is normally seen helps students (many of whom had not previously been engaged in history lessons) lean forward and imagine what it would have been like to be soldier—just a few years older than they are—trying to survive on soup made from boiled boot leather." Previously, teachers at each grade level would focus on the scope and sequence of textbook-driven history lessons, often integrating writing into social studies. "But when we infuse art, students visualize the role of government and citizen participation in new ways. They see the less-visible people who are affected by decisions," Bond shared.

Helping students make their

thinking visible is an effective teaching strategy used across all grade levels at Ocean Knoll Elementary. Sixth-graders read *Among the Hidden* and consider the fate of underrepresented communities. Teachers pose questions about how policies affect the story's characters and what lessons are applicable today. Fourth-graders study the Spanish Exploration Age by visualizing multiple perspectives of land ownership—not just the settlers' or missionaries', but also that of the indigenous people. When students study battles, they look at objectives from various perspectives and consider what long-term impact might have occurred if the battles had ended differently.



Perry Drew Elementary School, East Windsor, New Jersey

This shift from studying only the "master narrative"—the story that is traditionally taught from the dominant society perspective—to looking at many narratives, including those individuals who historically have been less visible, is intentional and impactful. Many students feel as if they don't have a voice when they don't see their ancestors' stories in classic history texts. The multiliteracies approach, using art and writing to give voice to historical figures who aren't typically seen, deepens understanding of the era and reveals patterns of social injustice.

"Our students compose handwritten letters that are illustrated with the scenes they would have experienced as a slave, servant, or solider, which explores history from alternative perspectives," Corona explained. She reminds principals that "art teachers are experts at teaching perspective and helping students realize that visuals look very different when a new perspective is taken. A birds-eye view of a battlefield is very different from how it looks from the trenches. History isn't only about those who triumph."

Ocean Knoll School, Encinitas, California

Visually juxtaposing images helps students see history in new ways and helps them connect the past with current events. Ideas around power, racism, exploitation, and unintended consequences flow from students as they research those who have been forgotten. Students draw upon—and literally draw—their newfound

insights. Corona said that when students present their work from these projects, "the depth of thought and honesty is stirring. They realize that art is not about passive beauty, but is an exchange of ideas between the artist and viewer that is only successful when it moves them both to see in new ways."



Visual journaling is another teaching strategy that effectively helps learners—both adults and students—see in new ways. The act of close observation while engaging with source material is intellectually rigorous. Teachers at Chabot Elementary in Castro Valley, California, have been building their own creative capacity and then applying the insights to instructional practices.

"Educators talk and read about authentic assessment all the time, but when teachers create visuals that demonstrate their deeper understanding, they have the epiphany that visualizing science or social studies brings content to life," said principal Vivienne Paratore. During professional learning sessions, Chabot teachers sketch, often stretching beyond their comfort zone. "Then they realize that the drawings enable them to see what each other is thinking. They reflect



Brooklyn Park Elementary School, Baltimore, Maryland

on how artistic studio habits of mind build understanding and provide formative assessment opportunities," Paratore added.

Providing art experiences in teacher workshops has moved teachers away from doing "cotton ball crafts" to rigorous art-infused projects in which the visuals convey original thought. Teachers apply their firsthand experience to instructional practices. For example, fourth-graders are creating "unconventional portraits" of historical leaders, in which the images convey historical context and show the person's personality.

According to Jason Engelund, who leads the school's art-infused professional development, the mantra for both teachers and students is "Don't copy the standard stereotypical image. Visually show us what you think." The key message he tells teachers and hears them repeat in classrooms is "build upon the context you know, and create something new that shows us your original thoughts." Paratore reported that this approach has added more than arts integration to their school: "We now have alternative forms of assessment and a culture of risk-taking that enables teachers and students to discuss whether or not their art meets their objectives and how they can learn from mishaps."



Making thinking visible makes learning interactive and adventurous. During a professional development session in 2016, teachers from Perry L. Drew Elementary in East Windsor, New Jersey, participated in a gallery walk to examine each other's artwork. They realized that creating visuals, then exploring each other's images and the thoughts behind the art, were ways to differentiate instruction for learners. Remembering the gallery walk so vividly, teachers decided to bring this deeper sense of ownership to students' learning experiences. So they challenged the tradition of teacher-designed bulletin boards and transformed the school's hallways into studentdesigned interactive displays.

Students use the design-thinking process to collaboratively create and

modify learning games that fill these active learning galleries. They design problem-solving challenges that other students explore as they navigate the hallways. Layers of learning unfold as this schoolwide project comes to life.

According to principal Robert Dias, many of his students have never been to a museum, but now

never been to a museum, but now they're taking on the roles of exhibit curator, designer, and problemsolver. "The level of responsibility they have embraced is inspiring," reported Dias. "They are not just passive consumers of content. They're thoughtfully planning how to convey the main ideas to other students in ways that are interactive and memorable. The topics of these visually rich learning games range from explorers' sailing ships to graffiti word walls. The consistent thread is that students plan how to convey meaning visually and engage others in an interactive learning experience. "It's refreshing to see how students assess their own work and self-correct to adjust to their peers' ideas," Dias explained. "I have the opportunity to see what they are thinking. This lens provides much more information than any test or textbook quiz ever could."

Cheri Sterman is the director of education at Crayola and vice-chair of the Partnership for 21st Century Learning.



Monett Intermediate School, Monett, Missouri

Access to Art-Infused Active Learning

Melrose Elementary School, Roseburg, Oregon

Tamara Rasmussen, Principal
This rural, Title I school's Creative
Leadership Team provided teachers
with art-integrated professional
development focused on Da Vinci's
model of merging academics, action,
and art.

Artists as Inventors: Exploring Form and Function

Public School 174—William Sidney Mount, Rego Park, New York

Karin Kelly, Principal
Teachers join inquiry teams for common planning, collaboration, and reflection across and within grade levels. In partnership with the Cooper Hewitt Design Museum and the Museum of Modern Art, teachers and students study design thinking to create and curate inventions.

Bridging the Gap With Art Sheridan Arts Spanish Dual Immersion, Minneapolis, Minnesota

Yajaira Guzman, Principal
Leveraging teacher leaders' expertise
and resources from the Walker Art
Museum and Minneapolis Institute of
Art, this grant provided professional
development for teachers. Their
focus was integrating art across the
curriculum, especially visual and
written literacy.

Building Thinkers

Wolf Canyon Elementary, Chula Vista, California

Debra McLaren, Principal
Project "Design Time!" provided
teachers with professional
development and students with
resources to merge art, engineering,
and creative problem-solving processes.
They developed a "FAST Track: Fine
Arts, Science, and Technology" art
integration program.

Contemporary Voices on Teaching Art

Chabot Elementary School, Castro Valley, California

Vivienne Paratore, Principal
Professional development and
an Art-Infused Lesson Planning
Guide, developed by the school's
Creative Leadership Team, focused
on highly relevant contemporary
art-integration strategies so teachers
make informed aesthetic and
pedagogical decisions.

Creating a Cohesive Community With Art Perry Drew Elementary School,

Perry Drew Elementary School, East Windsor, New Jersey

Robert Dias, Principal
What if students became producers
of knowledge, not just consumers of
content? What if learning extended
beyond classrooms as students
curated galleries that inspire
and document learning? They
used interactive cross-curricular
experiences, gallery walks, and
monthly professional development

to strengthen their studentcentered practices.

Design Thinking With Community Coaches

Monett Intermediate School, Monett, Missouri

Cherie Austin, Principal
The Creative Leadership Team
collaborated with the district's
regional technology center and
local industries to address students'
needs as future designers and
problem-solvers.

Embracing Partnerships Vandyke Elementary School, Coleraine, Minnesota

Sue Hoeft, Principal
Art integration deepens collaboration
and cultural understanding. Vandyke
educators partnered with other
schools to share insights and crosscurricular lesson plans.

Expanding Professional Learning to the Broader Community

Los Berros Elementary School, Lompoc, California

Heather Anderson, Principal
To align art-infused pedagogy
practices within their feeder schools
and deepen their collaborative
relationships, they included the
local day care center and other
schools in their weekly artintegration training sessions.

Priorities and Promising Practices

Henry Kaiser Elementary School, Oakland, California

Dennis Guikema, Principal
Hosting listening tours, art-ineducation networking meetings, and
walk-through observations for others
to observe their promising practices,
these educators learned from others
while sharing insights on the power of
art integration.

Observational Rounds Transform a Vision Into Practice

Powder Springs Elementary School, Powder Springs, Georgia

Debbie Broadnax, Principal
Cobb County School District's
"Investing in Educational Excellence"
vision is focused on innovation.
Art integration that involves
teacher training cohort groups,
multiday professional development,
collaborative planning sessions, and
observational rounds has delivered
positive results for Powder Springs.

Natural Rhythm of Art and Written Words

Dover Sherborn Middle School, Dover, Massachusetts

Scott Kellett, Principal
The "power of an image as reliable text" helped students read images as original source material. Collaboration among this middle school's English, science, and art teachers helped colleagues teach the parallels among science, art, and written words as they blended their three disciplines with a shared multiliteracies purpose.

"PERKS" of Student Growth Atwater Elementary, Shorewood, Wisconsin

Kayla Russick, Principal
The acronym PERK stands
for perseverance, empathy,
responsibility, kindness, and self-

discipline—the elements of this school's character code. Their grant focused on using visual representations as metaphorical thinking about citizenship and character traits to build students' personal sense of efficacy.

Power of Art to Persuade Ocean Knoll School, Encinitas, California

Jennifer Bond, Principal
Teachers and students used art
to explore social justice issues
and consider the power of art to
persuade, build awareness, and
inspire activism. In conjunction
with book studies and history
stories, students visually expressed
thoughts on injustice themes.

Scaffold Steps to Success Brooklyn Park Elementary

School, Baltimore, Maryland Rodney Walker, Principal
Just as experienced teachers know how to scaffold learning for students, this Creative Leadership Team used scaffolds to layer the depth of understanding robust art integration in their professional development. They outlined a multiyear "train-the-trainer" model, in which cohort groups of teachers share insights and lessons.

Bringing Art to the Community Increases Family Engagement

Creedmoor Elementary, Creedmoor, North Carolina

Nancy Russell, Principal
This rural school has a deep commitment to art integration and community engagement.
Using ideas they gathered from Crayola webinars, they took art experiences into the community center, trailer park, and housing complex, sparking fruitful conversations with families about children's creativity.

Sketching Science

Bush Elementary School, Idaho Falls, Idaho

Joshua Newell, Principal
Inspired by Leonardo Da
Vinci, this school's Creative
Leadership Team integrated art
and science instruction. Science
sketch journals documented
observations of ecosystems.

STEAM Ignites Learners' Energy

Bagdad Elementary School, Milton, Florida

Daniel Baxley, Principal
This rural, high-need school was
eager for art to energize their STEM
program. "Project LITE (Lightbulbs
Ignite—Teachers Excite)" provided
professional development for teachers
and illuminated their progress.

Tinkering Teachers Explore Design and Creativity

Roosevelt Elementary, Keego Harbor, Michigan

Dennis Rapal, Principal
Partnering with local university
architecture departments and
engineering and design firms helped
teachers and students see that
building a culture of creativity involves
collaborative problem-solving and
risk-taking. Real-world engineering
challenges, with engineers and
designers as coaches, made their
project-based learning come to life.

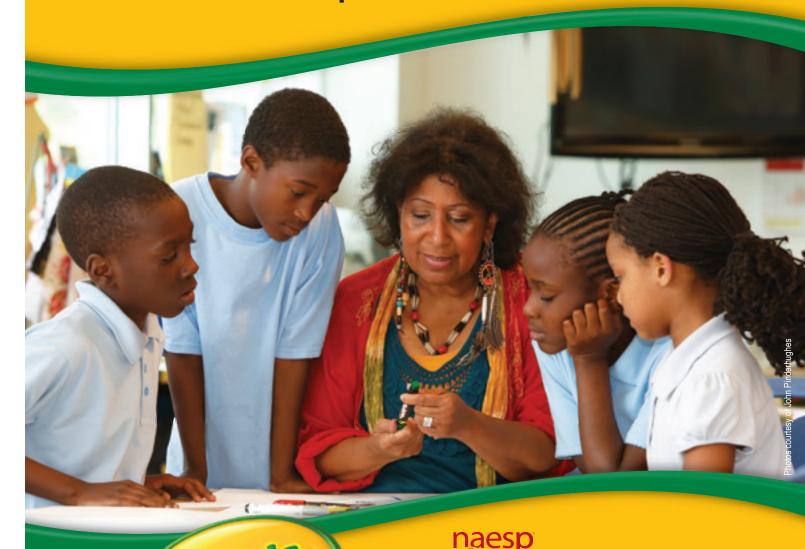
What Adults Learn From Children

Acmetonia Primary School, Cheswick, Pennsylvania

Gregory Heavner, Principal
This school's Creative Leadership
Team provided professional
development on mixed media
storytelling so teachers learned
about animation, moviemaking,
and art integration for multimedia
content creation. Their best
discovery was how much teachers
learn from children.

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