

Teaching by Design

Design Thinking is a problem-solving strategy that helps build students' 21st century skills.

By Cheri Sterman

A fundamental change occurs when schools design teaching around the problem-solving process. Instead of focusing on the memorization of answers that others have already figured out, Design Thinking schools challenge students to generate new solutions by using an iterative process that includes asking insightful questions and learning from mistakes.

For example, the first 20 minutes of each day at Young Audiences Charter School in Gretna, Louisiana, start with ART—an acronym for art reflection time. Whether it's a painting, song, or poem—each classroom focuses on an artistic-inspired, daily exercise. Students respond to the art based on three prompts: What do I think? What do I wonder? How will this curi-

osity inspire my day? Students write responses and then share their ideas. Principal Folwell Dunbar remembers when students discussed Banksy's street art and challenged each other on the role of community opinion in permitting graffiti; their conversation was as sophisticated and passionate as the public debate forums reported in *The New York Times* and *The Wall Street Journal*, Dunbar recalls.

"Let's ask ourselves how we can develop confident, creative thinkers," Dunbar said. "Design Thinking provides a framework that changes teachers' and students' mindsets. The best test scores come from classes that most completely embrace the Design Thinking process. More importantly, we see the innovative projects these students create—the real measure of success."

Big and Little Changes

"We love the lively debates these artistic explorations spark," explained Todd Shaffer, Young Audience Charter School's art educator. "When kids jump into a painting and describe how it smells and feels for them to be in that scene, we move away from our community's isolation and join a world that is rich with stimulation."

How do classroom teachers learn to facilitate those art reflection conversations and build the Design Thinking process across the entire curriculum? Shaffer collaborates with them and builds teachers' creative confidence. "Our principal has a deep commitment to co-planning time. The best art integration occurs when classroom teachers and art educators sit down together and build upon each other's expertise," Shaffer said.



ABOVE and RIGHT: Marietta Center for Advanced Academics, Marietta, Georgia

Dunbar believes that the most powerful tool principals have to manage this type of teaching is the daily schedule. He redesigned the day to enable the Design Thinking process to take hold. "I built in time for the art teacher to co-plan, co-teach, and coach classroom teachers. Our student day is a block schedule, so we don't interrupt children every 40 minutes to move from math to science or social studies. Teachers design robust interdisciplinary units and I give them large blocks of time for students' deep immersion into significant projects."

While the biggest changes Dunbar made were redesigning the daily student schedule and teacher-artist collaboration times, he points out that other little changes collectively have a large impact on a school.

- Vocabulary: "What we call the spaces and people in our building communicates what we value. It doesn't cost anything to use a new vocabulary." Dunbar calls the school's hallways "galleries," classrooms are "studios," and students are "creative learners." Every Friday they discuss their "creative achievements" and their parent meetings are called "celebrations of learning."

- Thinking behind the design: Their galleries provide thinking context. The art is displayed with the essential questions that prompted the exploration, lists the cross-curricular standards, and most important, includes the artist's commentary.

- Thinking about artists: At the beginning of each year, teachers name their classrooms after a favorite artist. Students learn these artists' stories throughout the year.
- Instructional rounds: Just like in the medical field, teachers learn from one another in rounds. They visit others' classrooms, consult in a collaborative way, and use Design Thinking to help one another solve problems.

Solving Real Problems

At the heart of Design Thinking is an approach to problem-solving that is built around inquiry, reflection, and modification. Dunbar describes some of the units his students created:

- Forming new civilizations as teams of city planners who must feed and govern their citizens;

What Is Design Thinking?

Design Thinking is a strategy for creative problem-solving that effectively builds critical 21st century skills and prepares students to be collaborative, inventive, and entrepreneurial. The process is both cyclical and iterative, requiring ideation, visualization, experimentation, discovery, and reflective assessment of solutions to real-life problems.

Although numerous models describe the steps in the Design Thinking process, the IDEA model is a succinct framework developed by a team of lead design teachers who participated in Art Education by Design, a community of learners supported by a grant from the National Art Education Foundation. The IDEA model focuses on four key steps: identify the challenge; define the resources/information needed; explore possibilities and create prototypes; and assess outcomes and plan improvements. Each step guides students through deeper understanding and mastery of cognitive problem-solving skills and productive habits of mind.

Design Thinking is less about drafting, measuring, and sketching and more about being empathetic, curious, and collaborative. It is a metacognitive, experimental, problem-solving process that involves risk-taking, critical thinking, and authentic assessment. Design Thinking focuses on teaching students how to learn, create, evaluate, and deeply understand in a relevant context. Immersion in this process develops the independent, innovative decision-makers needed for the future.

—Jan Norman, National Director of Education, Research and Professional Development, Young Audiences

- Inventing an innovative New Orleans architectural style that respects the historic legacy and addresses environmental realities; and
- Designing plans to save the eroding Louisiana wetlands.

Design Thinking starts with understanding the problem and considering many ways to solve it. Collaborative brainstorming around users' needs informs both form and function of the solutions designed. "We ask students to look at everything around them—chairs, light fixtures, buildings—and consider the decisions the designers

made," Shaffer said. "This prepares them for the roles they'll serve when solving their design challenges—what questions do we need to consider before we create solutions."

Elegant Fit

About two years ago, Jennifer Hernandez, principal of Marietta Center for Advanced Academics in Marietta, Georgia, realized the intersection between the way engineers and artists create is similar and complementary. She hired design artist Kelly Karr because, "Design Thinking is the perfect blend of these disciplines. It

fuels the innovative spirit, collaborative problem-solving, and sense of aesthetic that we might have missed if we stayed focused on STEM," Hernandez explained. "Adding the artist lens helps students be more observant. Our students learn art is more than decorative and lives beyond museums. Its presence is felt in every aspect of our lives." Karr teaches students to follow five steps as they integrate art and engineering:

- Ask insightful questions;
- Imagine possibilities;
- Plan collaboratively;
- Create; and
- Modify to improve.

Hernandez is passionate that "this cyclical process prepares students for the world they'll encounter. Yes, the world needs more engineers, but this process isn't just for engineers. This is a mindset, a life skill that prepares students for the future."

Make Disposable Mistakes

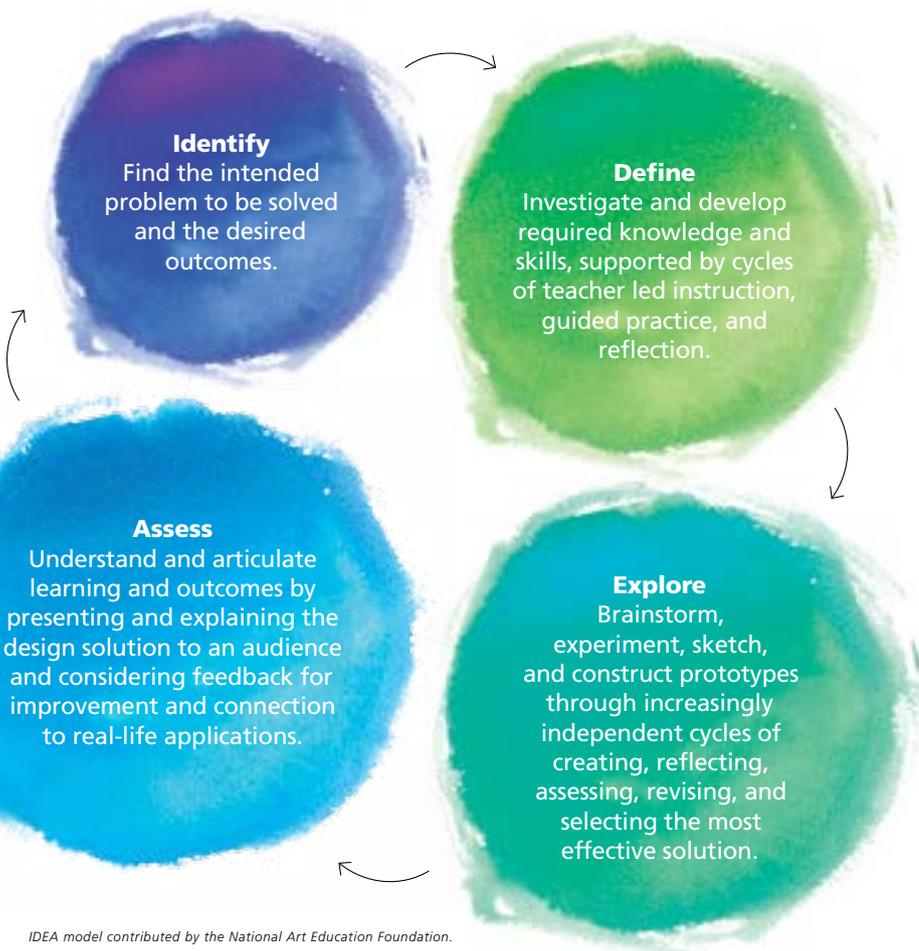
The Design Thinking process encourages people to be fluid with ideas and reflective about what they could improve. Dennis Palm, principal of Weaver Lake Elementary School in Maple Grove, Minnesota, said he encourages students to identify and learn from their mistakes.

Aimee Stahl and Lisa Feigenson, researchers at Johns Hopkins University, have studied how young children learn. They found that when expectations are defied and predictions are wrong, children focus more intently and learn more. Palm's experience confirms the research. Mistakes spark curiosity and deeper learning.

Weaver Lake Elementary installed a "maker space" to give students an open-ended place to playfully explore ideas and materials. This studio integrates technology into the creative process. Students are using Makey Makey boards and Scratch coding as they play with ideas. Their curriculum leader, Karla Juetten, came to educa-

The Design Thinking Process

Design Thinking is an inventive process through which problems are identified, solutions are proposed and produced, and the results are evaluated.



IDEA model contributed by the National Art Education Foundation.



tion with a computer design background. She helps classroom teachers embrace the integration of Design Thinking and technology.

Palm's recommendations to principal colleagues include a list of what he calls the "TMIs" that differentiate this maker movement approach from traditional teaching. He says principals need to help teachers avoid these TMIs: too much instruction, too many interruptions, and too much intervention.

Palm has found that this approach develops students' perseverance. "Stu-

dents grow to view mistakes as opportunities to improve. If we can keep kids from getting defeated by mistakes, we've given them a life-long, growth mindset."

Change the Paradigm

"The Power of Change" is one of the Design Thinking themes students explored at Marietta Center for Advanced Academics. Fifth-graders wrote about the changes they wanted to see. Students used amazing technology that turned their voices into large-scale



CLOCKWISE FROM TOP: Compass Charter School, New York, New York; Weaver Lake Elementary, Maple Grove, Minnesota; Pleasant Hill Elementary, Pleasant Hill, Missouri



visuals that changed when they spoke. Children created a huge kinetic sculpture, inspired by Alexander Calder, where the images shifted as the light patterns changed throughout each day. The big idea that came from this multifaceted unit was the children's belief in themselves—as builders, makers, and change agents prepared to embrace and create change.

Palm and Hernandez offer the same closing advice to principal colleagues. "Empower your students and teachers, and step out of their way," Palm recommended. Hernandez agreed: "As leaders, we need to humble ourselves. Set the stage for change and engage all the players. Teachers have as much voice in designing our school vision as I do. Children here are design thinkers who know they're capable of making important decisions. Hire people who embrace ways to redesign education and let their expertise shine. That's the way to design schools for the future." **P**

Cheri Sterman is director of education at Crayola.