

Pro-Bot

TEACHER GUIDE

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Using Pro-Bot in the classroom

PROGRAMMING

JOURNEY

Foundation focus

- Recognise that a range of technology is used in places such as homes and schools.
- Select and use technology for particular purposes.
- Develop basic understanding of action and reaction.



WONDERBUG



TACTILE READER



BLUE-BOT



EYFS

ACTION

REACTION

CLEVER CATS



EASI-CARS



RUGGED RACERS



BEE-BOT



Curriculum focus

- Understand what algorithms are.
- Create and debug simple programs.
- Use logical reasoning to predict the behaviour of simple programs.

KS1

PRO-BOT



ALGORITHM

DEBUG

KEY STAGE MATRIX

The key stage matrix has been designed to assist when looking at what products best suit your needs.

Download the Key Stage Matrix at www.tts-group.co.uk

KEY STAGE MATRIX		EYFS	KS1	KS2			KS3		
		Recep.	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7+
Clever Cats									
Easi-Cars									
Rugged Racers									
Wonderbug									
Bee-Bot									
TacTile Reader									
Blue-Bot									
Pro-Bot									
Scratch Controller									
InO-Bot									
Rainbow Matrix									
Robot Arm									
PI2Go									

Curriculum focus

- Design write and debug programs that accomplish specific goals.
- Use sequence, selection and repetition in programs.
- Use logical reasoning to explain how some simple algorithms work.

KS2

KS3



PI2GO



RAINBOW MATRIX



INO-BOT



Scratch compatible products

SCRATCH CONTROLLER



REASONING

SEQUENCE

DECOMPOSITION
PROGRAM



Previous Experiences

Prior to using Pro-Bot children might have worked with Bee-Bot and Blue-Bot. Bee-Bot and Blue-Bot provide a good route into learning the basic concepts of programming.

Progression

The activities listed below are in a suggested order of progression. There isn't a specific amount of time that should be spent on each activity. The time will vary from situation to situation. It may also make sense to break some of the activities down further to suit children's needs.

National Curriculum

The National Curriculum for Computing references below are indicative of some aspects of the curriculum that the activity covers. They are not an exhaustive list nor do they indicate that one activity fully covers that curriculum area. The activities support children in learning Computing skills and applying computational thinking.

Additional Support

A separate user guide is supplied with Pro-Bot.

Key Focus

1

Create a simple program using basic commands

National Curriculum for Computing

KEY STAGE 1

- understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions
- create and debug simple programs

Preparation:

This activity could be done with or without a mat. Check that Pro-Bot powers up when switched on.

Activity

Some of Pro-Bot's control buttons mirror those of Bee-Bot and Blue-Bot i.e.; Forward, Backward, Left, Right and Go. Using only those buttons allows Pro-Bot to be operated in an identical manner to Bee-Bot/Blue-Bot. This means learning progression can be made in easy to understand steps. As with Bee-Bot, mats and grids are available for Pro-Bot. This can support children's understanding of basic movement. Children should be allowed to spend some time using these basic commands to make Pro-Bot move. This activity may effectively be a re-cap of Bee-Bot/Blue-Bot or a first introduction to Pro-Bot.



Key Focus

2

Creating a program using commands and parameters

National Curriculum for Computing

KEY STAGE 1

- create and debug simple programs

National Curriculum for Computing

KEY STAGE 2

- **design, write and debug programs that accomplish specific goals**, including **controlling** or simulating physical systems; solve problems by decomposing them into smaller parts
- **use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs**

Preparation:

Check that Pro-Bot powers up when switched on. Identify a suitable surface to run Pro-Bot on. Smooth surfaces will allow Pro-Bot to move more accurately.

Activity

Once confident with the basic movement of Pro-Bot, children can start adding parameters to commands e.g. Forward 10. "Forward" is the command and "10" is the parameter. The parameter tells Pro-Bot how far to move forward. Angles of turn are parameters that can be added to Left or Right e.g. Right Turn 45. Children should spend some time experimenting with parameters and seeing how these affect Pro-Bot's movement. They can work towards creating regular polygons. A square is a good place to start.



Key Focus

3

Use repetition in programming

National Curriculum for Computing

KEY STAGE 2

- **design, write and debug programs that accomplish specific goals**, including **controlling** or simulating physical systems; solve problems by decomposing them into smaller parts
 - **use sequence**, selection, and **repetition** in programs; work with variables and various forms of input and output
-

Preparation:

Check that Pro-Bot powers up when switched on. Identify a suitable surface to run Pro-Bot on. Smooth surfaces will allow Pro-Bot to move more accurately. Have large sheets of paper and felt tips suitable for Pro-Bot ready.



Activity

After spending time experimenting with Pro-Bot and getting it to draw simple regular polygons, pupils can begin to look at ways to become more efficient in their programming.

Pro-Bot has a Repeat command. This can be used to repeat one or several commands. In the previous activity children might have used commands like these below to draw a square:

```
Main
Fd 10
Rt 90
Fd 10
Rt 90
Fd 10
Rt 90
Fd 10
Rt 90
```

Ask the children to look carefully at the commands. Can they see which instructions repeat and how many times they repeat?

The commands fd 10 and rt 90 are repeated four times. To draw the same square that is shown as the example bottom right enter:

This is an ideal point to use a pen in Pro-Bot's pen holder and see the shape that's drawn. What other regular polygons can the children create?

They should try drawing an equilateral triangle with Pro-Bot. This is often found to be challenging and can lead to some good discussions about internal and external angles. Another good discussion point can be around the relationship between the number of sides and the angle e.g.

```
Main
Rpt 4 [
  Fd 10
  Rt 90
]
```

A square is 4 sides, external angle 90°

A pentagon is 5 sides, external angle 72°

An octagon is 8 sides, external angle 45°

Tip: For each of the above multiply the number of sides by the angle.



Key Focus

4

Procedures (a set of instructions to complete a specific task).

National Curriculum for Computing

KEY STAGE 2

- design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts
 - use sequence, selection, and repetition in programs; work with variables and various forms of input and output
 - use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
-

Preparation:

Check that Pro-Bot powers up when switched on. Identify a suitable surface to run Pro-Bot on. Smooth surfaces will allow Pro-Bot to move more accurately. Have large sheets of paper and felt tips suitable for Pro-Bot ready.

Activity

Procedures are a great way for pupils to solve problems by decomposing them into smaller parts.

In LOGO, the programmer can 'teach' Logo a new command, for example "To Square". Every time the command "Square" is then typed; LOGO will carry out that procedure. Pro-Bot can be 'taught' new actions using its procedure functionality. For example - Pupils could use Proc 1 to store the instructions to draw the first initial of their name and Proc 2 to store the instructions for the second initial. By then using Proc 1 and Proc 2 from the main program Pro-Bot would draw the children's initials.

NB Pro-Bot has a hidden proc 39 that draws a Diamond and a hidden proc 40 that draws 8 diamonds as a star using Proc 39.



Key Focus

5

Creating a simple program one step at a time.

National Curriculum for Computing KEY STAGE 2

- **design, write and debug programs that accomplish specific goals**, including **controlling** or simulating physical systems; **solve problems by decomposing them into smaller parts**
- **use sequence**, selection, and **repetition in programs**; **work with variables and various forms of input and output**
- **use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs**

Preparation:

Check Pro-Bot that powers up when switched on. Identify a suitable surface to run Pro-Bot on. Smooth surfaces will allow Pro-Bot to move more accurately. Have suitable objects to bump and resources to build a small tunnel for Pro-Bot to drive through.

Activity

The curriculum for Computing 2014: “Work with variables and various forms of input and output.”

Developing a child’s understanding of inputs and outputs can be supported with the use of Pro-Bot. In the activities described so far, pupils have programmed outputs from Pro-Bot i.e. wheels moving and lights switching on and off. Pro-Bot can also produce different sounds. These are all forms of output.



Use of Pro-Bot can also help children understand inputs. Pro-Bot has front and back bumpers, a light sensor and a sound sensor. These are all input devices. Pro-Bot can be programmed so that it switches its lights on if the room goes dark or to back away and turn from an obstacle should it bump into one. There are a whole range of challenges children can be set using Pro-Bot including:

Make Pro-Bot switch on its lights when it drives through a tunnel.

Make Pro-Bot switch off its lights as it leaves a tunnel.

(Both of the above simulate automatic headlights on a real car)

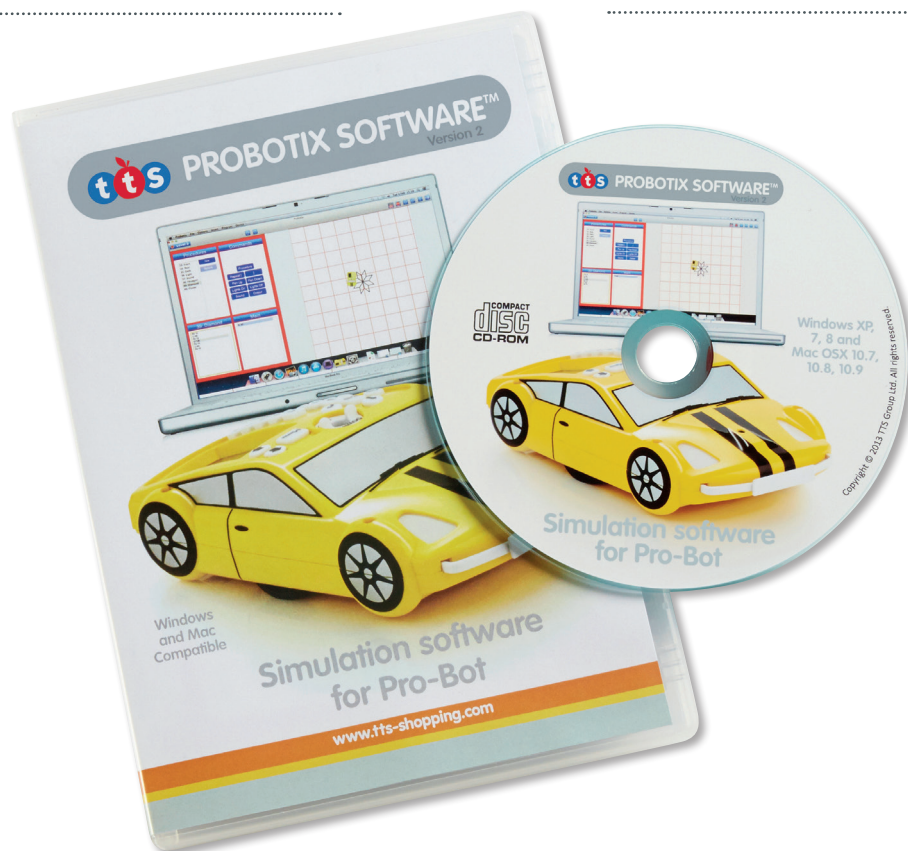
Make Pro-Bot navigate around an obstacle using the front bumper?

Make Pro-Bot work its way past several obstacles using front and back bumpers?

Program Pro-Bot so that it not move until it 'hears' a noise?

All the of the above are fantastic for developing children's computing skills, problem solving skills and their ability to work in a team!

The Probotix Software, included with Pro-Bot Class Bundle, allows children to experiment with on screen. The software has different modes (levels) making it suitable for a wider range of pupils. You can even place objects on screen for Pro-Bot to work its way round. Instructions created in Probotix can be downloaded to Pro-bot via USB cable and also uploaded for Pro-bot to Probotix.



TTS Scratch Devices

The Scratch Rainbow Matrix



Scratch Controller



Ino-Bot



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