

Background

In all honesty, I've really struggled with finding the right path for this project. The project idea has already had multiple iterations in the past month - from engineering a sieve to filter polluted water to creating rooms in a haunted house for our First Grade Buddies and many, many other ideas in between. I think I've felt so stuck because in the past few years, I've implemented a variety of engineering projects in my classroom and wanted this project to be a special one.

At the beginning of last week, I thought I had settled on an idea. Every year, our community celebrates Halloween with "Skeletons are Alive" in our downtown. Different businesses and organizations sponsor and dress up a skeleton in creative and interesting ways. I thought it would be a great idea to have a similar "Skeletons are Alive" at our school. I had started brainstorming and working on my project when I had a meeting with our school Social Worker.

I can't think of a year when I've had such significant emotional and social needs in my classroom. The past year and a half has impacted students in ways we are just starting to realize. About half of my class are in-person for the first time in 18 months and they've forgotten how to coexist in a classroom. They are struggling with anxiety, stress and focus, as well as an inability to handle their emotions. During standardized testing earlier this month, I had multiple students in tears and two students who seemed to be "frozen." These students both often took over 10 minutes to try to answer a multiple-choice question on the standardized math test. After meeting with the social worker, discussing my students' needs and reflecting on what a unique year it's been so far, I realized what my students really need is some social-emotional coping tools.

Students will be asked to engineer a silent, handheld, reusable mechanism using at least 50% recycled materials that meets one of the following goals:

- Helps students to find calm when feeling worried or anxious
- Allows students to fidget while improving focus and concentration on the lesson
- Brings students joy when feeling sad or down
- Encourages students to self-regulate when feeling angry or emotional

NGSS Standards

- 5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.
- 3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
- 3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

- 3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

CASEL Framework

- Self-Management: The abilities to manage one's emotions, thoughts, and behaviors effectively in different situations and to achieve goals and aspirations.
- Self-Awareness: The abilities to understand one's own emotions, thoughts, and values and how they influence behavior across contexts.
- Responsible Decision-Making: The abilities to make caring and constructive choices about personal behavior and social interactions across diverse situations.

Project Steps

1. Students will work through the Engineering Design Process adapted from NASA and Teach Engineering. I'd like to launch the experience with a picture book about a student facing an SEL challenge so we can center our project around empathy and understanding. I've always liked that element of Design Thinking.
2. I will provide students with a list of criteria and constraints which they'll need to keep in mind as they progress through the project. We've already introduced and explored these concepts in our classroom. Criteria are our objectives/requirements and constraints are limitations.
3. Students will be given some guided research opportunities in which they'll have to learn what types of SEL manipulatives are helpful in the classroom and how they work, which would be an aspect of procedural knowledge.
4. Students will use their research to choose a focus area and brainstorm possible options for their product. Developing a variety of ideas is a challenge for fifth graders. They tend to think that their first idea is the best and will work, no problem. I'd like to use Dartmouth's idea of a trade-off matrix to help students recognize that having multiple options to choose from tends to work best.
5. Students will build their prototype and test and improve as necessary. I may put students into small support teams so that they have other peers to talk through problems with or even ask members of their support teams to "test" their prototypes.
6. We will have a Design Expo in which students get to display their products to visitors.

My goal is to finalize the details of the project this week and get started next week.