Year 3. Lego WeDo

This is the first time the children will have encountered the LEGO WeDo kits in school, and as such explanations and introductions will need to be taken at a steady pace with this in mind. The focus of this unit is to help them become familiar and confident in the programming style of the LEGO WeDo software, with an emphasis on the motor functions and gearing mechanisms. The software takes them through some different mechanisms for this, including the ability to 'gear up' for extra speed on flat surfaces, or 'gear down' for more torque, to help a vehicle get up a hill, for example. The software involves a simple drag and drop button interface, which the children should get the hang of quite quickly. Children will need to work in pairs, so it is advisable to ensure that compatible children are paired up for these activities – perhaps ensuring those with higher needs have a stronger partner. Their skills will be further enhanced next year by moving into exploring pulleys and sensors.

Knowledge covered:

NC	Ladders Objectives
(2.1) Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts	Y3 - CS1 - I understand that usually a problem can be broken up into smaller parts. Y3 - CS3 - I know when to test a program and when to debug it if it doesn't work. Y3 - CS6 - I can predict some of the things that may happen BEFORE I run my program. Y3 - CS7 - I can read and explain a flowchart for a computer program
(2.2) Use sequence, selection, and repetition in programs; work with variables and various forms of input and output	Y3 - CS4 - I understand that repeating instructions can save time and make a program simpler.
(2.3) Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs	**Y3 - CS2 (KPI) - I can create an algorithm to make something happen successfully. I can talk about it.** Y3 - CS5 - I can explain how a simple program works (you may like to use the words input and output)
(2.4) Understand computer networks including the Internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration.	
(2.5) Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content.	
(2.6) Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information.	
(2.7) Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.	

Adaptive teaching – Recommended tried and tested practise in these lessons:

Due to the nature of Computing lessons and the common 'firefighting' required in lessons with technical issues or children who are individually confused over what may be considered small stumbling blocks, it is recommended that teachers put time and effort into reinforcing the use of school-wide learning ethos and systems (for example, the use of the 4B's – brain, board, buddy, boss) to encourage children to try to solve their problems in the right way rather than going straight to the teacher, or lessons will quickly become unmanageable. It is also recommended to follow our school's use of the Rosenshine model of mastery teaching strategy and teach lessons in a series of stages, with short, simple tasks being set, and children who finish early can be given encouragement to support and 'lifeguard' other students. This has twofold benefits; the process of teaching others cements and secures pupils' own mastery as well as ensuring the teacher isn't overwhelmed with personal requests for help. If one-to-one support is unavailable for high need children, it is a good idea to make sure these children are sat next to or near a higher ability student who may act as peer support for them, and these children are monitored carefully throughout lessons to ensure they stay on task and understand each objective given. Ensure that any hardware support that is required for individual's SEND requirements are adjusted appropriately and are tied to those students' individual log ins (e.g. Zoom tools or screen tints for students with visual impairments etc). Teachers should have a knowledge of Pupil Premium children,

particularly those who have been seen to struggle in Computing lessons, and these children should be monitored alongside those with SEND during lesson time to help ensure they access lessons along with the rest of the class.

Medium Term Lesson Plan:

Lesson 1	What is LEGO WeDo? L.I I can familiarise myself with LEGO WeDo hardware and software L.I I can control a physical system using a series of commands Y3 - CS1 **Y3 - CS2 (KPI)** Y3 - CS3 Y3 - CS5 Y3 - CS6 Y3 - CS7	S.C: I can follow instructions and guides carefully I can show a spirit of co-operation and teamwork	<u>Key Questions</u> What do know/remember of Lego WeDo? How does it work? Would a robot work without a computer program behind it?	Introduce the children to the Lego WeDo boxes. Explain the need for manners, respect and organisation – we may need parts from other people's boxes in these lessons. Discuss logistics of classroom organisation. Show some examples of what can be built with the kit: http://www.wedobots.com/2013/01/powerful-machines.html Let the children work though the mechanism challenges. After each challenge, review and discuss how each works. Motor movements Gears All programming skills/buttons. No other mechanisms. Encourage children to build, plan their program, plug in and test their program, and stop their program. Take photos of completed mechanisms and upload to Seesaw, along with screenshotted codes built. Children review and discuss the mechanism on Seesaw too.
Lesson 2	Programming functions L.I I can explore the LEGO WeDo programming commands L.I I can control a physical system using a series of commands Y3 - CS1 **Y3 - CS2 (KPI)** Y3 - CS3 Y3 - CS5 Y3 - CS6 Y3 - CS7	S.C I can include sounds in my program I can explore the 'display' function in the LEGO software I can control my physical system by making it pause or reverse.	<u>Key Questions</u> *Prior knowledge* What did you learn from the last lesson about how to use the kit? Which programming instructions did you use? How can we make our program stop?	As lesson 1, finish building children's knowledge of mechanisms and coding that can be used in the WeDo program. Children to explore the motors and gears but no other mechanisms. Use the above mechanisms in combination with exploring what they can create using the simple WeDo programming tools – adding sounds, wait times, displaying images or text on the screen etc. Demonstrate how the 'Add to display' button can be used to create a counter which is displayed on the screen. If time at the end of the lesson, children to choose one mechanism and see if they can use the remaining kit to build a character or object around it. Explain what it represents and how it works. Seesaw to evidence, review & discuss.
Lesson 3	L.I I can create a timed barrier Y3 - CS1 **Y3 - CS2 (KPI)** Y3 - CS3 Y3 - CS5 Y3 - CS6 Y3 - CS7	S.C I can use timing commands to make my barrier work correctly I can design a physical system to meet a set of specifications	<u>Key Questions</u> *Prior knowledge* Which physical systems you created in lessons 1 and 2 could help you with this task? Which programming instructions from lesson 1 or 2 could help you with this task?	Challenge children to create a barrier for a car park. It will need to raise, let one car through and then return to its original position with horizontal alignment. Extension activities: Create an additional program for longer/slower vehicles to get through the barrier, test out using keys on the keyboard to initiate the program, add sounds, add messages on display, build more objects around it so it looks like a barrier for a car park, use gearing up/gearing down to see if it improves the way the barrier operates, use the display function to add a counter to keep track of how many cars are let through in a day. Seesaw to photograph/video for evidence & review.
Lesson 4	L.I I can review and assess my design Y3 - CS1 **Y3 - CS2 (KPI)** Y3 - CS3 Y3 - CS5	S.C I can explore, test and debug my program to improve my overall product	<u>Key Questions</u> *Prior knowledge* What was good about your design last week? What could have been improved?	Children review last week's work. How far did they get? How could they improve their design? Assess strengths/weaknesses of their build & programming. Mind map ideas for improvement

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	Y3 - CS6 Y3 - CS7	I can creatively explore different methods of construction to improve my design	Which of the extension activities did you attempt? Were you successful? Which will you try today? Why?	Children to rebuild and improve upon the previous week's design using one (or several) of the previously suggested extension activities. Evidence and review on Seesaw.
Lesson 5	L.I I can program and build a moving vehicle Y3 - CS1 **Y3 - CS2 (KPI)** Y3 - CS3 Y3 - CS5 Y3 - CS6 Y3 - CS7	S.C I can creatively solve problems in designing my vehicle I can combine my building and programming skills effectively	<u>Key Questions</u> *Prior knowledge* How have the cars been built on the wedobots site? Why is it important that our programs today will need a planned 'stop'? Does it make more sense to build the mechanism first, or the vehicle?	Children to use their knowledge of Lego gearing to create a moving vehicle. Revisit http://www.wedobots.com/2013/01/powerful-machines.html To look at how certain vehicles have been built. Encourage children to build the moving mechanism first, then construct their vehicle around it. Extension challenges: Can they make it drive forward, stop for three seconds, then return it to its original position? Can they create a sports car? A 4x4? A van? Can they create one with a gearing down mechanism for added torque, capable of going up a slope? Can they use a gearing up mechanism for improved speed? Evidence and review on Seesaw.