Lesson Implementation & Reflection

Date: March 19, 2021

Grade: 4th grade

Name of the lesson: NASA JPL-Touchdown

The challenge that I presented to my students is called Touchdown, and it can be found on the NASA JPL website. The challenge Touchdown consists of constructing a shock-absorbing system for the astronauts to have a safe landing. During this activity, students practice the engineering design process by designing a spacecraft that can land safely.

I enjoyed and loved the Touchdown activity, and my students had an awesome experience with the challenge. This is the first time that I give myself and my students an opportunity to explore this activity, and I wished I could have tried it sooner. The first time I encountered this activity I did not care much for it, and thought that it would take lots of preparation time, but it did not.The materials were easy to find and gather, and the activity itself was easy to prepare for. The only material that I had to collect was the cardboard, and rubber bands.

I did this investigation with two-fourth grade classes during our science block. Both groups were excited about the challenge, and about testing their prototype outside in the playground. The students all on their own made it into a competition, and they decided that the winner would be the group whose lander landed standing up in all three levels, and kept the “ astronauts” safe. I don’t think I have ever seen my students so excited about science, especially

about wanting to modify and test their prototypes for improvements. I wished we had more time, and that they had their materials with them when testing outside, it could have given them more opportunities to continuously modify the lander.

This activity took us two days to complete. The first day the students gather into groups of three. Each group member was given approximately 15 minutes to design a model of their prototype. We read the challenge worksheet, but only the challenge and materials needed. After designing their individual prototype, each member shared their idea with the group. After the presentation, the group voted for the best design that they will use to create the lander. The next day was dedicated to constructing the prototype, the students were given about 30-35 minutes to construct their lander. Students work collaboratively and were all engaged in the activity through the whole process. They kept on discussing between themselves about adding details or extensions such as wings, and parachutes. It was beautiful to see them engaged and enjoying collaborating with each other.

The activity could be improved by allowing time for students to discuss with their group about the things that worked and how they could revise/edit their prototype. We did not have time for much reflection since we did this activity on the last day before spring break, and we ran out of time. Asking students to bring their materials with them outside, in case they needed to continue modifying their prototype could also be an improvement. In this activity we did not make use of "authentic space data", maybe as an extension I can integrate data analysis, I'm just having a hard time finding an activity with data analysis that can be connected to this particular activity.

Images of Artifacts:

Image 1: Student taping the legs on their lander.

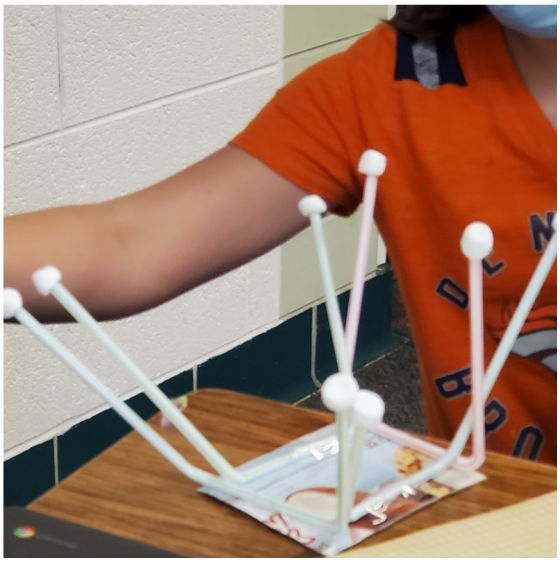


Image 2: Student presents finish lander.

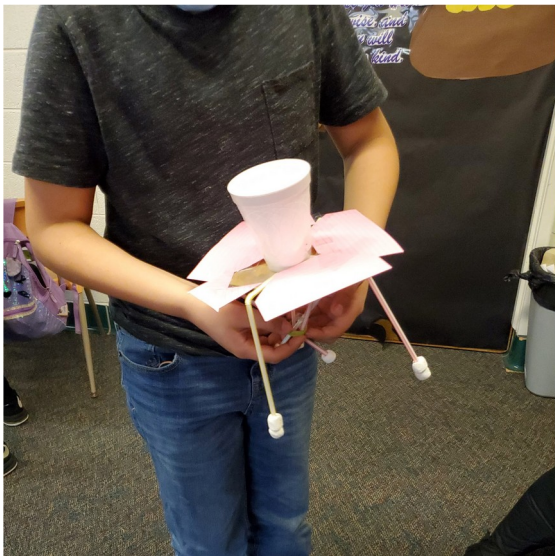


Image 3: Students working on lander, adding legs.

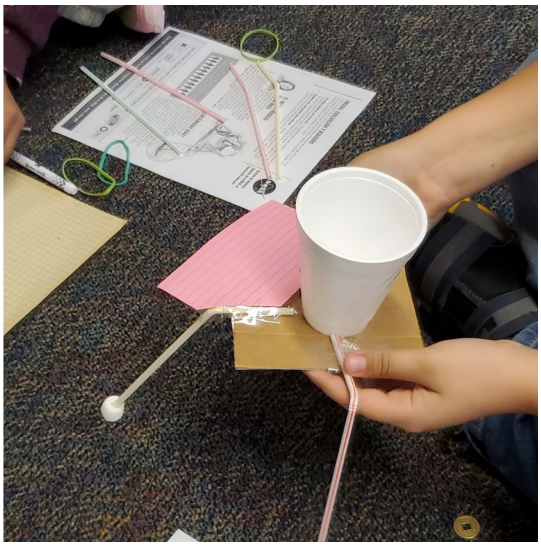


Image 4: Students adding a index card to use a parachute.

Image 5: Students testing their lander on the first level.

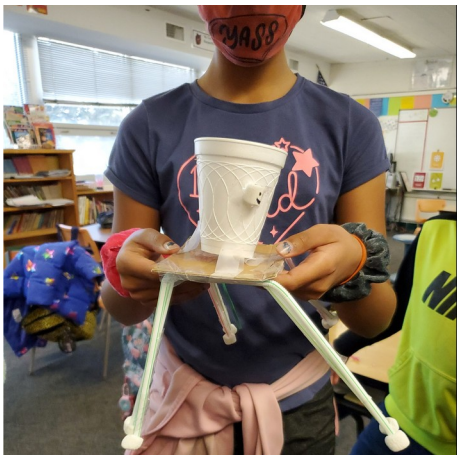


Image 6: Students presenting their final lander.

Image 7: Students testing their lander outside during the 3rd level (highest).

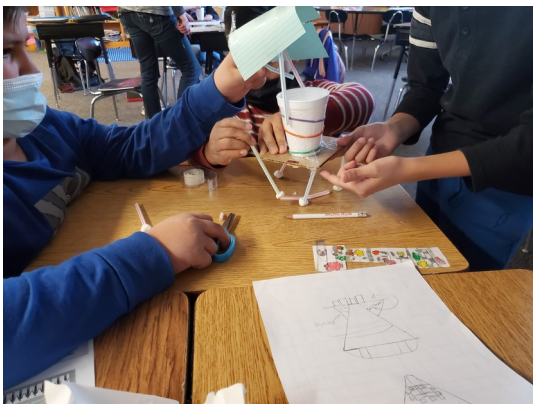


Image 8: Students building their lander.

Image 9: Students talking about their completed lander.

Image 10: Students testing their lander In the last level (highest).

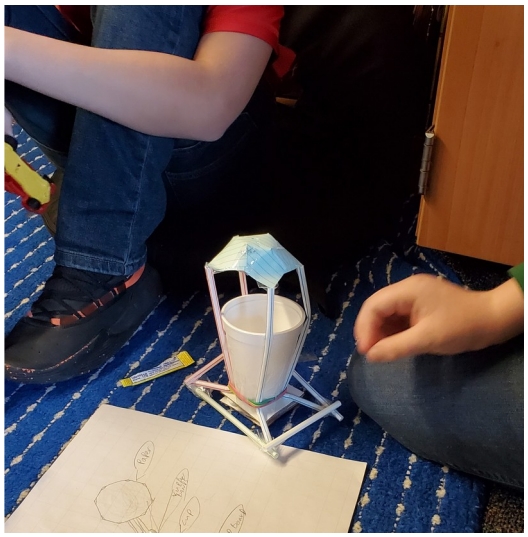


Image 11: Students testing their lander during the 2nd level (medium).

Image 12: Students testing their lander during the highest level.

Images 13- 15 show samples of students designs:

Image 13

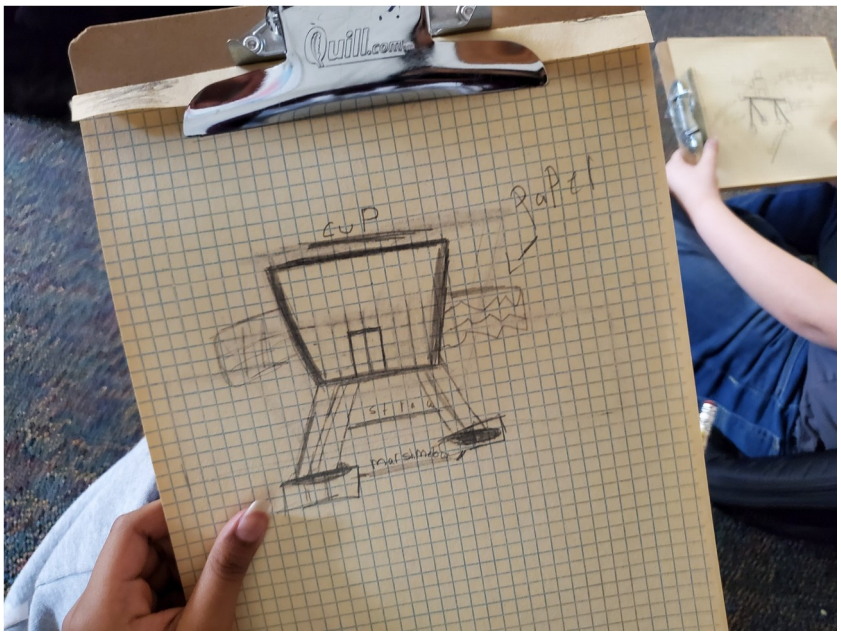


Image 14

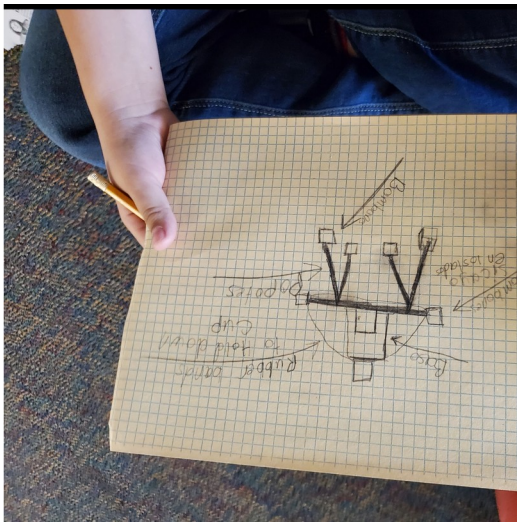
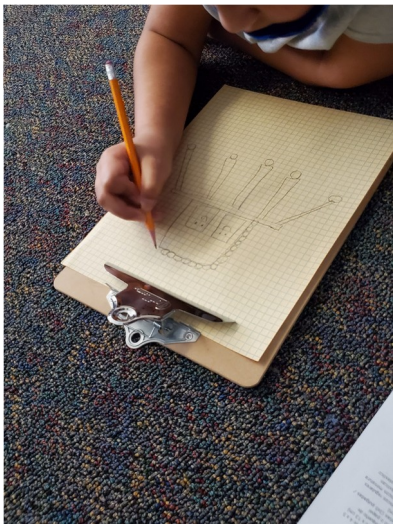


Image 15



- **References**

NASA.Jet Propulsion Laboratory- Activity Touchdown.*California Institute of Technology*.

https://www.jpl.nasa.gov/edu/teach/activity/touchdown/