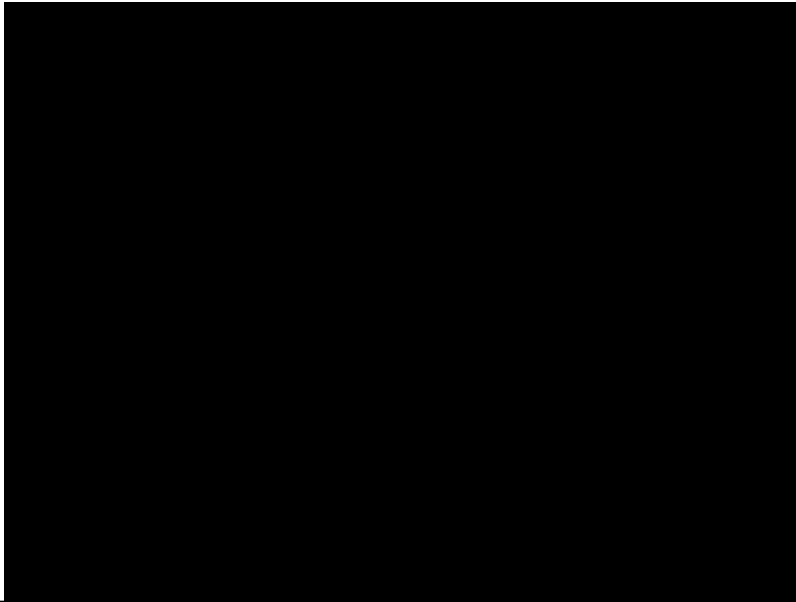
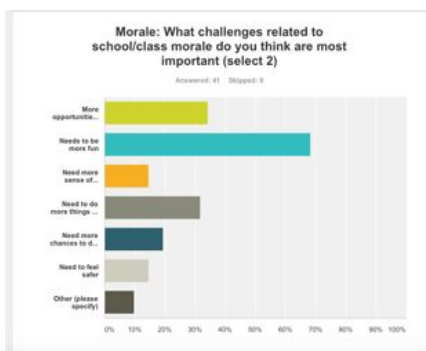


The Light Up Limbo Stick Group: McKenzie, Lucena and Cory



Defining the Problem: The Lack of Fun



Why?

- It was the biggest concern for all of the survey participants and for the kids.
- When kids are not having fun, they get bored, fall asleep and do not do their homework. They then get bad grades and tracked into lower 7th grade classes.
- For Cory, he made his own fun when there was not enough school sanctioned fun. Then he lost his opportunities for fun.

Answer Choices	Responses
More opportunities to celebrate accomplishments	34.15% 14
Needs to be more fun	68.29% 28
Need more sense of community	14.63% 6
Need to do more things as a class to make a difference	31.71% 13
Need more chances to do something important	19.51% 8
Need to feel safer	14.63% 6
Other (please specify)	9.76% 4

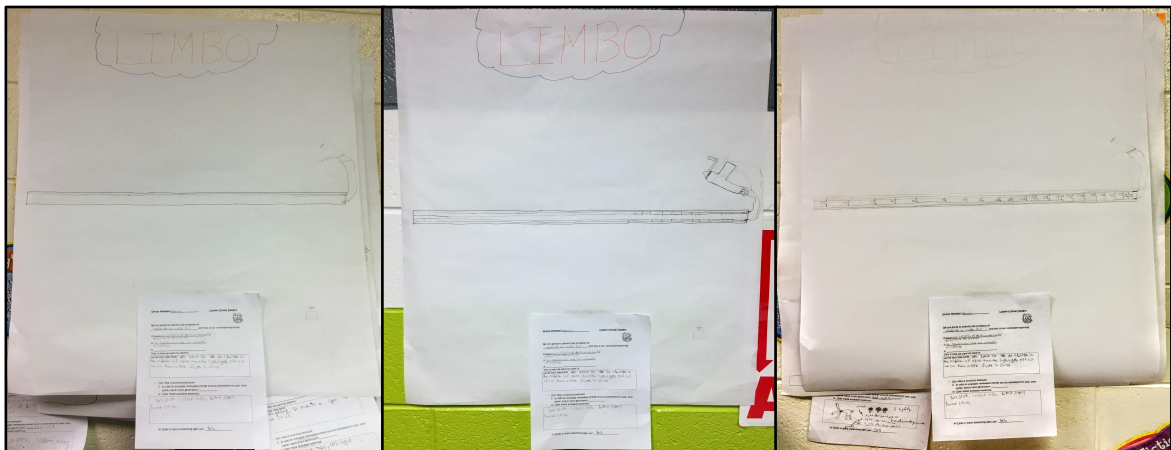
Total Respondents: 41

Designing the Solution: A Limbo Stick

- "Everybody likes to limbo."
- They had never limboed at school.
- It was a suggested solution on the survey results.
- Kids only went to recess once a day at the most so they wanted to have some movement breaks.

1. Kids Results		
What are the top 3 problems kids identified?	What percentage of kids cared about this problem?	Why do you think this is a problem?
needs to be more fun	68.29%	I think this is a problem because we only go outside for recess and it's not fun
more opportunities to celebrate accomplishments	34.15%	I think it's a problem because if people get 300 gymnas they don't get to celebrate
need to do more things as a class to make a difference	31.71%	I think it's a problem because we only go outside for recess

Sketch-Ups Over Time



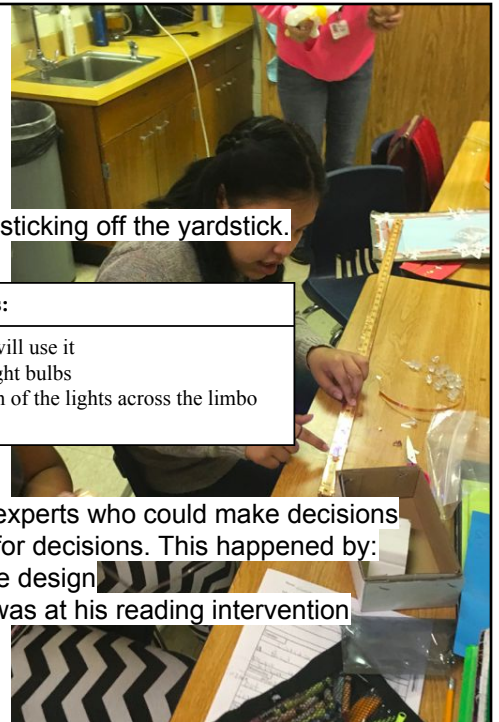
Feedback on Solution

- Make sure to use a parallel circuit.
- Make sure there are no sharp points from the LED lights sticking off the yardstick.

Technical Considerations:	Social Considerations:
<ul style="list-style-type: none">• Type of circuit• Type of energy source• How to position the lights to make it work effectively	<ul style="list-style-type: none">• How students will use it• Coloring the light bulbs• The distribution of the lights across the limbo stick

Teacher Tip: Recognizing all three members of the group as experts who could make decisions about this supported the two girls who were deferring the boy for decisions. This happened by:

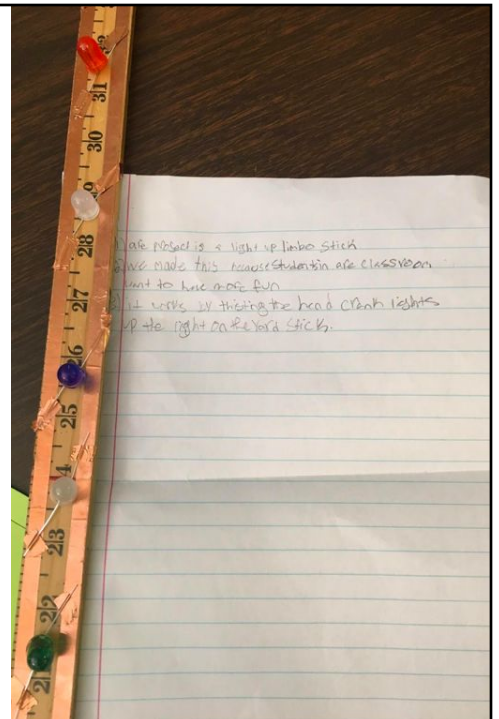
- Providing them with a doable first step in sketching up the design
- Not allowing them to go ask the boy questions when he was at his reading intervention pull-out because it was their design too.



Prototyping

“We created the limbo by using 23 led lights, a hand crank, a yard stick and copper tape. We did a parallel circuit so the electricity can flow through it.”

Teacher Tips: Using the invention supported the kids’ efforts! Their teacher played limbo music on her phone and the class limboed for breaks. Additionally, during the showcase, other students and even teachers limboed under it!



Troubleshooting

- Turning the lights to a diagonal angle so the LED lights' leads did not poke people.
- Spreading out the lights across the yardstick when they ran out of lights
- Fixing the hand crank generator when it stopped working.

Here you can see McKenzie and Lucena testing a mini-parallel circuit with a hand crank before they added it to their limbo stick →



Teacher and Students' Reflection on the Projects

Katie: So why did you say this says that you're smart?

Cory: Because of how like, well it's not just me that's smart. Our whole group, me and Lucena and McKenzie, when you start off people don't know what they're going to do, so you got to think about it. Think about it, think about it. (emphatically) And then you come up with an idea. That is time consuming, you put all the lights on, and decorate, and I just feel like it was a smart idea to do it. Everyone likes it, we finished it on time, and it was cool.

Katie: Cool, awesome. And you said that your whole group was smart, did like each person bring...I'm trying to say...

Cory: I understand what you're saying. Yeah, they kind of did because they were tossing out ideas on how to improve it as we were building, like we had to have the lights straight, or diagonal, things like that.

-Cory explaining how the limbo stick shows how he and his group members are smart.

I've got blinders on and I forget that part [the importance of fun in school]. And as kids, they probably have blinders on for what I need, but they know that part so we were able to have that discussion and they wanted to do things in the classroom that would make it fun to be, you know, recognized and also I think part of them for fun was actually making it.

=Mrs. K explaining what she learned with the kids.

Light up limbo

Story of the engineering invention:

We made our invention because people in our classroom were not having fun so we wanted to help with that.

We created the limbo by using 23 led lights, a hand crank, a yard stick and copper tape. We did a parallel circuit so the electricity can flow through it.

We first drew it then started building it and made changes we needed to make.

Some people said that they thought that it would be fun to do a limbo in class.

About the engineers:

- Cory plays football
- Lucena likes to dance
- McKenzie has been to New York

Materials: 23 light, copper tape, hand crank and a yard stick



Reflection Rubric

1. What **knowledge** and **practices** did the students develop and use?
2. How were the students **recognized** for their expertise?
3. In what ways, did students have opportunities to take **action** in meaningful ways?
4. What outcomes were made possible by the combination of the students' knowledge/practices, recognition and action?

Write any questions you have that will help you teach this design cycle.