Dueling Buggies Lab

Students measure properties of a fast and slow buggy so that they can predict where the two buggies will meet when driven toward each other from starting lines provided by the teacher.

I break the class into groups of 6 to 8 students. Each group gets a few minutes to measure everything they think would be important to know about the motion of two battery-powered buggies, one fast and one slow. I make slow buggies by wrapping one battery in electrical tape and using a strip of aluminum foil as a shunt across it. After the students have made the measurements they deem necessary, I take each group's buggies away from them and mark two start lines, one for the fast buggy and one for the slow buggy. The students need to figure out and then mark where the two buggies will meet. Once they have made their prediction, I return the group's original buggies back to them and they test their prediction.

Depending on how much time you devote to the activity, you can ask to solve the problem multiple ways. I let them use any techniques they want. Once the have a solution, I ask them to solve it again with another technique to check their solution. Possible techniques might include: life-size motion map, graphing to find the intersection, two equations and two unknowns, and ratio reasoning. The larger group allows subgroups to solve the problem multiple ways at the same time.

I don't usually grade the activity, but precision points could be awarded. Points can also be awarded for the group's explanation of the solution. All students are asked to be prepared to explain their group's solution. A random draw chooses the student to present the solution for the group, so the group is responsible for making sure every member of the group understands how they reached their solution.

My lab tables can be written on with chalk for marking starting and meeting lines, but spreading whiteboards across lab tables or the floor would accomplish the same thing. With an initial separation of 3.5 meters, my students seldom miss the intersection by more than a few centimeters.