

Incursion Description

Introduction to Robotics

This session will introduce your younger students to robots through scientific investigation of how robots are able to reference light, sound, degrees and touch sensor readings from their environment and then undertake actions or work depending on sequential commands called programming.

Students will work directly with the NXT robot and undertake simple experiments, eventually creating their own 5 step program on the NXT robot and see how well their robot performs; time permitting students will then progress onto programming their robot on the computer and undertake a number of simple challenges. Computer programming provides a broader range of programming commands. Math's, science and thinking skills are all interwoven into these simple activities that will open up a whole new world to your students

Supplied Equipment

My Software

LEGO MINDSTORMS NXTg / LEGO RoboLab 2.9.3 programming software

My Hardware

- 15 Laptop Computers with all associated electrical leads and power-boards and electrical leads
 - Data Projector
 - 15 LEGO NXT basic robots with light, sound, ultrasonic, touch and angle sensors
- (I can use your LEGO sets if you wish, especially if you have RCX robots)

Session Details

Suitable for years – 3 – 6

Session Length - Best outcomes are obtained with a 1hr 40min + session due to the number of skills we are employing. Shorter sessions can cover limited basics

Student Skills Required –some computer experience and competence with a mouse. No previous robot programming required.

Preparation –Ideally students should have completed the Robotics Background Activities supplied on my web site to place robots in context and for the best educational outcomes (see following).

Room required – I bring in quite a lot of equipment so please make a fairly large room available with floor-space for the robots to dance, a GP, art room or hall is ideal . As I supply my own computers there's no need to tie up a computer lab for the sessions/s.

When I confirm your session booking I will provide additional information on the logistics for your day/s.

Additional Information – down-loads and web:

Teachers can down-load the scope and expected outcomes from this session from this URL on my website

Find out additional information about the NXT robots I will be using here:

<http://www.techellenttraining.com.au/about%20NXT.html>

Additional information on the LEGO programming software can be found here:

Information about the organisation on the day is available here:

<http://www.techellenttraining.com.au/Incursion%20Logistics.pdf>

GETTING THE MOST OUT OF YOUR ROBOTICS INCURSION

CLASS PREPARATION

Your classes will gain the most from their robotics incursion if they have some prior knowledge about robots.

- My website provides teachers with some basic activities that should place robots in the context of “thinking” machines that do work for us.

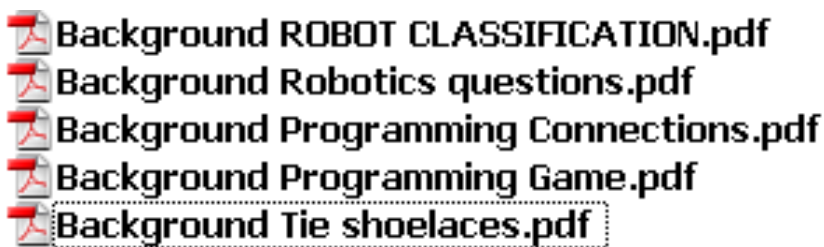
- Emphasise the fact that robots can only do what they are told to do if they have the required sensors (inputs) and motors /lights/ sounds etc. (outputs)
- Robots can only process commands that are clear and sequential and provide the robot with all the information it needs to obey the command – what do you want it to do, using which outputs (eg motors) direction and speed and for how long.

Please go to :

<http://www.techellenttraining.com.au/Resources.html#Background>

<http://www.techellenttraining.com.au/Resources.html>

Following links towards the bottom of this page will take you to .pdf documents with physical activities and discussion points on robots.



1 Initial class discussion, what is a robot, what do all robots have in common? – download the pdf document –

<http://www.techellenttraining.com.au/Background%20ROBOT%20CLASSIFICATION.pdf>

2 Physical activity - makes programming outputs more understandable – download the .pdf document :

<http://www.techellenttraining.com.au/Background%20Programming%20Connections.pdf>

3 Simple programming game that helps train the discipline of programming- download the .pdf document:

<http://www.techellenttraining.com.au/Background%20Programming%20Game.pdf>

4 Can a robot tie it's shoe lace ? Activity

<http://www.thetech.org/robotics/activities/page05.html>

and the accompanying worksheet .pdf from my website.

http://www.techellenttraining.com.au/Background_Tie%20shoelaces.pdf

The Tech organisation has a fantastic website with plenty of other robotics activities that you may like to try.

5 If you are still looking for more robotics activities and questions download this .pdf from my website:

The more preparatory activities that students have undertaken prior to their incursion day, the more hands-on robot programming we can progress onto .Please circulate this information to teachers of all classes participating in the incursion.

After the day

Cut and Paste Programming Sheets

Once your students have done the Robotics incursion you may like to try these cut and paste programming sheets to see how much basic programming they have taken on-board. The first template is the sheet they past their programming icons onto. Sheets 2 and 3 provide the icons to cut out as well as the configuration bars for each icon. You will only need one template for each student but you may need to print off 2 or 3 copies of sheets 2 and 3 per student

This is the master template that you paste your programming icons onto

<http://www.techxellenttraining.com.au/NXT%20Programming%20template1.pdf>

This is a sheet of MOVE icons and their configuration bars

<http://www.techxellenttraining.com.au/NXT%20 Programming%20icons2.pdf>

Here's a sheet with the wait for OBJECT (sonar), play a sound and show a graphic icons and configuration bars

<http://www.techxellenttraining.com.au/NXT%20 Programming%20icons3.pdf>

Debate / Discussion Topics

- ☞ In the future robots will be doing all the jobs that humans now do.
- ☞ Eventually robots will be almost un-recognisable from human beings.
- ☞ Robots can do things better than humans.
- ☞ Robots could be dangerous to humans