Edbot Basics

Scratch 2.0

Teacher's Guide

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Introduction

This unit is suitable for students in KS2 and KS3 and covers the following criteria:

- 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

Number of lessons

Recommend 6 x 1 hour teaching lessons, although this will work with slightly shorter or longer lessons.

The timings shown are colour coded to help you split up the lesson timings to fit your length of lesson.

Pink   Short activities (under 5 minutes each)

Yellow   Medium length activities (between 6 and 12 minutes long)

Blue   Longer activities (over 12 minutes long)

Suitability

This unit is suitable for mixed ability classes.

Differentiation

Lessons are differentiated by outcome and this is reflected in the success criteria and part of each lesson involves the students working independently, freeing up the teacher to offer more one-to-one help to the students who need it. There are also instructions in the lesson plans on how to adapt the lesson for lower or higher ability students.

Preparation needed by the teacher

The teacher needs to make sure that they are familiar with the contents of each lesson and the activities and questions involved which will help them with assisting the students in the lesson.

Each student should be issued with a mark sheet at the beginning of the unit. Some lessons use videos to teach the students the skills they need; this will require the teacher to make sure that they have speakers attached and switched on.

The Edbot Software should be installed on all the PCs and it is a good idea to have the students log in with their individual user names if they have them. This makes it easier to find their PC in the Edbot Software to give them control of the Edbot. You also need to ensure the Edbot Software is configured correctly on the teacher's PC with the Edbot connected via Bluetooth.

Make sure the Edbot's batteries are fully charged and installed correctly.

Before the first lesson you will need to convert the Scratch projects in the *Student Files* and *Teacher Files* folders so they reference the particular name you've given to your Edbot. Use the Edbot Software to do this. You'll find the project converter in the Scratch menu. Copy the converted student files into a shared area that the students will be able to access.

Assessing without Levels

"As part of our reforms to the national curriculum, the current system of 'levels' used to report children's attainment and progress will be removed. It will not be replaced.

We believe this system is complicated and difficult to understand, especially for parents. It also encourages teachers to focus on a pupil's current level, rather than consider more broadly what the pupil can actually do. Prescribing a single detailed approach to assessment does not fit with the curriculum freedoms we are giving schools." [1]

With this in mind, we have developed a three-tier system which can easily be adapted to any system your school has implemented. We have referred to these bands as

- Foundation Essentials
- Mainstream Learners
- Extended Experts

Assessing Progress

Each student should be given a mark sheet on which they will need to write their name, so that they can get the same sheet back each lesson and could be kept in a work folder which they can refer to every lesson.

The assessment sheet is based on "A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives"[2] and avoids use of the old national curriculum levels altogether. This means that the same unit can be used in years 3, 4, 5, 6, 7, 8 or 9 and the students can still show they have made progress.

Edbot Basics

Name: **Class:**

Assessment Objective	Foundation Essentials	Mainstream Learners	Extended Experts
A.O.1 Movement	☐ I can make Edbot move by controlling individual servos or running a pre-installed motion	☐ I can control the servos and run a motion to make Edbot move	☐ I can explain why robots are used rather than humans in some situations
A.O.2 Loops	☐ I can use *forever* loops in my code ☐ I can use *repeat* loops in my code	☐ I can use the *repeat until* loop in my program ☐ I can explain what is meant by the term "nested loop"	☐ I can plan and create a complex program using a variety of loops and nested loops successfully
A.O.3 If Blocks	☐ I can use *if* blocks and *if...then...else* blocks ☐ I can use operators including =, <, > and mathematical operations correctly in my programs	☐ I can join strings together to make more complex outputs ☐ I can create a simple maths quiz ☐ I can create a number guessing game	☐ I can alter my programs to make improvements
A.O.4 Lights	☐ I can create a light sequence using loops	☐ I can add script to sprites to control the colour of the lights on Edbot	☐ I can use the *join* block and random numbers to control the lights on Edbot
A.O.5 Sensor	☐ I can use a *forever* block, *if* block and the distance sensor to make Edbot react if something is close by	☐ I can write a program to help Edbot navigate as it moves around the classroom automatically	☐ I can create a program that uses sprites and the distance sensor to control how Edbot moves around the classroom
A.O.6 Football	☐ I can plan the actions needed to help Edbot play football	☐ I can create a program which will allow Edbot to play football	☐ I can amend and update my program as needed

The assessment should be completed at the end of every lesson by the students as a form of self-assessment and the last slide in each presentation tells the students the skills that they have covered. The students tick the box next to the objective if they feel they have fully met that criteria. The teacher can then use this as a basis to help them assess the students' ability along with class observations, questioning students and viewing the students' work.

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[1] Taken from www.education.gov.uk/schools/teachingandlearning/curriculum/nationalcurriculum2014/a00225864/assessing-without-levels downloaded on 5th March 2014

[2] Anderson, L.W. (Ed.), Krathwohl, D.R. (Ed.), Airasian, P.W., Cruikshank, K.A., Mayer, R.E., Pintrich, P.R., Raths, J., & Wittrock, M.C. (2001). A taxonomy for learning, teaching, and assessing: A revision of Bloom's Taxonomy of Educational Objectives (Complete edition). New York: Longman.

Edbot Basics   Lesson 5 – Using the sensor

Lesson objective:	Use the distance sensor attached to Edbot.	
All will be able to: Use a forever block, if block and the distance sensor to make Edbot react if something is close by.	**Most will be able to:** Write a program to help Edbot navigate as it moves around the classroom automatically.	**Some will be able to:** Create a program that uses sprites and the distance sensor to control how Edbot moves around the classroom.

Differentiation

Low Ability:	High Ability:
Make sure they plan out their programs. They can do this with flow diagrams, writing out each step or writing a bullet list of the code they need, whatever they feel comfortable with. They may need help in finding the code they need and remind them to look at the colours in the examples which should help them.	Add a celebration so that if a key is pressed Edbot will do a celebration. See if they can write loops to stop having to tell Edbot to move forward each time. These loops can be attached to a keyboard shortcut on the stage rather than added to the sprites.

Starter

Time	Description	Resources
Short Activity	Ask the class what they think the program will do. Encourage them to explain each line of the code.	edbot_scratch2_ basics_lesson5.pptx Slide 2 edbot_scratch2_ basics_answers.pdf

Main Activities

Time	Description	Resources
Short Activity	Explain the objectives to the class.	Slide 3
Long Activity	Open the sample project **sense.sb2**. Talk through the code with your students and then run it to allow the students to see the sensor working. Explain to the class about the sensor. Explain the program using the slides. Ask the students to open **edbot_scratch2_blank.sb2** and save it as **Navigate.sb2**. They need to write a program that will make Edbot walk around the room avoiding the obstacles. When they think they have written the correct program ask them to talk you through their program before they test it out.	Slides 4 – 6 edbot_scratch2_ blank.sb2 sense.sb2
Short Activity	Go through the slides explaining the problem with the first example and how to get around that problem.	Slides 7 - 9

Plenary

Time	Description	Resources
Long Activity	Ask your students to open the **edbot_scratch2_basics_lesson5_direct.sb2** project and add code to the individual sprites to control how Edbot moves around. Once you have the programs working set out a route around the room and ask people to direct Edbot using their programs. You will need to nominate a team and then connect Edbot to that team's computer so they can start the route. They then nominate a different team to connect their computer to control Edbot for the next section of the route and so on. Test Edbot's sensor occasionally by putting your hand in front of the sensor to see if it refuses to move forwards.	Slide 10 edbot_scratch2_ basics_lesson5_ direct.sb2

Self-Assessment

Time	Description	Resources
Short Activity	Give out the mark sheet from the previous lesson. They read through the highlighted objectives and if they feel they have met the criteria fully they need to tick the box. If they do not feel they have met the objective they should not tick the box.	edbot_scratch2_ basics_mark_ sheet.pdf Slide 11