Stop for Pedestrians

Pedestrians have the right of way. Can you program your car to stop for them?

A new pedestrian crosswalk is being planned for a two-meter-long road. Its exact location will be announced shortly. Before the crosswalk is constructed, you will be given some time to run your car for various distances along the road and collect data.

At the end of this practice time, the new pedestrian crosswalk will be built. You will be told exactly how far it is from the beginning of the road. You must program your car to drive as close as possible to the crosswalk without entering it. Once the crosswalk location is announced, you will not be allowed to run your car again. You may only program it.

For the test, you will place your car at the beginning of the road and, when given the signal, start the program. To successfully complete the challenge, your car must stop within ten centimeters of the crosswalk, but no part of your car may enter the crosswalk.

Good luck!

Procedure:

1. Build a NXT car from the elements in your kit.

2. Write a NXT program to run your robot car forward for 1 second.
3. Download and run your program.

4. Measure your distance from the starting line of the road. Record your results on a line graph.

5. Repeat your program changing the time values each time to 2 seconds, 3 seconds, 4 seconds, and 5 seconds.

6. Record your results on your line graph after each test run.

7. According to the information on your graph, make a prediction of how long you need to program your robot to travel to the crosswalk. You will only have one shot at getting to the crosswalk and not hitting the pedestrians!

Teacher Notes

Objectives:
1. To collect data to solve a particular problem.
2. To use data to make predictions, then test them.
3. To interpolate from a line graph plotting time vs. distance.

Materials:
NXT kit
Computer
Tape for marking lines
Meter stick
Stopwatch
LEGO minifigs (optional)

Time: Approximately 45 minutes

Notes:
1. Before starting this activity, create a two-meter-long course for the cars with strips of tape for the start and finish.

2. Depending upon the students, you may want to give them some guidance in collecting data, measuring and encourage them to graph their results.

3. The crosswalk can be made from a long piece of tape stretched across the road. Make sure that it is parallel to the starting line. If you wish, you can populate the crosswalk with LEGO minifigs.

4. The assessment for this activity can be accomplished in different ways.
   - Require any student who is not successful to repeat the challenge, with different crosswalk locations, until they pass it.
   - Note each group's results on the initial test and then give prizes – a small prize to any group which comes within ten centimeters of the crosswalk without going over; a slightly larger prize to the group that comes closet without going over.

Resources:

- Activity based upon one by Professor Chris Rogers of Tufts University.
- Physics by Design by Barbara Bratzel