# Lesson 22 – Servo Motors Part 2

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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 | * Make and program a simple robotic arm * Program the servo to move left and right * Write programs to control the servo with the buttons * Apply skills and code to create your own moving object. |
| 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 motor to move is engaging for Learners | **Expected Progress:**   * Learners build and code the robotic arm   **Good Progress:**   * Learners program the servo to move left or right by pressing Button A or B * Learners plan your own movement of an object (walking, waving, flower growing etc.)   **Exceptional Progress:**   * Learners build and program the movement of the object |
| Links to KS3 Programme of Study | |
| * 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 * 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 |
| * Use of the servo attachments * Making a robotic arm move * Appling learning to create own moving object. | * Animatronics * Servo |
| 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 would need to be edited, replacing Pin 1 with Pin 2.  Some Learners may require support planning their own moving object, such as which attachment to use and how to connect it up to the leg / arm etc. | * Lesson 22 ppt * Lesson 22 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 * One or servo motors * Three AAA batteries * Access to the Servo attachments * Arts and crafts * Scissors * Access to [micro:bit Python Editor (microbit.org)](https://python.microbit.org/v/3) |
| Lesson Flow | |
| * This lesson builds on the previous lesson where students will have set up their own servo. The content below can be achieved through using the same solution as the previous lesson. The Kitronik:Servo lite board is the recommended hardware although the same functionality can be achieved through using the servo:lite with crocodile clips. * Teacher could demonstrate the servo moving as the Learners enter the room – something simple like a figure spinning round or a hand waving. * Teacher to discuss the use of servo in animatronics and robotics * Teacher recaps the basic elements of the programming values for the servo motor, (angle and speed) * Teacher to hand out the attachments to Learners * Learners attach the arms to the servo * Learners work through robot hand activity activities, building a moving / waving robotic arm * Learners complete other activities * Teacher to support Learners where required * Learners to complete Stretch Task * Teacher to support Learners where required * Learners to demonstrate and share their projects | |
| Making | |
| * Building your own moving object with the servo | |