# Lesson 21 – Servo Motors Part 1

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| The Big Picture – Why Is This Relevant? | Learning Objectives |
| * + - * Servo motors are very useful as the speed can be adjusted as well as the direction of rotation       * This makes them perfect for use in robots and animatronics; drones; model cars and planes | * Know what a servo motor is and how it works * Know how to set up the Kitronik Servo:Lite hardware * Learn the features of the code * Write programs to control the servo |
| Engagement – How Can I Engage Learners? | Assessment for Learning |
| * The teacher could demonstrate a servo moving at the start of the lesson * Show a video clip of a robot or animatronic and ask the Learners to discuss how they think the movement is controlled * Programming a servo to move is engaging for Learners | **Expected Progress:**   * Learners connect up the Servo:Lite board * Learners write code to turn the servo to the right   **Good Progress:**   * Learners adapt code to turn the servo to the left * Learners program the servo to stop using a button or Iteration   **Exceptional Progress:**   * Learners program the servo to move left or right by pressing Button A or B |
| Links to KS3 Programme of Study | |
| * understand the hardware and software components that make up computer systems, and how they communicate with one another and with other system * design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems * use 2 or more programming languages, at least one of which is textual, to solve a variety of computational problems; make appropriate use of data structures [for example, lists, tables or arrays]; design and develop modular programs that use procedures or functions | |
| Key Concepts | Key Words |
| * How a servo works * Setting up the Servo:Lite board * Program the servo * Adjust the speed and direction * Programming the servo to stop | * Servo * GND * Pulse width |
| Differentiation | Resources |
| Ensure that Learners wire up the servo correctly and that they are using Pin 1 not Pin 2. This pin could be used but the code needs to be edited, replace Pin 1 with Pin 2.  The basic movement program is easy to access. Learners may need support with the stopping programs and Stretch Task. | * Lesson 31 ppt * Lesson 31 Activity Sheet * Sample Python code * 1 micro:bit per Learner * 1 USB cable to connect the micro:bit to a PC * A PC * Servo:Lite * A servo motor * Three AAA batteries * Access to [micro:bit Python Editor (microbit.org)](https://python.microbit.org/v/3) |
| Lesson Flow | |
| * Teacher could demonstrate the servo moving as the Learners enter the room * Teacher discuss the features of a servo motor * Teacher walks through the set up of the Servo:Lite board * Learners attach the Servo:Lite hardware * Teacher to talk through and demonstrate how to attach the servo motor * Learners attach the servo motor * Teacher to check correct pins have been used (brown, red, orange) * Teacher explains the pulses width and speed values that control the servo * Learners could write this down although it is included in the Activity Sheet * Teacher explains the basics of a program to control the servo * Learners attach one of the arms to the servo * Teacher to support Learners where required * Learners write up program and test servo * Learners work through activities and complete Stretch Task * Teacher to support Learners where required * Recap main learning content of the lesson   If you do not have access to Kitronik servo:lite board you can achieve similar functionality using a regular micro:servo. Full instructions on how to use this alternative can be found here: [Equipping a microservo with Crocodile clips (microbit.org)](https://makecode.microbit.org/device/servo#:~:text=Equipping%20a%20microservo%20with%20Crocodile%20clips%201%20Using,connection%20...%204%20Calibrating%20...%205%20Troubleshooting%20) | |
| Making | |
| There are no making activities in this lesson. | |