Karen Fox 2010

Pro-Bot®

Activity Pack

Introduction

Based on the Bee-Bot, Pro-Bot offers greater functionality and progression via a simple and child friendly interface. The arrow buttons work just like the Bee Bot but allows the children to input the amount of movement or the degrees of turn, and a built-in LCD screen allows children to preview procedures.

The robot features four built-in sensors which can activate procedures from touch, light and sound.

Using probots provides great links to numeracy, particularly position and direction and Geography, using the language of movement and grid references.

This guide will provide information on the use of probots in the classroom. From learning objectives and activities to assessment.

The use of Probots can support many ICT learning objectives, such as those below. (Learning objectives are taken from the Control and monitoring strand of the Bolton ICT Capability Route Map.)

ICT Learning Objectives – Control and Monitoring	
F/S	Know that some toys can be controlled
	Understand that things happen due to actions – cause and effect
	Know some devices need instructions to operate and control them
KS1	Moves an on screen turtle using single commands
	Can provide a sequence of instructions for a floor robot
	Is aware of sensors in everyday life e.g. burglar alarms, automatic doors
	Can move a floor robot forwards/backwards/specify units
	Can enter a sequence of instructions to move a floor robot to a designated point incorporating turns
	Can use the repeat key to produce symmetrical shapes
	Can use FD, BK, LT, and RT to control a floor turtle

ICT Learning Objectives – Control and Monitoring	
KS2	Uses programmable resources to support learning
	Can enter a sequence of instructions to move a floor robot to a designated point incorporating turns
	Can use the repeat key to produce symmetrical shapes
	Can use and edit a pre-written procedure
	Can combine procedures to form a new procedure
	Can write a list of commands to produce a pre-drawn shape and amends instructions as required
	Independently uses the repeat command
	Control simple devices (light bulbs, motors, and buzzers) by giving direct instructions
	To use simple procedures independently
	Alter the program set-up for a particular sensor e.g. making the lights come on when it goes dark.

Logo

Probot uses logo as its programming language. The following commands can be used in Logo to control the movement of the on-screen turtle:

FD	forward	BK	back
RT	right	LT	left
Rpt	Repeat	Pause	Pause PS

Go will make the probot go but pressing it again will make your probot stop.

By default pressing just Fd or Bk will move the probot by 25cm and Lt or Rt will turn by 90 degrees. This can be changed by adding the amount of turn or length e.g. Fd 30 Rt 90

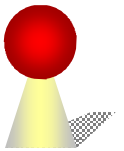
Activities and Games

Synchronised Speeding – Give the children a list of instructions to input into the probot and set of the cars together. Are the cars synchronised?
Use pocket dice to create a random route.

Skittles – knock down skittles in a particular order or link to numeracy. Can you make a total of …?

Slalom – Can you weave in and out of the course? Can you do it with one set of instructions?

Astro Challenge – Can the car make its way past the planets (balls on plastic cups) without crashing into any?



Making letters with Logo

Use the pen holder in the probot and flipchart paper or PVC mats. (Berol pens fit well)
Can children draw a letter E or H?

Predict the letter that these instructions produce.

1) FD 90 RT 90 FD 40 BK 40 RT 90 FD 40 LT 90 FD 30

2) FD 30 RT 90 FD 20 BK 20 RT 270 FD 20 RT 90 FD 30

3) BK 60 FD 30 RT 90 FD 30 RT 90 FD 30 BK 60

Now can you draw the letter K? Now try the letter Z.

Consider - Can children visualise the letters first? Do they need whiteboards to plan the route out? Can children plan a different route for the same letter?

Routes

Make a route using blocks, junk materials or draw a route with chalk or masking tape.
Using estimation, mathematical vocabulary.

Can children make a route using different criteria e.g. 2 right angle turns, a complete circuit.
Can children record their instructions and then ask another group to test the track and check the results.

Give the children tapes, measuring sticks and rulers to help them to plan the route.

Repeat

The repeat key can be used to draw shapes.
To draw a square type - Repeat [4 fd 10 rt 90]
This will draw a square with sides 10 cm long.

Drawing Other Shapes using repeat

Triangle: Repeat 3 [fd 120 rt]
Pentagon: Repeat 5 [fd 72 rt]
Hexagon: Repeat 6 [fd 60 rt]
Octagon: Repeat 8 [fd 45 rt]
Circle (approx): Repeat 20 [fd 18 rt]

TIP: *To work out how many degrees to turn, divide 360 by the number of sides in the polygon. So a nine sided nonagon would need to turn by 360/9 = 40° at each step*

Procedures and Sensors

Pro-Bot has several different types of procedure. They are numbered from 1 to 39. Procedure numbers 1 to 32 are fully definable by you, numbers 33 to 37 are for sensors and 38 to 40 are the built-in, invisible, demo sequences. The other special procedures are also shown differently in the display and are:

33 FRONT:	Run when the front touch sensor is triggered
34 REAR:	Run when the rear touch sensor is triggered
35 DARK:	Run when the light sensor goes from light to dark
36 LIGHT:	Run when the light sensor goes from dark to light
37 SOUND:	Run when the sound sensor is triggered
38 HEXGN:	Draws a hexagon (not visible)
39 DIAMND:	Draws a diamond (not visible)
40 FLOWER:	Draws eight diamonds using proc 39 (not visible)

Programming a procedure

Press menu **à** New Proc **à** 33 Front **à** Now change this to make the car move backwards and turn when the front sensor is pressed.
e.g. bk 10 rt 50

This will now happen each time the sensor is pressed. Procedures 1 – 32 will only work if you add them.

Petal Procedure

Programme procedure 1 (half petal)
Proc 1 Rpt 10 [Fd1 Lt 6]

Then **Proc 2** Rpt [Proc 2 Lt 120 Proc 2 Lt 60]

Procedure 2 will now draw a full petal.
Now on the main screen add
Rpt 6 [proc 1]

Special Commands Menu

Press and hold the menu button or 2 seconds and the list of special commands will appear. These can be added to the main programme or any procedure.

Light On:	Switches the Pro-Bot's headlights on whilst running
Light Off:	Switches Pro-Bot's headlights off
Sound 1:	Plays sound "switch on"
Sound 2:	Plays sound "button click"
Sound 3:	Plays sound "car horn"
Sound 4:	Plays sound "data transfer"
Sound 5:	Plays sound "transfer complete"
Sound 6:	Plays sound "error"
Sound 7:	Plays sound "go to standby"

Other Example Programmes

6-Pointed Star

```
Rpt 6 [
  Fd 10
  Rt 120
  Fd 10
  Lt 60
]
```

5-Pointed Star

```
Rpt 5 [
  Fd 10
  Rt 132
  Fd 10
  Lt 60
]
```

Control and Monitoring Assessment Statements

The following assessment statements are taken from the Control and Monitoring strand of the Bolton ICT Assessment Grids and are levelled to match National curriculum level descriptors for ICT.

The assessment statements which can be achieved through the use of probots are highlighted.

Control and Monitoring assessment statements	
BL 1	I can operate everyday technology including Digital video/camera/Tape recorder/Kitchen items in cooking/Control Equipment /Remote Control toys/Programmable toys
BL 1	I can identify and explain how I use everyday ICT in the home and community
BL 1	I know that some toys can be controlled
BL 1	I can names items we control in the everyday environment
1	I know some devices use a sensor/need a signal to activate them e.g automatic doors
1	**I know some devices need instructions to operate and control them e.g. microwave**
1	**I know ICT devices are powered by mains or battery and I should observe basic safety rules**
1	**I can provide single instructions for a floor robot**

Control and Monitoring assessment statements	
2	**I can use the a simple logo program and move an on screen turtle using single commands.**
2	**I can provide a sequence of instructions for a floor robot**
3	**I can enter a sequence of instructions to move a floor robot to a designated point incorporating turns**
3	**I can use the repeat key to produce symmetrical shapes**
3	I can use sensors to take accurate measurements and record results
3	I can use the pen down and pen up commands to move the turtle
3	**I can use and edit a pre-written procedure**
3	I can attach a sensor to a device connected to a computer and take readings.

Control and Monitoring assessment statements	
4	I can predict how things will change over time and uses sensors to record this
4	**I can write a list of commands to produce a pre-drawn shape and amend instructions as required**
4	**I can combine procedures to form a new procedure**
4	**I can independently use the wait and repeat command**
4	I can control simple devices (light bulbs, motors, and buzzers) by giving direct instructions
4	I can alter the program set-up for a particular sensor e.g. time span of recording
4	**I can use REPEAT FOREVER**
5	I can use IF…. THEN…
5	I can use and program 2 inputs
5	I use simple procedures to control more than output device