

Challenge 2: "The Fast and the Furious"

Teacher resources:

Robot constructed in Challenge one.

Measuring devices: Tape measure, metre ruler, string,

Graphing materials - a sheet of graph paper per pair (with extras for mistakes) pencil and ruler or (my preferred option!) a small tablecloth with a regular check, masking tape to make the axes, textas and sticky dots for data points.

Teacher notes: Some students will conclude the greater the power the further the robot travels, some will look at the linear relationship for each set of data. Very capable students may investigate the 'line of best fit' and how this might be determined for each power level.

SACSA Outcomes:

Mathematics- Data

Key Idea: Students engage with data by formulating and answering questions, and collecting, organising and representing data in order to investigate and understand the world around them. [In] [T] [C] [KC2] [KC6]

4.2 Reads and describes information in given tables, diagrams, line and bar graphs. Makes predictions based on the information, understanding the limitations of data interpretation and the possible social consequences of these limitations. [In] [T] [KC2] [KC6]

3.9 Describes and generalises relationships between measurable attributes as patterns and explains the impact of varying one aspect of the relationship. [F] [T] [KC1] [KC2]

Task card: There are 5 power levels for your robot. It is your challenge to produce a single graph of distance vs time showing each of these power levels. You will need to decide what times to use and what measurements need to be taken. You may need to complete some of the question sheet BEFORE progressing too much further!

Question/ Research/ Reflection:

What is an 'independent variable'? Looking at your task card, what is the independent variable in this case?

What is a 'dependent variable'? Looking at your task card, what is the dependent variable in this case?

What is a control variable? There will be control variables in your challenge. What are these control variables? (Please see your teacher if you are having trouble getting started with these!)

How will you measure both the independent and dependent variables? (You may need to do some trial runs to see what units are appropriate.)

How can you make sure that the data you collect will not be confused?

What labels need to be on the graph so other people know what your graph is about?

After completing the graph:

Comment on the graph you have produced. How did you distinguish between the different power levels? What conclusions can you make from your graph?

Reflection:

What information did you need to find out? When you don't know how to do something there are a number of different options you can try. What are the ways that you found out the information that you needed to complete this challenge?

A group in a different school completed this challenge. The data they collected was different to yours. How might this be possible?

How could your graph be improved? What might make it more accurate?

At Distance Control/ Teacher Notes

This challenge worked well using the Distance Control. Students logged into the host school computer and their programmes were downloaded to the robots. The robots were video taped and the measurements for each power level and time sent to the students to complete their graphs at a later time.

Modifications: In the first trial of this challenge, the host school sent the measurements back to the client school students. Next time, the video will include a measuring tape and a close up of where the robot finished so students can practice reading measuring devices.

