Knowledge Building Project, K

Female: **[00:00]** So this whole process started. We'd been talking about weather in the class, which is an outbranch of our astronomy that we started the winter term with. And wind was really difficult because the kids didn't have a lot of ideas of where the wind might come from. Maybe from the flapping of birds.

Student: Jacob Two-Two's wearing a mohawk!

Female: That makes perfect sense to me. Matteo, add some colour to it, okay? While you're there. And then, so they'd started talking about how wind affects things, though. So it affects the waves, it affects the leaves, it affects us when we walk down the street and get blown by it. So that's where our challenge came from. Could we come up with something that could be so affected by the wind that it would move forward? And the challenge is up there. So the wind or a fan will only blow an empty carton so far. What can you design to make the carton travel further when it's blown?

So on the blue sheets here, the kids just drew—they got blank paper and they drew their first ideas. And their first ideas went from very, very simple. Here's Chloe's. Chloe really didn't know what she wanted to do with this one. We had said that all the power had to come from the fan. It couldn't come from the carton itself, but she wasn't sure. So she just ended up drawing a carton, drawing a fan, and saying, "I don't know what to add. Jet packs?"

To something very, very elaborate, like Matteo's, who you saw earlier. He has a cardboard sail. He has an air-sucker. He has a woodchip cow-catcher for cleaning stuff out of the way. Six wheels altogether, three on each side. He has something else that's going to shoot the woodchips out the back.

And other people just had variations on—on de—designs. Wheels were on some of them. Wings were on some. Flags were on others. Sometimes a combination. This one has two wheels that will help it move smoothly and one more wheel for balance. So the kids were really thinking of the kind of design features they really needed and why. So, "Wings, one on each side. I'm going to use feathers, nine on each side. Maybe they will catch the wind."

Here's one. "Twenty feathers to make each wing, attached with glue. Each wing will be as big as Carol's hand."

Here's some more jet packs and a tailfin. "It should catch some wind."

"The flag will help it blow, but it should be a little bit big to move the carton. The flag will be made of white paper. It will be a square. Each side will be 15cm long." Because we were doing—in math, we were doing measurement, so centimetres started playing a big part.

So the next thing was actually to get to bring in their cartons and actually make them. So whatever they said they wanted to make, whether it was a cow-catcher or bunny ears or wings, whatever they wanted, we made it, and as much as possible I tried to help them make it out of the materials that they had asked for.

And once all 22 were made, we went into the gym next door, which has a tiled floor, and we set up a starting line and we got the blow dryer out, and we tested each one,

and we measured it. We measured it with metre sticks. The first ones only need one metre stick, but some of them actually got into the 300s, which was pretty amazing. And the idea was that we were really watching not whose went furthest, but why some of them were going further than the others. And because the kids were so excited, nobody was cheering just for their own. The kids were screaming any time one kind of went on to—off to the second or the third metre mark. It was incredibly exciting.

So then, as soon as we did the test, kids had so many ideas about what they wanted to do to redesign their—their—what we started calling land ships. We actually had a—a—a parent come in who's been a glider pilot and he started talking to the kids about some of the—the reasons why some of those features worked so well.

So then the kids wrote down how fars [sic]—theirs went. Here's one that went 7cm, 13, 68cm, 207cm, 141. Huge range. And they talked about why, though. "The wings helped it because the wind pushed them." "The sail worked but it needed wheels." So the kids were being very, very thoughtful about what they wanted to do.

And then the next question was, "How do you plan to redesign your vehicle to make it go even further?" "I want another sail and four wheels." "I want to add six wheels." "Maybe my sail should be straight." So that was a great way(?). The kids starting talking about symmetry. You heard them earlier. That helped a lot. "I'm going to add wings on both sides like Cici's(?), symmetrical."

So the kids were actively calling on the other children's ideas to—to build them, and one of them ... I just need to find it ... Says, here. "I want to make big wings like Cici." So really thinking about what worked and how they were going to change it.

So then right away, we had to get back to the changing, so all the kids redesigned them, and then we had another big test. It was incredibly exciting the second time because as the kids told you, all but one of them really improved in the distances that they travelled. And the kids were **[05:00]** shrieking and screaming.

And because they were so excited, like, getting the kids to do this kind of writing, which might seem like a lot of writing for five-year olds, but they're so engaged. They're so interested. They want to communicate those ideas. It's a piece of cake getting them to write. In fact, they're asking when their turn can come, and it's the same with the measurement. It wouldn't be my expectation that kids could read 357 on a metre stick, but there they were. We—we were adding them up: 100, 200, 300, and 57. It's so exciting.

So then, we run out of—we constantly run out of wall space. So these are the pictures of the kids with their redesigns, and now they're comparing it. So their first test: 33cm, their second test 138cm. "How much further did your redesigned land ship travel?" And you can see on the picture, we marked where the first one went to so that they could see how much further it went.

But it—just because they were so interested, they were—kept asking. I helped them. I did most of the math for here, but to find the difference. "Mine went 105cm because I added three wings." "My land ship went 131cm more because it was symmetrical," which it wasn't the first time. "My ship travelled 90cm further. The wings helped." Because that's what she added to hers. "My land ship travelled 59cm more. I added two flags."

So whatever they did, things really changed for them. Huge sense of satisfaction. And they just wanted to redesign it again and test it again. So we did one more test, right, adding ramps, just because we thought it would be fun? And fa—and giant fans with the kids running behind them, but we haven't had a chance to write about those yet.

So that's where they are. And the whole idea is that no matter what you do, you can always do better, that we can always improve, especially if we really are responsive to what other people do and what other people suggest.

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