

Edbot Dream

Scratch 3.0

Teacher's Guide Sample



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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 4 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
Yellow	Medium length activities
Blue	Longer activities

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.

The teacher will need to be familiar with the Edbot Dream Scratch blocks. The documentation is available via the Edbot Software by selecting “Documentation...” in the “Help” menu. The teacher can use the edbot_dream_scratch3_intro.pptx presentation to introduce the new Scratch blocks.

Each student should be issued with a mark sheet at the beginning of the unit.

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 Dream robot. You also need to ensure the Edbot Software is configured correctly on the teacher’s PC with the Edbot Dream robot connected via Bluetooth.

Make sure the Edbot Dream robot’s battery is fully charged and installed correctly.

Before the first lesson you will need to convert the example Scratch projects so they reference the particular name you’ve given to your Edbot Dream robot. Use the Edbot Software to do this. You’ll find the project converter in the Scratch menu. Copy the converted 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 Dream Scratch 3.0 Mark Sheet			
Name: _____		Class: _____	
Assessment Objective	Foundation Essentials	Mainstream Learners	Extended Experts
A.O.1	<input type="checkbox"/> I can program the crocodile robot to open and close its mouth.	<input type="checkbox"/> I can program the crocodile robot to repeat a series of actions and react.	<input type="checkbox"/> I can program the crocodile robot to react when you click.
A.O.2	<input type="checkbox"/> I can make the scorpion robot's tail move.	<input type="checkbox"/> I can program the scorpion robot to move and react.	<input type="checkbox"/> I can program the scorpion robot to talk and use my own defined Scratch blocks.
A.O.3	<input type="checkbox"/> I can make the puppy robot move.	<input type="checkbox"/> I can make the puppy robot move and react using my own defined Scratch blocks.	<input type="checkbox"/> I can create an efficient program with clearly explained code.
A.O.4	<input type="checkbox"/> I can make the puppy robot react to the IR sensor.	<input type="checkbox"/> I can make the puppy robot move and stay inside the circle.	<input type="checkbox"/> I can make the puppy robot constantly move and stay in the circle.

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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.

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.

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Lesson 2 of 4 - Scorpion

Lesson objective:	I can control multiple outputs with a sensor. I can use “forever” loop blocks, “if” blocks and define my own blocks.	
All will be able to: Make the scorpion’s tail move by controlling a motor’s speed and direction.	Most will be able to: Program the scorpion to move and react to an object.	Some will be able to: Program the scorpion to talk and use their own defined Scratch block.

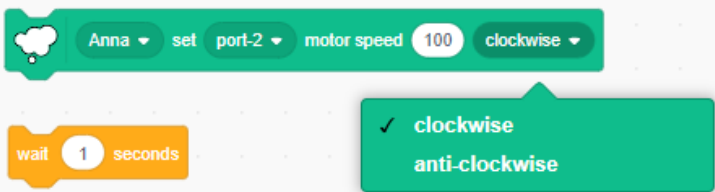
Differentiation

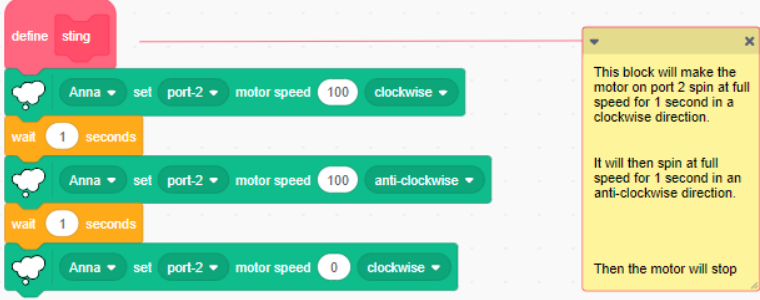
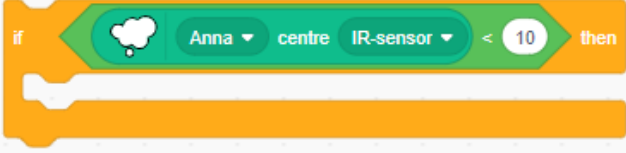
Low Ability: Will be given a program file which has all the blocks they will need already included. Focus on getting the tail and legs to move only. Students will experiment with blocks and combine them correctly.	High Ability: They should define their own Scratch blocks in their program and attempt to make the scorpion talk.
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Starter

Time	Description	Resources
Short Activity	<p><i>The lesson presumes that the scorpion robot is already built and ready to use. Edbot dream robots take between 45-60 minutes to build depending on ability. Factor in 15 minutes or so to disassemble old robots.</i></p> <p>Slide 2 - Explain the objectives to the class. Slide 3 - Demo the scorpion with the default program from the sample project folder, <i>dream_scorpion.sb3</i>. Wave your hand in front of the scorpion robot to get it to react. Explain that in this lesson the students will be writing a program to make the scorpion behave in this way. First, they need to think about the inputs and outputs on the scorpion that they can use to control its movements. Slide 4 - What are the inputs and outputs being used? Inputs – IR Sensor, Outputs - 2 motors and speakers from computer.</p>	<p>Scorpion robot</p> <p>dream_scorpion.sb3</p> <p>edbot_dream_scratch3_lesson2.pptx</p> <p>Slides 2 - 4</p>

Main Activities

Time	Description	Resources
Medium Activity	<p>Set students a challenge - Can you make the tail sting? Discuss what that means? Tail moves and then stops. Using the demo scorpion program again, click on the sting procedure so that the students can closely observe the movement of the tail – make sure that they can see that the motor moves one way and then the other. Note - the tail motor is plugged into port 2 according to the instructions. Ask students to write a program that makes the tail sting.</p> <p>Give students a hint if needed of the blocks/instructions they need.</p>  <p>Remind the students that they need to stop the motor moving after the tail sting. Next, ask the students to define their own Scratch block called “sting” that contains the blocks they used to make the tail sting. (Remind them how to do this if necessary). Allow them time to test their code by connecting them to the scorpion robot.</p> <p>Low ability students can be given a file with the blocks pre-loaded - <i>edbot_dream_scratch3_lesson2a_scorpion.sb3</i>.</p>	<p>edbot_dream_scratch3_lesson2a_scorpion.sb3 (for LA students)</p> <p>Slide 5</p>

<p>Short activity</p>	<p>Review solutions with the class</p>  <p>Why does the motor need to move clockwise and anti-clockwise each time? Get the students to examine how the scorpion's tail is constructed. The lever on the scorpion's tail limits the movement of the motor to 180° so the motor needs to reset to the initial position each time. When the motor moves in a clockwise direction the tail will sting. The tail will sting again when the motor moves in an anti-clockwise direction.</p>	<p>edbot_dream_scratch3_lesson2a_scorpion_solution.sb3</p> <p>Slide 6</p>
<p>Long Activity</p>	<p>Student challenge: Can you make the scorpion react and sting when someone gets too close?</p> <p>Get the students to describe the steps needed:</p> <ul style="list-style-type: none"> - make it move - make it sting - make the scorpion react to something getting too close <p>Discuss with the students, decomposing the problem. Show demo again if needed. What have we already worked out? Sting. What is the next step? Movement – forwards and backwards. What does the scorpion use to react to something getting too close? The centre IR sensor.</p> <p>Give this code block clue to students who are finding the IR sensor difficult to work out.</p>  <p>Extension</p> <ul style="list-style-type: none"> - Can you make it speak as well? - Can you create your own scratch blocks for the forwards and backwards motions? <p>Allow the students time to test their code by giving them control of the scorpion. If they are waiting for their turn, remind them to comment their code. Right click on the block and choose 'add comment'.</p>	<p>edbot_dream_scratch3_lesson2b_scorpion.sb3 (for LA students)</p> <p>Slides 7 - 9</p>

Review

Time	Description	Resources
<p>Medium Activity</p>	<p>Get the students to share their solutions and answer the questions. Get them to explain their code, by summarising what it does. If needed show possible solution, edbot_dream_scratch3_lesson2b_scorpion_solution.sb3, which uses user defined Scratch blocks.</p>	<p>edbot_dream_scratch3_lesson2b_scorpion_solution.sb3</p> <p>Slides 10 - 11</p>

Self-Assessment

Time	Description	Resources
<p>Short activity</p>	<p>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.</p>	<p>edbot_dream_scratch3_mark_sheet.pdf</p> <p>Slide 12</p>