Novel Engineering

Students Offer Solutions for Peter in *The Snowy Day*

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A snowball slingshot was one of the winners in the novel engineering challenge.
Photos courtesy of Kristin Hancock.

A good book lets us imagine ourselves in the story—befriend the main character, explore the setting, and consider what we would do in any given event. Novel engineering brings imagination to life by giving students the opportunity to identify a problem in the story and design a solution using everyday objects. It was this very concept that brought together an unlikely collaboration between myself, a language arts teacher, and my colleague at Crestview Middle School in Ellisville, Missouri, math teacher Liz Buesteton.

As soon as Liz and I learned about novel engineering in a professional development session at our middle school, we wanted to bring our classes together. After all, I never thought I'd find common ground with the math curriculum! There was only one thing holding us back; we lacked the needed supplies to let students truly get creative in their engineering.

Call it fate or just serendipity, a few days later, our assistant principal Ali Krinski emailed staff members about a mini-grant opportunity from the Ezra Jack Keats Foundation that would be the perfect avenue for novel engineering. The annual mini-grant offers up to $500 to fund innovative and collaborative programs that benefit children. Best of all, our students would read Keats's beloved classic picturebook *The Snowy Day* to think about ways to help protagonist Peter and collaborate on real, working solutions to his challenges.

Thoughtfully and nervously, we wrote a pitch for the mini-grant. We listed items we would order online to bring the project to life. Since novel engineering is all about encouraging kids to be creative, the possibilities for supplies were endless. A plastic spoon can be reinvented as a working catapult. Aluminum foil can be as versatile as modeling clay. Straws gathered together become a weight-bearing tool. We couldn't go wrong with ordering a hodgepodge of ordinary things. The only essential purchase was, of course, the Caldecott-winning book.

We were awarded the mini-grant in May 2016, at the end of the school year. We had the entire following school year to implement our idea. Our novel engineering lesson took place in early April 2017.

Putting the Plan into Action

As two people who had never written a grant before, we were over the moon when we received a congratulatory email from the foundation. We knew our students would be ecstatic too.

Liz and I combined our classes during a ninety-minute block, which allowed more than forty kids to participate. All of our students were in eighth grade.

Students rarely think of math and language arts as being compatible skills, but novel engineering challenges them to

Kristin Hancock *teaches eighth grade language arts at Crestview Middle School in Ellisville, Missouri. She and her colleague Liz Buesteton received a mini-grant from the Ezra Jack Keats Foundation to implement novel engineering.*

The book that inspired the challenge!

analyze conflicts in a story and create real-world solutions. The students were engaged, focused, competitive, and supportive of one another.

As teachers, we were able to see a side of their creativity that we do not get to see on a daily basis.

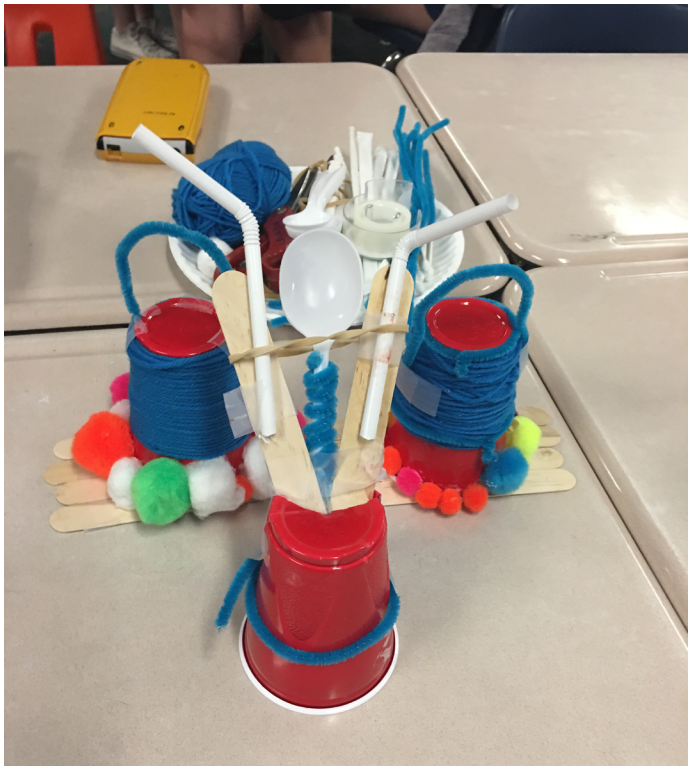
Ready to Build!

Once our supplies arrived, we could begin. The day we brought our classes together, we had groups of students sit together at pods of desks to form teams. We explained the novel engineering challenge before reading *The Snowy Day* out loud to all students. As students listened to the story, they considered different problems Peter faced.

Some students were drawn to Peter's disappointment over not being able to join in the fun of the big kids' snowball fight. Other students wanted Peter to be able to keep his snowball from melting. Still other students were concerned about Peter keeping warm in the snow. Each team brainstormed, sketched, and discussed what they could invent and actually build to help Peter.

After carefully analyzing the story's conflicts, students were free to gather supplies from our eclectic offering of items. Many students wanted to build a snowball launcher to give Peter an advantage in the snowball fight with older, bigger kids. Even though the teams had similar ideas, each team's trial and error process looked different. Students had to consider concepts such as velocity and trajectory when creating their working catapults.

One group designed snowshoes to fit a small child like Peter using plastic cups, pipe cleaners, craft sticks, tape, and brightly colored pom-pom balls. They hoped the base of craft sticks would allow Peter's feet to walk in deep snow easily, similar to Alaskan snowshoes.



Students used many materials to engineer their solutions for Peter.

Two different groups wanted to give Peter a shield to protect himself from flying snowballs. One group built a sturdy shield out of paper plates. The other group packed handfuls of straws together tightly to form an impressive blocking mechanism. Both groups learned that problems can be approached differently to find shared solutions.

To keep Peter's snowball from melting, one group built a snowball cooler out of aluminum foil formed into a three-dimensional box with a lid. My only regret from the day was that we couldn't control the weather to provide real snow for students to test their inventions.

When the forty minutes of work time ended, each group was responsible for presenting its finished project to the class. Students demonstrated how their invention worked and explained how their design would change the story. The creativity and excitement in the room was contagious with each group wanting to outdo the next.

Even though it was a difficult decision, Liz and I declared the group that built snowshoes and a snowball slingshot the winners. The students beamed with pride.

Needless to say, Liz and I recommend novel engineering to stretch students' critical thinking and develop collaborative communication. Students of all ages can adapt their designs to their own abilities. Though the activity could be completed with any story, *The Snowy Day* is an excellent starting point for educators who are eager to try novel engineering. &