

Year 5. LEGO WeDo

After their work with the LEGO WeDo kits so far in KS2, the children should be familiar with the use of motors, gears, pulleys and sensors. This unit will require a reapplication of these skills, and will introduce them to crown gears and levers. At the beginning of each of these LEGO units, we have chosen to include a 're-familiarising' lesson to begin with to refresh the childrens' memories as to how to use the kit and the software. They are then asked to ensure they practise creating the crown gear and lever mechanisms so they are confident in how they move and work. After that, they are given two lessons; one with an open ended challenge which requires them to make use of these new mechanisms, and another to review and improve upon their design, bringing in skills learned from their previous experiences with the kit.

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.

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	Y5 - CS1 - I can use a range of sensing tools (e.g. within programs such as Scratch) to control what happens (e.g. based on the positions of the sprite, mouse position or inputs such as sound level).
(2.2) Use sequence, selection, and repetition in programs; work with variables and various forms of input and output	Y5 - CS2 - I can recognise an error in a program, debug the program and explain the changes I have made.
(2.3) Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs	Y5 - CS3 (KPI) - I recognise the need to test and retest whilst a program is being developed. Y5 - CS4 - I understand why it may be useful to simplify a program as much as possible (e.g removing unnecessary code or using a REPEAT instruction) Y5 - CS5 - I understand that any system requires input devices (e.g. keyboard) and output devices (e.g. printer). Y5 - CS7 - I understand what decomposition and abstraction are
(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.	Y5 - CS6 (KPI) - I understand that computers can be linked together to create a network and that this can help me working with others online (collaboration)
(2.5) Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content.	Y5 - CS8 - I can explain that computers can be connected together to form systems Y5 - CS9 - I can recognise the role of computer systems in our lives
(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	

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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.	

Medium Term Lesson Plan:

Lesson 1	Crown Gears and Tilt Sensors 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 Y5 - CS1 Y5 - CS2 Y5 - CS3 (KPI) Y5 - CS4 Y5 - CS5 Y5 - CS6 (KPI) Y5 - CS7 Y5 - CS8 Y5 - CS9	S.C: I can create a crown gear mechanism I can create a tilt sensor based lever mechanism I	<u>Key Questions</u> *Prior knowledge* What do we know/remember of Lego WeDo? How does it work? Would a robot work without a computer program behind it?	Reintroduce the children to the Lego WeDo boxes. Remind the children of need for manners, respect and organisation – we may need parts from other people's boxes in these lessons. Remind children of the preferred logistics of classroom organisation. Remind the children about some things that can be built with the kit for inspiration/'wow' moment: +- http://www.wedobots.com Let the children work through the mechanism challenges once again to refresh their memories. They should explore (only): Motor movements Gears Pulleys All programming skills/buttons Sensor Pulley Crown gears – <u>Must do</u> Tilt sensor/lever – <u>Must do</u> NOT the worm gear or cam. Crown gears and tilt sensor/ levers are new this year. Show children the crown gear and ask them when, how and why these may be useful. All children must complete at least one crown gear and one tilt sensor/lever mechanism, so teacher must allow some time for free exploration but ensure these two mechanisms are built at some point in the lesson. Evidence use of the crown gear and tilt sensor/lever on Seesaw. Children to review their new learning.
Lesson 2 & 3	Crown Gears and Tilt Sensors L.I I can create and program a physical system to specific criteria Y5 - CS1 Y5 - CS2 Y5 - CS3 (KPI) Y5 - CS4 Y5 - CS5 Y5 - CS6 (KPI) Y5 - CS7 Y5 - CS8 Y5 - CS9	S.C: I can plan my design I can build and program my design to work like a real-life physical object I can evaluate my design and suggest possible improvements I can develop and improve my design	<u>Key Questions</u> *Prior knowledge* What does the crown gear do? What kind of a movement does it create? How could this be useful? How could we use a lever/tilt sensor in our design?	Children to create a real world object which uses a crown gear or a tilt sensor. Greater depth challenge – use both. Children given an opportunity to create first draft, evaluate it, listen to classmates' ideas, magpie ideas they like, then re-draft their idea and evaluate once again. Reflect on the activity as a whole once complete.