

Duke/DPS Robotics Program

10/22

Lesson Plan 2

Goal: *Create a bumper car that can push other cars around.*

Materials Needed: *Brookbot with touch sensor and bumper.*

Part 1: Dead Reckoning, Continued

To finish up what we started last week, have your team write a program that drives the robot in a square around the tabletop. They will have to figure out how to make a 90-degree turn for this to work. Show them how this can be done by turning the wheels a specific number of degrees, or for a specific amount of time at a given power level. Guessing and checking is fine! This should take no more than 15 minutes.

Part 2: The Touch Sensor

A. *Wait for Sensor*

Last week we wrote programs that waited for a set amount of time. Now we want to show the students how to have robots respond to sensor inputs. Show your students the wait for sensor block:



As before, be sure to point out the block options at the bottom of the screen. On the left side, you can change the sensor type. Today, we're using the touch sensor. On the right, you can change the input port and the action to respond to. We will stick with "pressed" for the action.



B. Construction

For the subsequent parts, your Brookbot will need a touch sensor mounted with a bumper attached. Feel free to use the default Brookbot touch bumper, or to have students make their own. It is suggested that you split the team; Have two work on the bumper and two continue programming. Make sure your builders stay on task and finish in a timely fashion!

C. Respond to Touch

Using the wait for sensor block from above, have your students write a program that goes straight until it hits something and triggers the touch sensor:



Part 3: Bumper Car Challenge

Using these programming tools and your bumper-equipped robot, build the best bumper car you can! The above program that goes straight till the bumper is triggered is a good starting point. From that point, your group can decide what to do. Some options are: backing up and then ramming forward at full speed, backing up, turning and moving in a different direction, or moving randomly. You will probably also want to discuss loops, as you want your bumper car to bump more than just once. The bumper cars will be judged on both creativity and effectiveness.

Optional

If you have considerable time left, you can have your team change the gearing on the robot to gain more power or more speed, depending on what your team wants to achieve. Do this **ONLY** if you have enough time to explain gearing up vs. gearing down and torque. Do not simply re-gear the robot for them.