

## Challenge 3: "Follow the Yellow Brick Road"

### Teacher Resources:

LEGO Mindstorms robots.

Coloured tape- electrical tape works well- in black and a number of colours- or butchers paper with coloured markers.

Lots of cleared floor space.

### Teacher Notes:

This challenge has a number of levels- it is relatively easy to follow almost straight lines, harder to follow tight curves and far more challenging to follow curves that 'double back' (like a squashed 'S'). Students can either follow the curves you produce or produce their own.

### SACSA Outcomes:

Design and Technology

#### 4.1

Explains the decisions and choices made in designed and manufactured products, processes and systems and identifies alternative possibilities. [In] [T] [KC2] [KC6]

#### 4.5

Evaluates materials and equipment in order to meet principles of function, aesthetics and sustainability. [F] [In] [KC1]

### Task card:

Using the light sensor, programme your robot to follow a line or path. There are simple paths on the sheet of white paper found at the bottom of your kit for you to trial your programme, but see how complex a line you can follow! If you want a really hard challenge, ask to compose your own line with lots of twists and turns and made out of different colours.

### Question/ Research/ Reflection:

Your light sensor will pick up different readings depending on the colour of the surface your robot is placed upon and the distance from the sensor to the surface. You may need to research how to use your light sensor (there are some good tutorials on the net- Google Search will help you find them).

You will need to turn the left and right motors on and off to try and make your robot follow along the line. If your robot is to the right of the line, which motor do you need to use? When your robot finds the line, what do you have to make it do so that it doesn't just go over the line and continue round in circles?

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### Reflection:

Did the robot do what you thought it would do? Was the challenge harder or easier than you thought it would be?

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Sometimes robots use multiples of the same sort of sensor. Do you think this challenge would have been easier if you had more than one light sensor attached? How might you use the second sensor?

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### At Distance Control/ Teacher notes:

I expected this challenge to work well through the use of at distance control but there were a number of issues which reduced the effectiveness of the challenge. The major one was the lack of immediate feedback. This is a challenge that works well using trial and error- trying a small simple path to follow, making modifications to the programme, trying again until a complex path can be followed. Student (and therefore teacher) frustration was evident as students were not able to get immediate feedback for their robot and so momentum of the task was lost.