Blue-Bot®
TEACHER GUIDE

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Using Blue-Bot in the classroom

PROGRAMMING

JOURNEY

Foundation focus

EYFS

- 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.

CLEVER CATS

EASI-CARS

RUGGED RACERS

ACTION

REACTION

WONDERBUG

TACTILE READER

BEE-BOT

Curriculum focus

- Understand what algorithms are.

- Create and debug simple programs.

- Use logical reasoning to predict the behaviour of simple programs.

BLUE-BOT

KS1

PRO-BOT

ALGORITHM

DEBUG

KEY STAGE MATRIX

The key stage matrix has been deigned 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 Recep.	KS1 Year 1	KS1 Year 2	KS2 Year 3	KS2 Year 4	KS2 Year 5	KS2 Year 6	KS3 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

DECOMPOSITION

PROGRAM

RAINBOW MATRIX

INO-BOT

SEQUENCE

REPETITION

Scratch compatible products

SCRATCH CONTROLLER

REASONING

SEQUENCE

Previous Experiences

Prior to using Blue-Bot with its companion app, children could work with Remote Control vehicles and Bee-Bot. Remote control vehicles can help develop an understanding of action, reaction and directional language. Bee-Bot offers a good route into very 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 in this guide 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. Using Blue-bot can support children in developing their computational thinking skills; it helps children to engage in open ended problems which require the use of decomposition, modelling and algorithms. In this guide which can then be applied to many different aspects of the curriculum.

Additional Support

Further detail on the Blue-Bot App is provided at the back of this guide. There is also a downloadable poster of Blue-Bot which has all its key parts labelled.

Key Focus 1

Creating a simple program one step at a time.

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
Set up a suitable mat e.g. Shape Mat (smaller ones are probably better) and check that Blue-Bot connects to the app. Open the app. Select the appropriate mat. Then choose Explore Mode and Step by Step

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Activity
Introduce Blue-Bot and the Blue-Bot app. Explain that Blue-Bot is a floor robot that can be controlled from a tablet/computer. Explain that instructions are sent to Blue-Bot using Bluetooth. Talk about robots becoming more common in everyday life, for example they are used in factories to make cars, they can also be found in homes as vacuum cleaners or lawn mowers.

Children should work in pairs or small groups. They need to set each other challenges to complete. These should be, setting Blue-Bot's starting point and the destination to get to e.g. Using the Shapes Mat. Start Blue-Bot on the yellow circle and get to the red triangle.

The child given the challenge should then try and get to the destination by moving one step at a time. They are not allowed to touch the real Blue-Bot once they've set its start position. Once they've managed to get Blue-Bot to the right destination they should move Blue-Bot back to its start position and then press "Go" to run their full program/ algorithm. As it runs they can watch it step through on the screen on the floor.

A simple extension to this activity could be to set obstacles, squares that can't be driven over. e.g. Start on the green rectangle and get to the blue rectangle without going over any yellow shapes.

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Key Focus   2
Writing and debugging a program

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**

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**

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Preparation
Set up a suitable mat e.g. Shape Mat (smaller ones are probably better) and check that Blue-Bot connects to the app. Open the app. Select the appropriate mat. Then choose "Explore Mode" and "Basic Programming".

....

Activity
After solving challenges step-by-step children should move on to planning a route before pressing Go (Basic Programming). At first the challenges will be similar to those above. The 'programmer' should try and put in all the instructions they think they need to complete the task. When they press Go they can see if they've managed to complete the challenge. If they haven't been successful they should debug their sequence of instructions and try again. Their debugging may mean that instructions need refining by adding, moving or removing. The Pen tool is useful to see where Blue-Bot has been. Pauses can be used to help break a problem down in to chunks (decomposition). When straight forward challenges are solved the idea of obstacles should be introduced. After that the challenges can become more difficult e.g. Shape mat - Can you visit two red shapes or all the triangles? Money mat - can you make 12 pence? How few steps can you use to make 12 pence?

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This activity could also be completed using the Blue-Bot TacTile Reader.

Key Focus

Reading programs

National Curriculum for Computing
KEY STAGE 1
• **use logical reasoning to predict the behaviour of simple programs**

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Preparation
Set up a suitable mat e.g. Shape Mat (smaller ones are probably better) and check that Blue-Bot connects to the app. Open the app. Select the appropriate mat. Then choose "Explore Mode" and "Basic Programming". Or use "Challenge Mode" - "Random Instructions".

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Activity
Children should be able to read simple programs and work out what they will do. They could work with a partner and create simple Blue-Bot instructions for each other read and predict where Blue-Bot will end up. They could begin by deciding where Blue-Bot will start from and then add one instruction to the command sequence. Their partner could indicate where they think Blue-Bot will get to and then press Go to check if they are correct. They could switch roles and repeat the process. After that they could move to two instructions, then three, then four etc. Alternatively they might just choose to tap the direction buttons in the app randomly and see if they can predict where Blue-Bot will get to. Again this could start with one instruction and increase each time it is solved. In the Blue-Bot app challenge modes there is a set of challenges called "Random Instructions". This automatically creates challenges similar to those outlined above.

This activity could also be completed using the Blue-Bot TacTile Reader.

Key Focus

Becoming more efficient

**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**

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
Set up a suitable mat e.g. Shape Mat (smaller ones are probably better) and check that
Blue-Bot connects to the app. Open the app. Select the appropriate mat. Then choose
"Explore Mode" and "Repeats".

Activity
As children become more confident in their Blue-Bot
programming skills they can work towards becoming
more efficient in their programming. They can look at
how they can reduce the number of commands they
need by using repetition. For example rather than 4
forward steps they could repeat 1 forward step
4 times. Again this activity works well by starting
simple challenges. Using bigger mats is a good
way to extend this activity.

This activity could also be completed
using the Blue-Bot TacTile Reader.

Key Focus 5

Repetition in programming

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

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

Set up a suitable mat e.g. Shape Mat (smaller ones are probably better) and check that Blue-Bot connects to the app. Open the app. Select the appropriate mat. Then choose Explore Mode and "Repeats" and then "45 Degree Turns".

Activity

Starting with Repeat mode, children can explore which shapes they can draw. With only 90° turns available there is an obvious limit to the range of shapes that can be drawn. Switch the app to 45° mode and explore which shapes can now be drawn. Shapes can be drawn with just 45° turns and also combinations of 90° and 45° turns.

Getting started with Blue-Bot®

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When the Blue-Bot App is launched for the first time it has limited functionality. After the App has connected to a Blue-Bot all functions will be unlocked. This only needs to be done once. Please see later in the guide for further details of connecting to Blue-Bot.
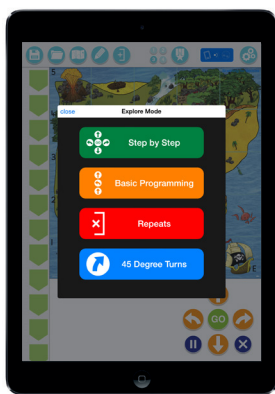
After the App has opened the option to select a mat will appear. Tap on a mat to select it (mats can also be imported or photographed – see later in the guide).

Two modes are available. Tap one to select it.

Explore mode is open ended, allowing you to set your own challenges and activities.

Challenge mode provides you with a range of activities and problems to solve.

Modes can be switched at any time using the buttons on the main toolbar.

Explore Mode

Explore mode offers four different programming options.

1   **Step by Step** – This allows a Blue-Bot program to be built one command at a time. As the command button is tapped Blue-Bot will move and the command will be added to the program. The entire program can be played back by pressing GO.

2   **Basic Programming** – A number of commands can be added to the program before they are run. Commands can be added by tapping the command buttons or by drag and drop. Commands can also be moved around and deleted.

3   **Repeats** – This mode incorporates Basic Programming and also allows one or several commands to be repeated (looped)

4   **45° Turns** – This mode builds upon Repeat and allows Blue-Bot to be turned through 90° and 45°.
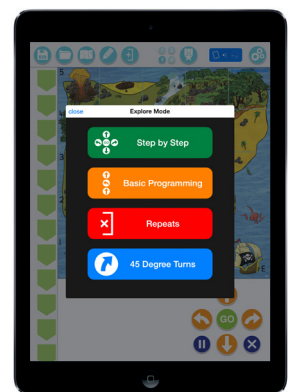
Once a programming mode has been selected a Blue-Bot icon and a mat will be displayed. Drag the Blue-Bot icon onto the mat to the position you wish it to start from. When you release Blue-Bot it will snap into a square.

The command buttons and command sequence will be displayed.

To add a command to the program either tap the command button once or drag and drop it.

To move a command's position in the program drag it to a new position.

To remove a command drag it off the program line and let go of it.

Repeat and 45° Mode

To repeat a command or a group of commands tap the repeat button.

Tap in the red circle by the first command in the repeat sequence. Then tap the circle by the last command in the repeat sequence. A red surrounding bar will appear. Use the + and – minus buttons to select the number of times the commands should be repeated.

45° degree turn

NOTE: In 45° mode the mat will be greyed out because Blue-Bot will not move a complete grid square at a time when rotated 45°.

Challenge Mode

There are four different types of challenges.

1 **Get from A to B**

2 **Obstacles**

3 **Fewer Buttons**

4 **Random Instructions**

Difficulty Levels –
For each type of challenge there are 3 difficulty levels. The level can be selected using the stars which can be seen when a challenge is opened.
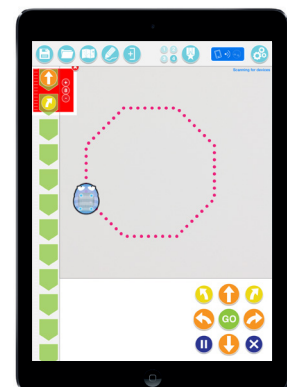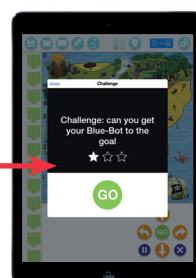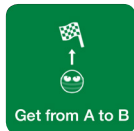
1 Get from A to B

From a random starting point write a program to get to the destination flag. These challenges deliberately do not tell you that you've failed to complete them. Keep trying until you succeed. There is no single correct answer. As long as the destination is reached you have succeeded.

Write a program to get to the destination.

2 Obstacles

These challenges are the same as those in **Get from A to B** but with obstacles in the way. These challenges deliberately do not tell you that you've failed to complete them. Keep trying until you succeed. There is no single correct answer. As long as the destination is reached you have succeeded.

Write a program to avoid the obstacles and get to the destination flag.

3 Fewer Buttons

One or two command buttons are removed and the challenges need to be solved without them. These challenges deliberately do not tell you that you've failed to complete them. Keep trying until you succeed. There is no single correct answer. As long as the destination is reached you have succeeded.

Write a program to get to the destination flag without all the command buttons being available.

4 Random Instructions

Read a simple program and predict what it will do.

Read the program and predict where Blue-Bot will get to. Drag the destination flag to where you think that will be.

Main Menu Bar

Save · Mats · Reset · Callenge Mode · Settings

Load · Show / Hide Trail · Explore Mode · Connection Status
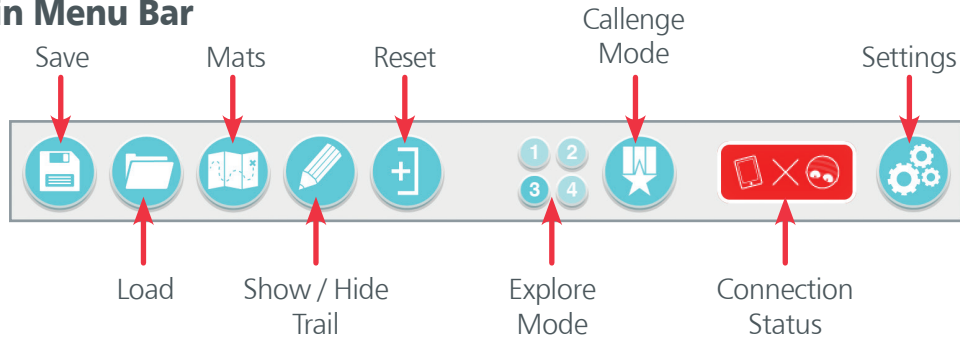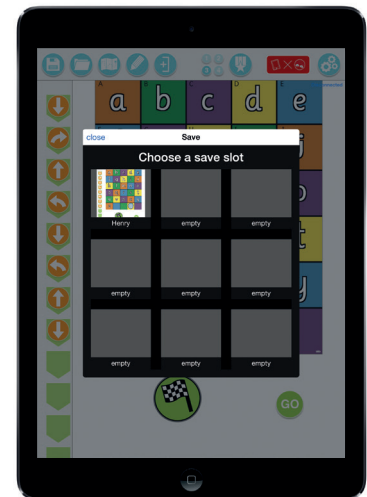
Saving and Loading

To save a program:

1   Tap the save icon.

2   Tap on a save slot.

3   Type in a name for the program.

4   Tap save.

To open a saved program:

1   Tap load.

2   Tap on the file to load.

NB There are nine save slots available.
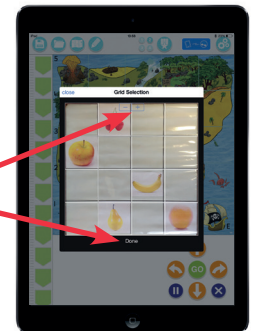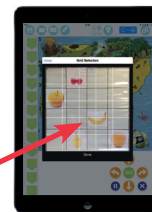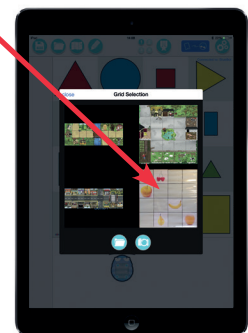
Mats

Tap on a mat to select it. OR

1   Tap the **camera icon**

2   Take a photo of the mat. Try and get it as centred as possible.

3   Tap **+ -** to select the right number of grid squares. Then tap **Done**.

4   Select the photograph from the mat list.

5   The photographed mat is now ready to be used.

Settings

Show / Hide Buttons

On this screen, buttons in the app can be hidden or unhidden by tapping on them. For example the mats button could be switched off making it more difficult for children to change mats and therefore remain focussed on one.

Connect, disconnect and rename Blue-Bot

Connect or disconnect from a Blue-Bot using the slide switches. A Blue-Bot can only be connected to one device at a time.

To rename a Blue-Bot you must be connected to it. Tap on Rename. Enter a new name and then tap on rename again. Blue-Bot will disconnect and should reappear in the list with a new name.

Blue-Bots can be renamed to help with classroom management. You might also add a small label or number plate to each Blue-Bot with its name so you can easily identify which is which.
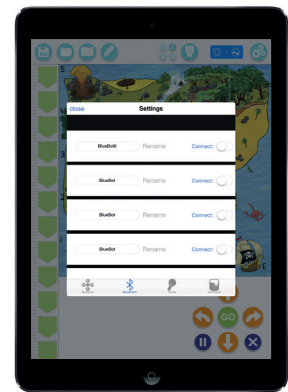
Voice Recorder

This screen allows a recording to be made for each command button. As Blue-Bot moves the recording will be played back. For example the word 'Forward' could be recorded for the forward button. Recording a voice or sound for each command will mean children get auditory feedback which can help to reinforce the use and understanding of particular commands and language.
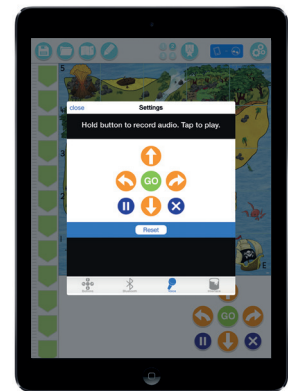
Interface Colours

This page allows the screen background colour to be changed. It also allows the button colour to be changed. Tap on the colours or buttons to select them. Changing the colours used may make the screen clearer for users with specific visual needs.

The Blue-Bot app has been designed to work across a number of platforms and is a free download. Using the app with Blue-Bot unleashes the full potential of Blue-Bot in your classroom. Once you open the app on your device, select your Blue-Bot and get programming! The app allows you to select a Bee-Bot mat that you may already have , so you can replicate what's on screen in real life!

Explore Mode

Step by step programming
When a button is pressed, Blue-Bot will move and the instruction will be added to the list. Once you're happy with the algorithm, place Blue-Bot back at the start point and press go!

Drag and Drop programming
Choose your instructions for Blue-Bot and drag them into the algorithm bar on the left. If you have spotted an error then quite simply drag the instruction out that you do not want anymore.

Repeats
Blue-Bot app features the option to include repeats in your program to make it even more efficient!

45 degree turns
Blue-Bot can be programmed to make 45 degree turns left and right. How many shapes can the children draw with Blue-Bot?

Challenge Mode

This mode sets challenges for the children to solve with Blue-Bot.

Obstacles
Blue-Bot app will randomly put obstacles on the on-screen mat for Blue-Bot to navigate around, adding complexity to the program.

Fewer Buttons
In this challenge the app will remove one or two directional buttons. Can Blue-Bot still get to where it needs to be by using just left and forward, for example?

Random Instructions
With this challenge you will be presented with a list of instructions for Blue-Bot and based on this you must predict which square Blue-Bot will end up.
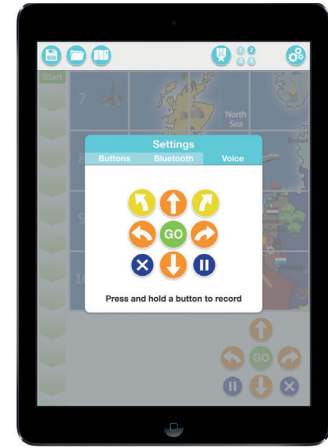
Extra Features

You can choose to remove some of Blue-Bots buttons to make it more challenging to program. Blue-Bots can be renamed on the app to make classroom management of multiple Blue-Bots easy. Children can record themselves saying a command and can assign it to a button on Blue-Bot. As the algorithm goes through its cycle, children can hear themselves saying the instructions as it cycles through the program!


ANDROID APP ON
Google play

Available on the
App Store

*Available March 2016

Available on the iTunes App store for iOS, on the Google Play Store for Android and as a download from the TTS website for PC* and Mac OS*

Download your FREE Blue-Bot® poster from the TTS website! Available in A3 or A4, the posters label the components of Blue-Bot® revealing the secret of what gives Blue-Bot its buzz!
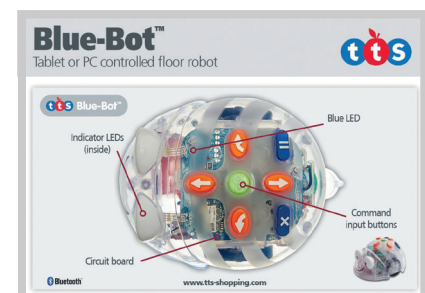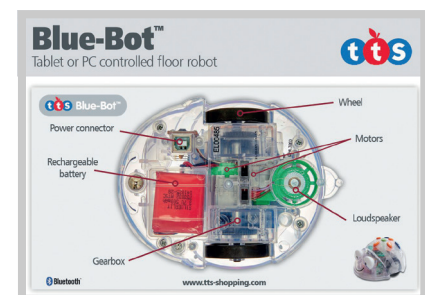
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Blue-Bot Rechargeable Docking Station

Blue-Bot Mat Pack

Bee-Bot Bumper Mats Set