Empowering Students in Math through Entrepreneurship (Grades 6-8)
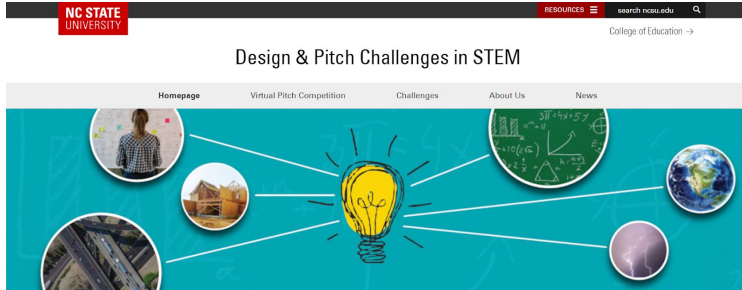Erin Krupa, Michael Belcher, and Jere Confrey
North Carolina State University
NCTM 100 Days of Professional Learning 2020
July 14, 2020, 7:00 PM - 8:00 PM EDT

The Design & Pitch (D&P) Challenges in STEM, including all support materials, can be accessed for free at:
https://sites.ced.ncsu.edu/design-and-pitch/

For more information, contact us at:
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Entrepreneurial Framework: The D&P Challenges in STEM leverage the excitement of entrepreneurial pitch competitions to increase students' interest and engagement in STEM, while also supporting rich mathematics learning. The challenges were built around the following entrepreneurial framework, which shows several key characteristics of entrepreneurship (outer circle) that the challenges are intended to elicit through engaging students in authentic entrepreneurial processes (inner circle).
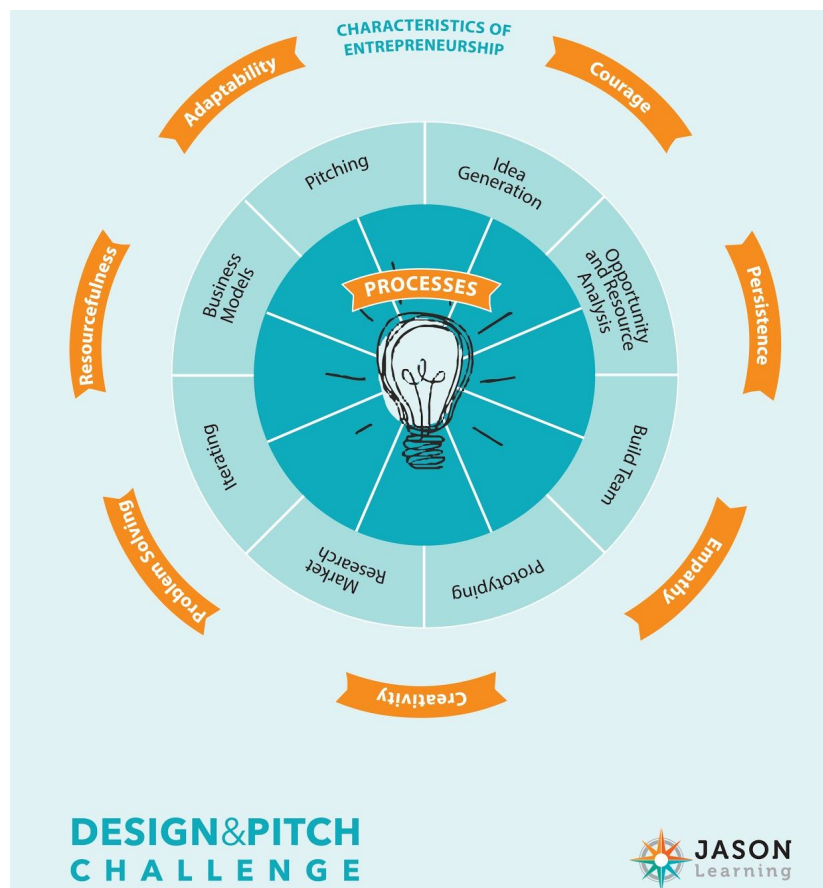

(Confrey, Krupa, & Belcher, 2019)

Challenges: The D&P Challenges in STEM currently include 9 entrepreneurial-based STEM challenges. Each real-world challenge is introduced by a STEM professional and/or entrepreneur. The following table lists the title, context, and aligned CCSS-M standards challenge champion for each challenge. To learn more about the challenges, explore our website at https://sites.ced.ncsu.edu/design-and-pitch/

Challenge Title	Challenge Description	Challenge Champion	Mathematical Topics
Operation Lifeline	During natural disasters, delivering essential supplies like water, food, and medicine becomes a race against time. This challenge becomes even harder when the supplies have to be kept cold the whole time so that they don't spoil. In this Design & Pitch Challenge, you will find a workable solution for this important problem.	**Kris Ludwig** Scientist at the United States Geological Survey	3-D Figures; Proportional Reasoning
Power Me Up	Gas-powered vehicles release harmful greenhouse gases and rely on a natural resource that will someday be gone. As a result, more and more people are buying electric vehicles. More electric vehicles means there is a need for more electric vehicle charging stations. This is an opportunity for savvy entrepreneurs. In this Design & Pitch Challenge, you will plan a company that builds charging stations for electric vehicles.	**Kristin Vicari** Senior Chemical Engineer at Tesla	Analyzing Data; Proportional Reasoning
Keep it Real	Smartphones are everywhere. They make so many things easier. We can get a ride, order a pizza, and connect with people across the world with a single tap of the screen. But what happens when smartphones get in the way of communication? In this Design & Pitch Challenge, you will design a way to help people put down their phones and connect, face-to-face.	**Cardell Patillo** Executive Director of Mile High Kids	Collecting, Analyzing, and Representing Data
Building Algorithms	In today's internet world, data on people's opinions are highly prized. One way to understand those opinions is to ask people to complete surveys. Researchers then create formulas, or algorithms, that analyze their survey responses in an automated process. Many successful businesses are built around algorithms. Your challenge is to build an algorithm that uses people's opinions to rate or rank something you care about and that can be the start of a successful business.	**Cathy Yee** CEO & Founder of Incluvie	Equations and Inequalities; Percentages
Prototype to Profit	Being an entrepreneur is about finding problems and turning them into opportunities. It's about inventing new solutions that create value for customers and using those solutions to make money, because even the best ideas need funding to succeed. At the heart of making money is finding the right business model type. The right business model type can be the difference between success and failure for an idea. And, sometimes, the business model type itself is the solution.	**Tyler Maloney** Materials Science Engineer & Entrepreneur	Representing and Solving Linear Functions
Erase Food Waste	The way food looks is one indicator of whether it is safe to eat. But in the United States, we take this idea too far. Most grocery stores and restaurants won't offer produce to their customers that isn't perfectly shaped and colored, even if it is perfectly safe to eat. This results in a lot of food waste. In this Design & Pitch Challenge, you will design a food-related business that uses a sliding price scale to reduce food waste.	**Oscar Ekponimo** Founder & CEO of Chowberry	Percentages; Data Collection and Analysis

[Fix It: Design for Community Impact](#)	In every community, there are problems that need solving or things that need improving. The most effective solutions are ones that meet the needs and desires of the community. If you pay attention and ask questions, you will notice what people want and what they're lacking. Entrepreneurs don't wait on the sidelines for others to do the work. They jump in and use their energy and passion to make change happen. What can you fix in your community?	**Gitanjali Rao** Inventor & STEM Promoter	Proportions; Transformations; 3-D Figures
[Flashy Fashion](#)	Technology can now be integrated into clothes, bags, and wearable devices for both self-expression and health & safety applications. Designers' creativity is shining in fashion shows, and tools like LEDs are now accessible enough that anyone can learn to make wearable technology. How will your design light up the world?	**Kelsy Dominick** Designer & CEO of DiDomenico Design	Coordinate Plane; Transformations; Domain and Range
[Pollution Solution](#)	Plastic is a big environmental problem. The world is becoming overwhelmed by plastic waste, especially plastic containers that hold consumer products. Can you imagine a solution to replace plastics that does not cause as much harm to the environment?	**Clifford Okoth Owino** Founder & CEO of Chemolex	3-D Figures; Data Collection and Analysis

Design & Pitch Challenge Process: Drawing from research on project-based learning, design-based learning, and entrepreneurial-based learning, each challenge engages students in a collaborative and iterative process in which they 1) research open-ended and authentic problems; 2) develop, test, and revise prototype solutions; 3) construct business plans for making their solutions actionable; 4) describe and reflect on the process for building those solutions; and 5) practice and deliver a concise and convincing 5-minute pitch to judges. The following image outlines this process.
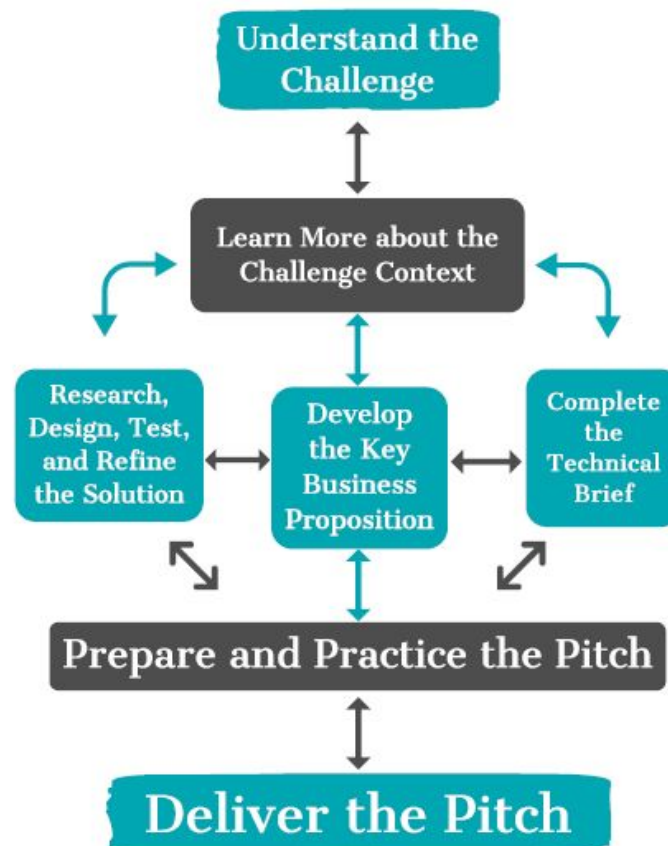
Learn More about the Design & Pitch Challenges in STEM: We are looking for teachers and schools who would be interested in partnering with us to research the challenges. Use the link or QR code below to sign-up for more information. **We can even host an online Virtual Design and Pitch Competition with you and your students.**

Interest form: go.ncsu.edu/design-and-pitch-signup