

Design Tool 1.1: Ms. Rizzo's STEM Class: A True Story

Ms. Rizzo is keeping a sharp eye on her science students as team members work to gather data from their testing. Their task is design barriers to slow down the rate at which sediment is flowing out of their model streambeds, and some teams are having more luck than others. To test the barrier system it designed, each team sends a liter of water down a model streambed containing sand. The team then measures the amount of sand that washes past the barriers and enters the model watershed (a bucket at the end of the streambed). One team member clocks the amount of time this takes. Team members use this data to calculate the sediment flow rate and decide whether to redesign the barrier system to hold back more sediment.

Several teams discover that their barrier system does not work well. Ms. Rizzo walks around the room and reassures those teams that it's okay that their barrier systems didn't succeed. Failure is a normal part of the engineering process; they can use what they learn to redesign their barrier systems. She refrains from giving them advice but does ask a few guiding questions to be sure they are on the right track.

Ms. Rizzo's students really care about the real-life problem they are working to solve. New construction near their school is allowing large amounts of sediment to wash into a nearby stream. Students have already studied the value of watersheds in science and they can see how the sediment flowing from this stream and into the watershed damages the environment. So they are working in teams to design barrier system prototypes that might hold back the sediment. By now a few teams are starting to realize that while they are decreasing the amount of sediment that gets into the stream, they are creating a new problem. Now the sediment is building up in their streambed. Uh oh! How can they solve this new problem?

Ms. Rizzo nods to the math teacher, Mr. Curtis, who enters the room. He's been teaching these students about flow rate and he's come to check on their progress with the STEM project. One of the students catches his attention and remarks, "Mr. Curtis, do you remember when I asked you why we needed to learn how to calculate rates? Well, now I know. We have to use flow rates to solve this engineering problem. It's like we're combining math and science."