# Transcript: Building the Fastest Car (second–third grade)

**Text on screen:** Building the Fastest Car (second–third grade).

**Logo**: Count, play, explore—for early education.

**On screen:** A group of children stand next to tables with ramps made of posterboard at each end and foam pool noodles as bumpers. They are testing the speed of vehicles which they have crafted from cups, cardboard, and other crafts, sending them down the ramps.

Enedina Huff, STEAM Educator speaks from a classroom.

**Enedina Huff:** Students were invited to explore how weight would affect an object's speed when traveling down a ramp. They explored the placement of weights as well as the amount of weight they wanted to add.

**On screen:** One of the cars is shown. It is constructed from cardboard, washers, straws, and plastic cups

**Enedina:** They were invited to apply what they learned or investigated to the building of a car.

**On screen:** Enedina speaks to children from a classroom. A slide is shown titled "Engineering Challenge." The slide shows an illustration of a toy car and instructions. Instructions read "Build a vehicle that can travel the fastest using only the materials provided."

Materials:

- 2 plastic straws
- 2 wooden dowls
- 1 2-oz cup
- 1 cardboard piece (7 in by 4 in)
- Masking tape
- Glue dots
- Markers (for decorating)

**Enedina:** Your goal is to build a vehicle that can travel the fastest, using only these materials. You need to discuss with your partner, are you going to use weight? How are you going to use weight? How much weight are you going to use? And before you start to build, I'm going to give you five minutes to discuss and plan with your partner.

I did invite them to plan while looking at the materials, and sometimes, I will have them document. They'll sketch out their drawing and plan how to use the materials, but I wanted them to engage their group mates in conversation for this particular activity.

**On screen:** Enedina kneels next to two children on the floor. There is a container of straws, dowels, and plastic wheels next to them.

**Enedina:** Okay, so remember that your wheel needs to spin, and your wheels actually attach here. So if you need this piece to spin ...

**On screen:** Enedina points to the wheels.

**Child 1:** We can use a ...

**Enedina:** Go ahead.

**On screen:** One of the children sticks a straw onto a dowel rod with a wheel on the other end.

**Enedina:** Okay. And how do you keep that wheel from sliding off the other side?

**Child 1:** Tape it.

**Child 2:** Tape it.

**Enedina:** Okay.

I invited them to test and redesign as much as they needed to, to be prepared to race.

**On screen:** Two children are on the floor. They use tape to connect straws and wheels to the cardboard.

**Child 3:** No, wait, we made a mistake. These are kind of crooked, this one.

**Child 4:** Oh.

**On screen:** The children adjust the way they attached the straw to the cardboard.

**Enedina:** One group in particular did struggle, and I saw the answer but I really wanted them to find what needed to be changed on their own.

**On screen:** Enedina kneels next to two different children as they try to attach a dowel axel to a cardboard with tape.

**Child 5:** And I tried it again, but I didn't want it to fall off so I took it off.

**Enedina:** Okay. So what do we want this piece to do? We want it to move, right?

**Child 5:** Yeah.

**Enedina:** But if we tape it down, is it going to be able to move?

**Child 5:** No, it can't.

**Enedina Huff:** So what's missing? Does this one move?

**On screen:** Enedina points to a dowel that is taped to the cardboard.

**Enedina:** This one moves. What's the difference between here and here?

**On screen:** Enedina points to the dowel taped to the cardboard, and the straw taped to the cardboard.

**Child 6:** Because it has the straw that lets it.

**On screen:** One of the children has realized that the dowel rod should go through a straw rather than taping a dowel directly to the cardboard.

**Enedina:** Ah.

**Child 5:** Ohhh.

**Enedina:** I think that's important, to build that environment where they can feel confident and comfortable failing. They learn more by failing. We even had that

discussion. You learn more when you fail than you do when you're successful every single time.

**On screen:** Children are testing their cars on ramps on the floor. Enedina is speaking to two children with their car on the floor.

**Enedina:** Did it roll straight?

**Child 2:** It curved.

**Enedina:** Do you want it to curve?

**Children:** It curved because it has two of them. It has two.

**Enedina:** Okay. Do you think you could adjust the wheels to change that curve?

**On screen:** Enedina is speaking to the same two children later in the day.

**Enedina:** So is it rolling straight? It stopped curving? Do you think that'd be better for a race?

**Child 2:** Yes.

**Enedina:** Possibly?

**Child 1:** And it goes faster.

**Enedina:** Ah. What did you change? What did you shorten? You said it was too long. What did you shorten?

**Child 2:** This.

**Enedina:** The straw?

**Child 1:** It was long from right here, but we put it closer.

**Enedina:** Oh, the space between the wheels?

**Child 1:** Yeah.

**Enedina:** Oh, that's interesting. Okay. So I see that and I see that you also moved it a little to the left, huh? Interesting. And it's better?

**Children:** Yeah.

**Enedina:** Okay.

They really wanted to race, so they were motivated to continue moving through that engineering design process.

**On screen:** Children are lined up behind six individual ramps with their cars ready at the top of each ramp. Enedina is a few yards in front with a finish line taped across the floor.

**Enedina:** Three, two, one.

**On screen:** The cars take off and the children run after them.

**Children:** [chattering].

**Enedina:** Would you like to race again?

**Children:** Yeah!

**Child 7:** We won. We won.

**Enedina:** We test so that we can revise and we can redesign and we can change those things, and that's part of a problem-solving cycle, so they were continually testing, revising, and that perseverance is invaluable.

**On screen:** Enedina stands at the front of the classroom facing seated students.

**Enedina:** Turn and talk to your partner. If you could change anything about the way you built your car, what would you change? Anything you'd change?

**On screen:** Two children show how they put washers in the cups on their car to add weight.

**Child 7:** Yes, the weight. Because if we add two more …

**Child 8:** Because it was too heavy with three here and three here. It would be heavy.

**Enedina:** Okay.

**Children:** So we add two to this one, I think.

**Enedina:** At the end, I asked the kids what advice they would give to the next group of students. So what are some things that you found that really worked or what are some things that you would advise they change? I feel like that's very important for engineers, engineering design, to build on the successes and failures of the people before you.

**Text on screen:** A special thanks to the children, families, and staff of Virginia Avenue Elementary, without whose helpthese videos would not have been possible.

**Logo**: Count, play, explore—for early education.