Engaging Middle Grades Students in STEM-Based Entrepreneurial Challenges

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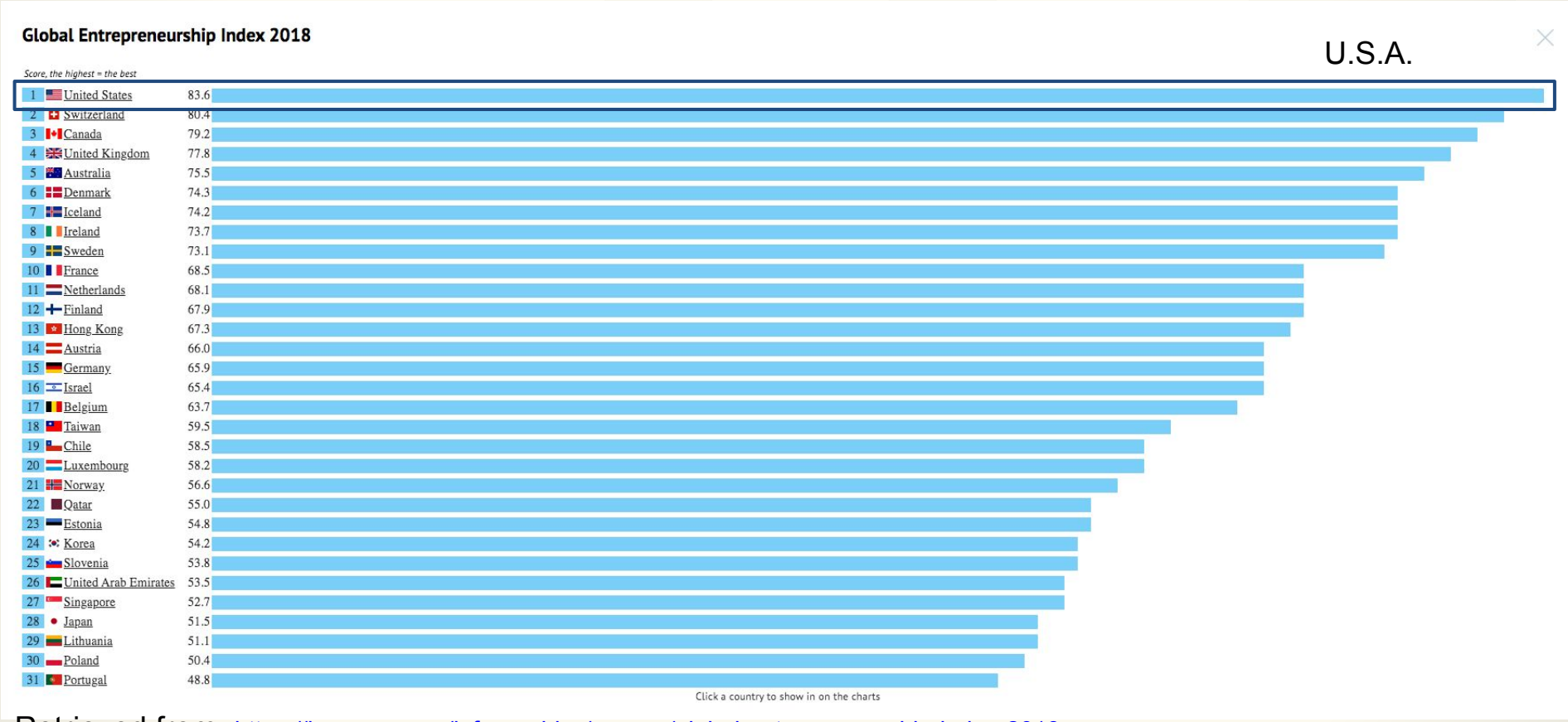
Materials for Design and Pitch Challenges have been authored by the SUDDS team and produced by Jason Learning

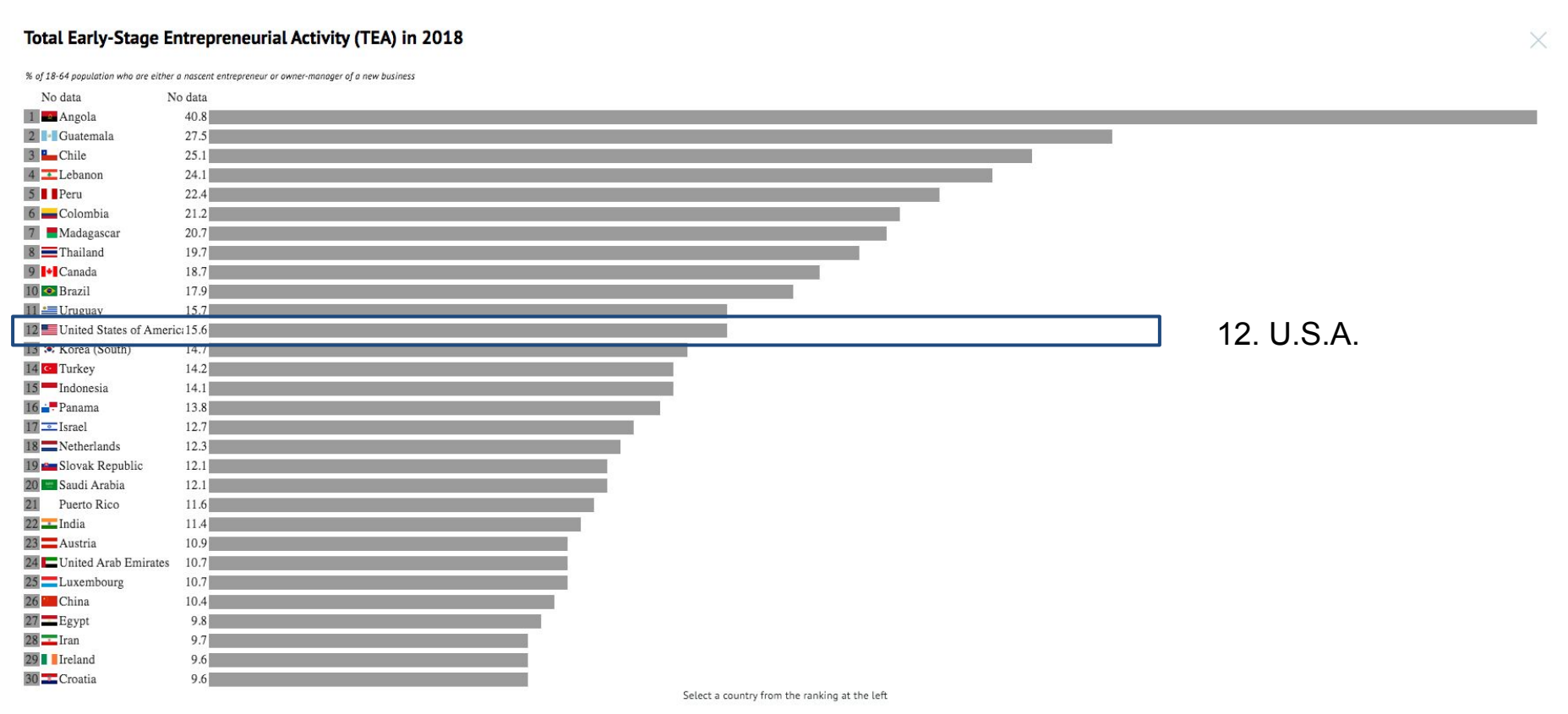
Global Entrepreneurship Index:
A measure of the health of a country's entrepreneurial ecosystem



Retrieved from: https://knoema.com/infographics/nyyasp/global-entrepreneurship-index-2018

The Global Enterpreneurship Development Institute (GED() methodology collects data on the entrepreneurial attitudes, abilities and aspirations of the local population and then weights these against the prevailing social and economic 'infrastructure' – this includes aspects such as broadband connectivity and the transport links to external markets. This process creates 14 'pillars' which GEDI uses to measure the health of the regional ecosystem.

Early-Stage Entrepreneurship



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Retrieved from: https://knoema.com/infographics/nyyasp/global-entrepreneurship-index-2018

Implications of Entrepreneurship for the Preparation of Students

To prepare for 2030, people should be able to think creatively, develop new products and services, new jobs, new processes and methods, new ways of thinking and living, new enterprises, new sectors, new business models and new social models. Increasingly, innovation springs not from individuals thinking and working alone, but through co-operation and collaboration with others to draw on existing knowledge to create new knowledge (p. 6).

ED 2030 (2018) Organization for Economic Cooperation and Development (OECD).

Contributions of Entrepreneurship

To the Economy

- Contributing to GDP
- Generating employment
- Generating tax
- Introducing new technology
- Assisting other Industries in the economy

To the Community

- Solving social problems
- Generating change
- Hiring locally
- Empowering communities
- Creating generational wealth

Student Perception of Entrepreneurship

Entrepreneurs take action to benefit both the “greater good” and the entrepreneur.

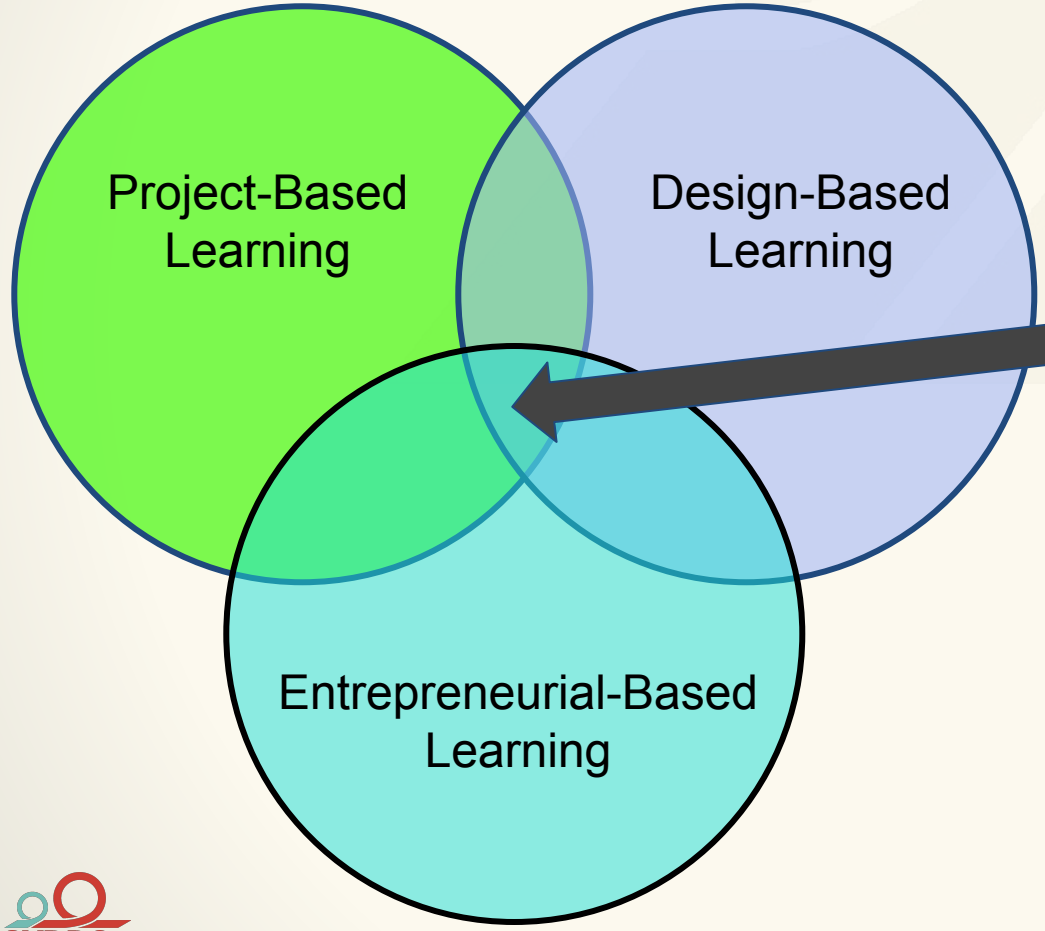
Is-is someone who-who takes an idea and uses it to their own advantage but also other people’s advantages.

Learning about Entrepreneurship

To develop entrepreneurial skills and an entrepreneurial approach to problem-solving, students need opportunities to:

1. Engage in authentic entrepreneurial tasks (Passaro et al., 2017);
2. Collaborate, argue, and debate ideas and processes with peers (Passaro et al., 2017);
3. Reflect on their knowledge and skills relative to a specific entrepreneurial opportunity; and
4. Consider ways of providing value to customers (Lackeus, 2015).

Innovative Approaches to STEM Instruction



The Design & Pitch Challenges in STEM

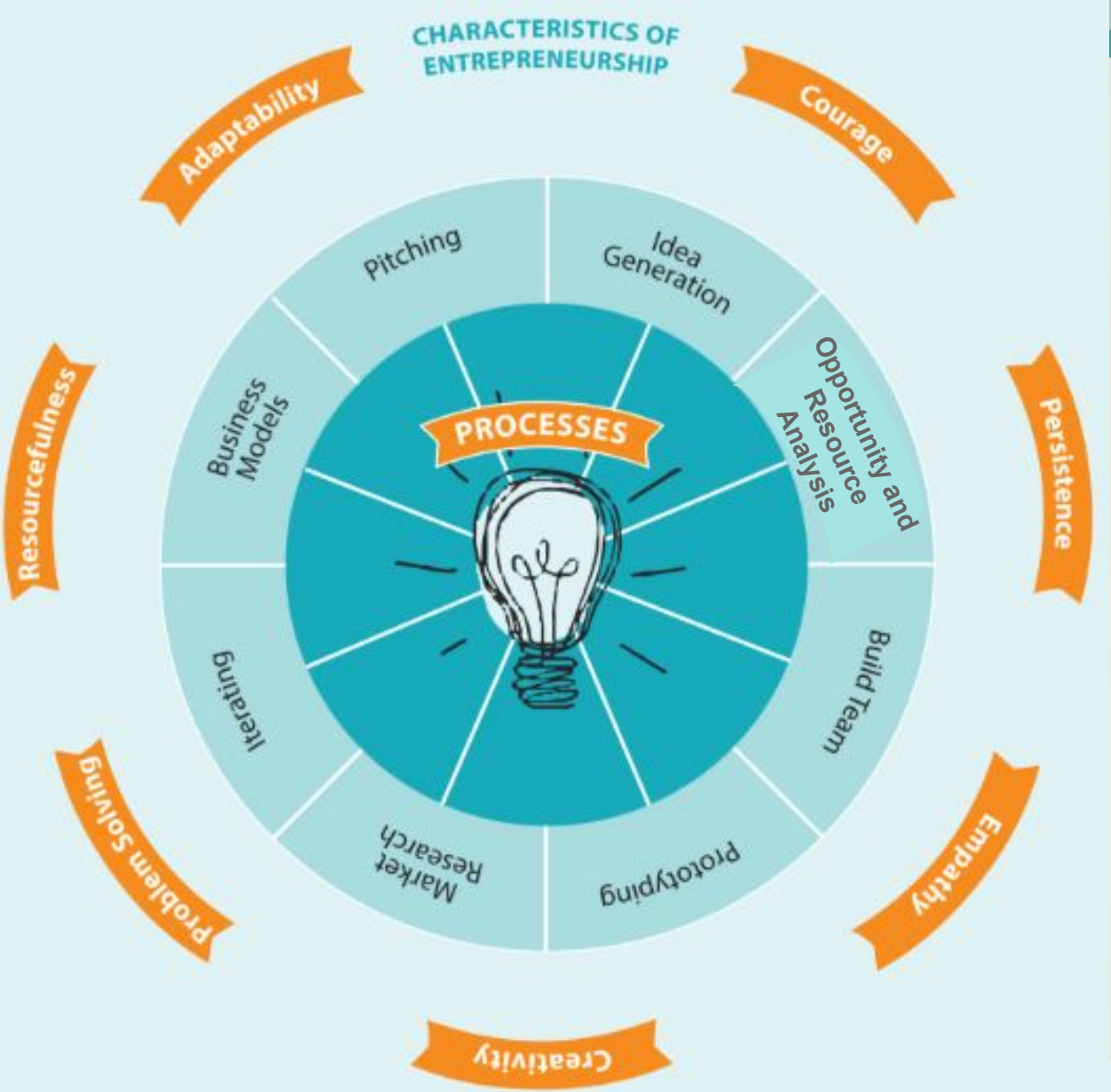
015;

1. Introduces students to business perspectives
2. Supports students' engagement
3. Connects to disciplinary knowledge
4. Can motivate the pursuit of STEM fields

Existing K-12 STEM Entrepreneurial Educational Programs

SUDDS

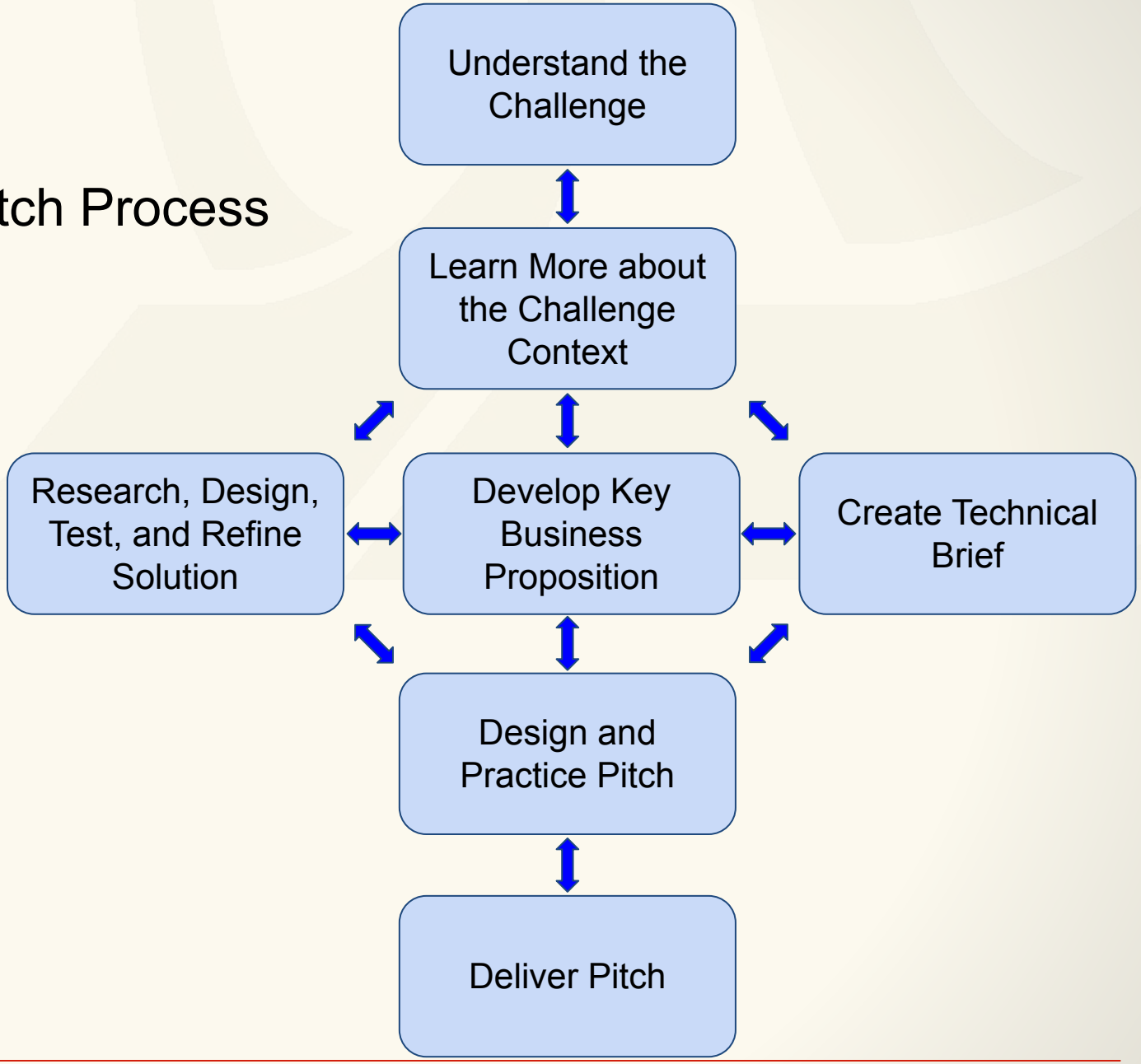
Framework for Entrepreneurship



DESIGN&PITCH CHALLENGE

Confrey, Krupa, & Belcher, 2019

The Design & Pitch Process



The Design & Pitch Challenges in STEM

Operation Lifeline

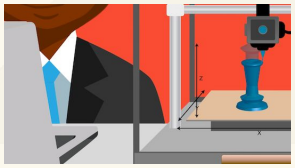
Power Me Up

Keep it Real

Building Algorithms

Prototype to Profit

Erase Food Waste



Fix It: Design for Community Impact

Flashy Fashion

Pollution Solution

Components of Design & PItch Challenges

Design & Pitch Challenges in STEM

You have great ideas for how to make the world a better place. The Design & Pitch Challenges in STEM are your chance to start turning those ideas into a reality.

In these Challenges, you will need to think like an entrepreneur as you create real solutions to messy STEM problems. You will use your knowledge and expertise in creative ways to invent new products that meet customers' needs. You will need to be able to

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https://www.jason.org/design-and-pitch

Design & Pitch Example: Building Algorithms

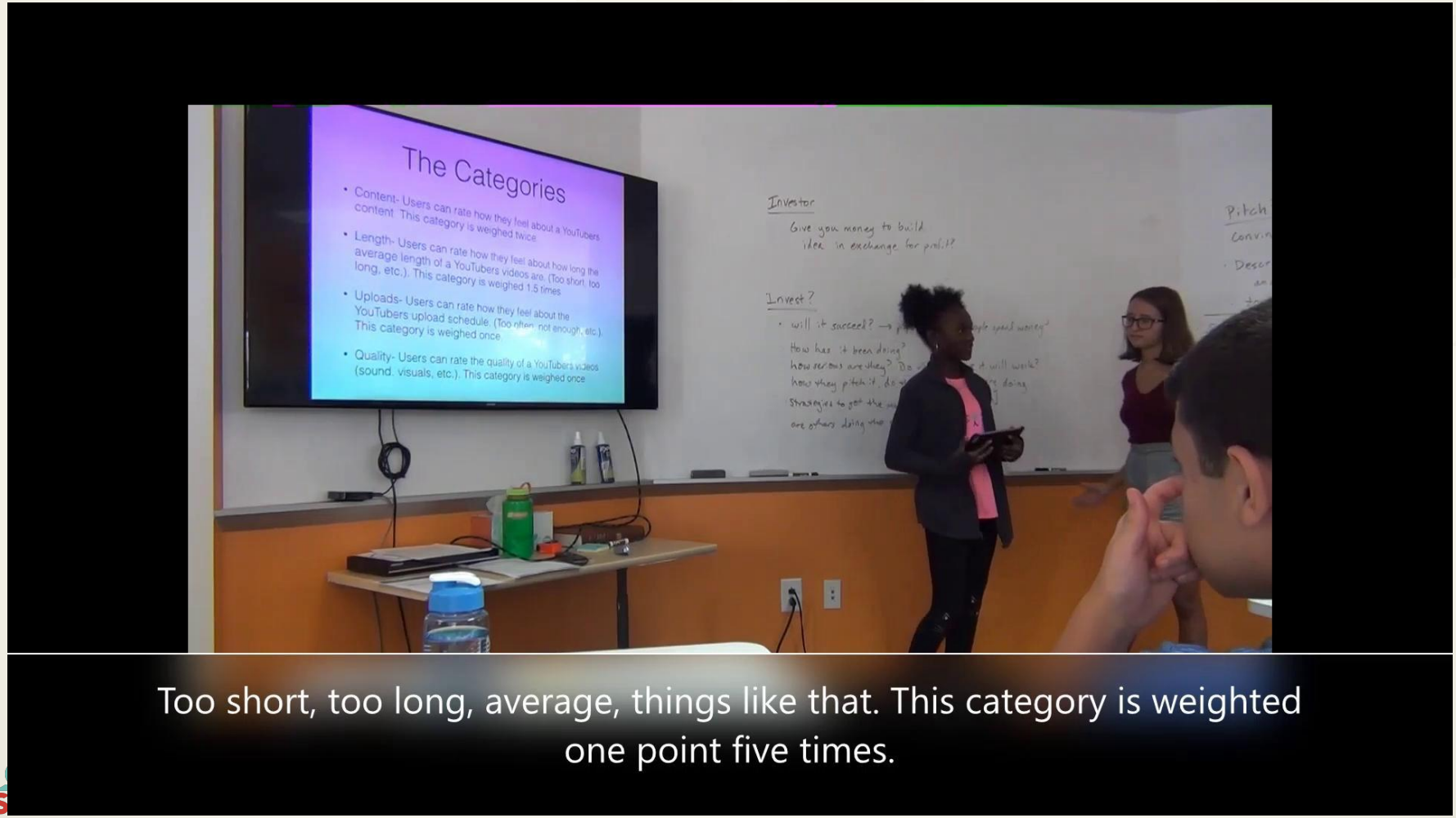
Early Findings: Entrepreneurship and Authenticity

Entrepreneurship connects math to real and familiar contexts.

and then I was like, "Oh! I use-we use-I use that,". And then-and it's just kind of like and it kind of connected everything for me.

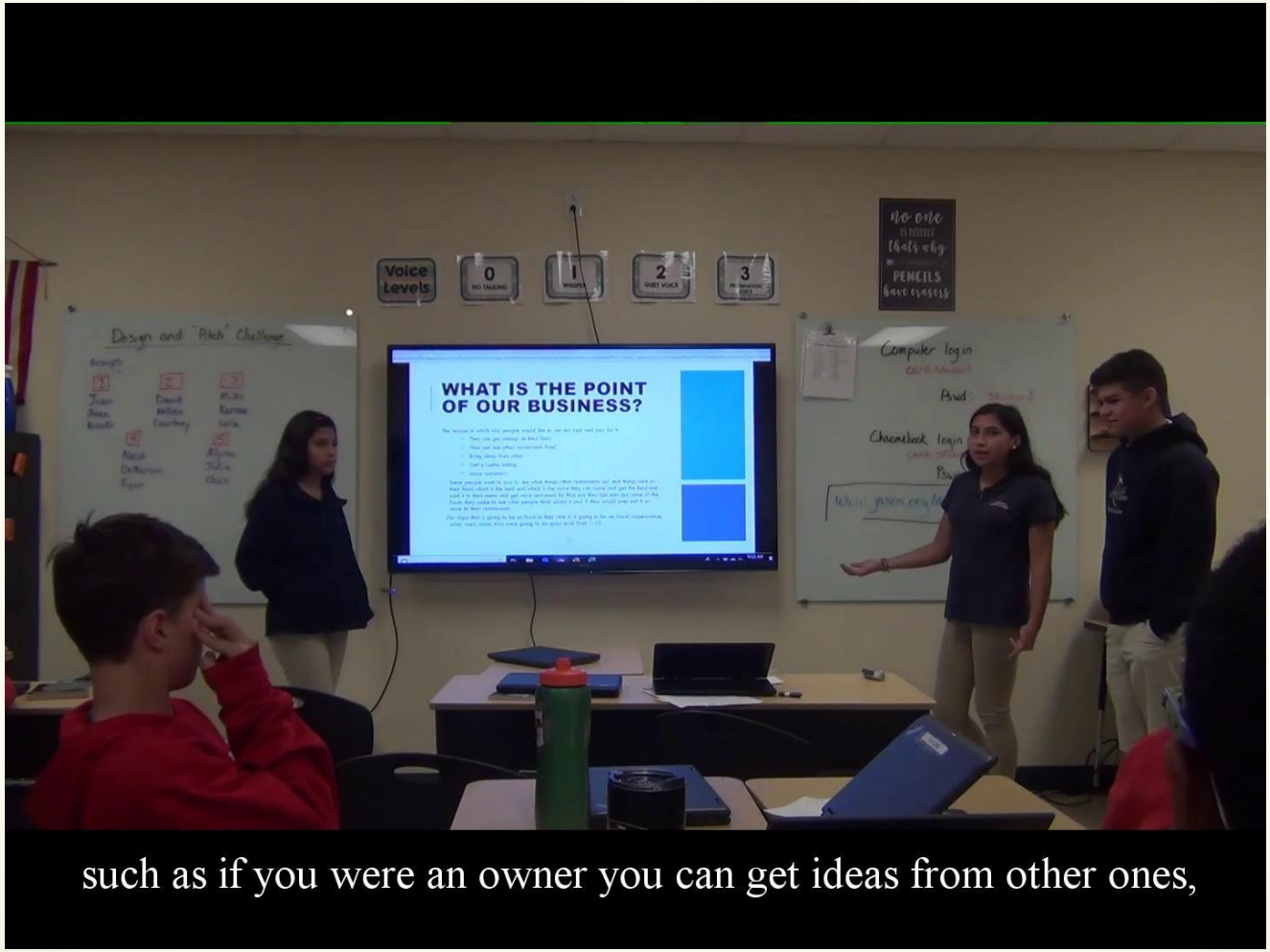
Early Findings: Mathematical Reasoning in Building Algorithms

A weighted algorithm for rating YouTube channels



Early Findings: Mathematical Reasoning in Building Algorithms

An algorithm for rating foods



Conclusion

- Developed 9 D&P Challenges
  - Created framework
  - Designed materials
  - Tested with small groups of students
  - Tested in classrooms
- Dissemination Efforts
  - JASON Learning partners with 52 districts across the United States
    - Individual teachers
    - Community events
  - Locally in middle schools
  - Public website will soon house all 9 challenges
- Research
  - Student STEM interest
  - Student motivation and self-efficacy
  - Mathematics learning