

Wheels Circumference and Distance Sheet

Mindstorm EV3

Objective:

1. To figure out the relationship between wheel circumference and distance traveled.
2. Create a conversion factor from cm to motor rotations
 - a. So you can measure a distance and make the robot travel the distance

Procedure A:

1. Create a data table for the following information
2. Measure and record the diameter of your wheel.
 - a. This is the distance across the whole wheel
3. Calculate and record the circumference of the wheel
 - a. $Circumference = \pi * diameter$
4. Predict how far your robot will travel when the motors are set to 3 motor rotations.
5. Create a program that will make your robot go forward for 3 motor rotations.
6. Run the program.
7. Measure and record the actual distance the robot traveled.
 - a. Repeat steps 6 and 7, 3 more times
8. Find the average distance the robot traveled.
9. Calculate your percent error.
 - a. Using the average distance traveled.
10. Change the number of motor rotations and redo the lab.

Questions A:

1. How many cm does your robot travel during 360° of rotation (1 turn)?
2. How many degrees does the wheel turn if you wanted the robot to travel 15 cm?
 - a. Creating a conversion factor (cross thingy) may be beneficial
3. You have a wheel with a diameter of 9 cm, how far will the robot travel if the motor turns 780° ?

Procedure B:

1. Figure out how you could be given a distance and then determine the number of motor rotations.

Questions B:

1. How many degrees does the motor rotate when your robot travels 45 cm?
2. **Challenge:** Your robot travels 50 cm when the motors rotate 2000 degrees, what is the diameter of the wheels.

Assessment:

Mr. Gunkelman will choose a distance and you will have to program your robot to travel the selected distance.