Robotics Distance Worksheet

Essential Question: How do I create an equation that will represent the relationship between Wheel Rotations and Distance when programming a Mindstorms Robot?

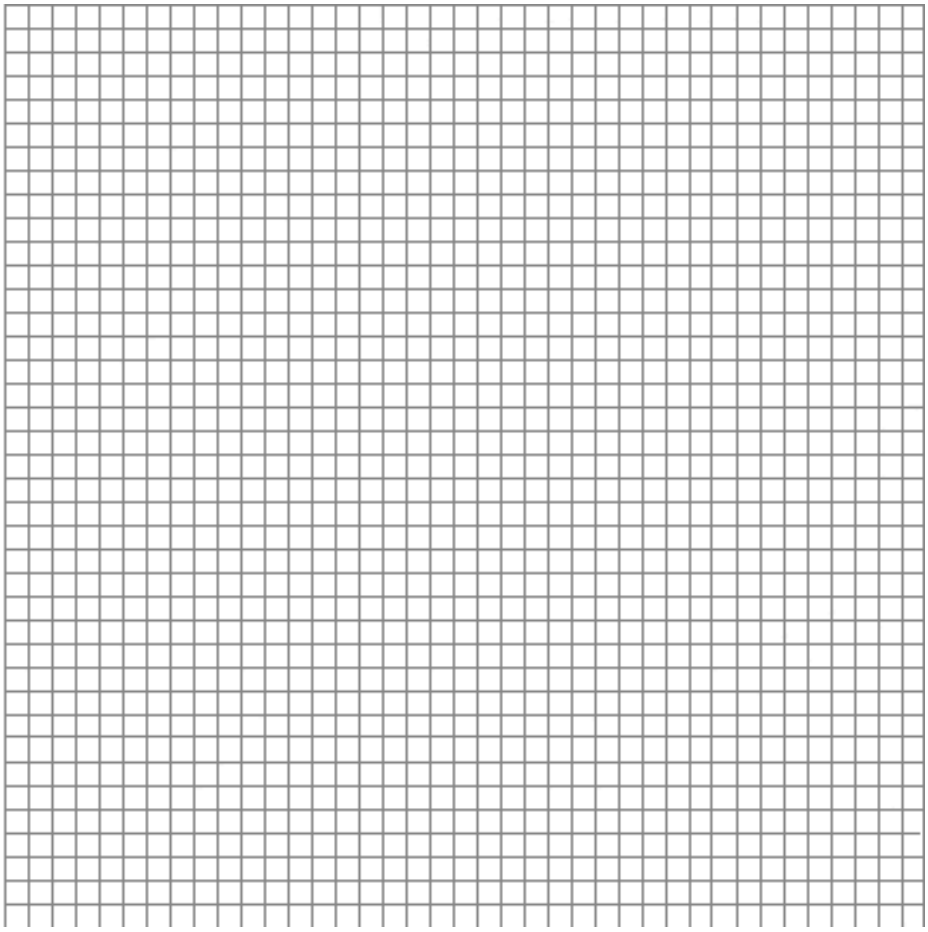
Standards: (Taken from Georgia Performance Standards) (See Page 3)

Process Overview:
1. Collect the Data
2. Model the Data with a Graph
3. Create an equation with the Graph
4. Test the equation with a new Independent Variable.

Step 1. Collect the Data:
A. Do 4 Tests with a Motor Block set to the given 4 values. Record the distance in centimeters the robot travels for each trial:

Rotation	Distance Robot Travels in centimeters
0.5	
1.0	
1.5	
2.0	

Step 2: Model the Data in a graph: Create a linear graph using the Data from Step 1



Step 3: Create an equation. Using the Data from the Step 2 Graph: Create a linear equation to predict all values for Rotation and Distance. (Hint: find the slope of the graph)

Step 4: Using your equation, find the Rotations needed to make your robot travel 20 cm. Test your result using the robot.

Extensions:

What is the relationship between the slope of your graph and the diameter of the tire on the Robot?

Standards for Distance Worksheet: (Taken from Georgia Performance Standards)

MM1A1. Students will explore and interpret the characteristics of functions, using graphs, tables, and simple algebraic techniques. (Georgia Math I (9th Grade Math)

M6A2. Students will consider relationships between varying quantities. (Georgia 6th Grade Math)

a. Analyze and describe patterns arising from mathematical rules, tables, and graphs.
b. Use manipulatives or draw pictures to solve problems involving proportional relationships.
c. Use proportions (a/b=c/d) to describe relationships and solve problems, including percent problems.
d. Describe proportional relationships mathematically using y = kx, where k is the constant of proportionality.
e. Graph proportional relationships in the form y = kx and describe characteristics of the graphs.

f. In a proportional relationship expressed as y = kx, solve for one quantity given values of the other two. Given quantities may be whole numbers, decimals, or fractions. Solve problems using the relationship y = kx.

M7A3. Students will understand relationships between two variables. (Georgia 7th Grade Math)

a. Plot points on a coordinate plane.
b. Represent, describe, and analyze relations from tables, graphs, and formulas.
c. Describe how change in one variable affects the other variable.
d. Describe patterns in the graphs of proportional relationships, both direct ($y = kx$) and inverse ($y = k/x$).