



Unit 3.6 iTech -iControl



Year: Three (Level1)
Term: Summer

Background information for teachers

Pupils will build upon their coding knowledge gained during Level 1 iProgram and learn how to control both simulated and external systems. Pupils will use computational thinking to plan, create and write a program to run an external device. This will involve writing code within the language Blockly, stringing code together to make algorithms, solving and debugging any issues, and coding to achieve the goals set out by the instructor. At the end of the half term pupils will have the opportunity to test their code on a physical object.

Learning Outcomes for the Unit

Learning outcome for the course: During this course pupils will learn to code an external device. They will have to learn that external factors can affect how their program runs, e.g. uneven flooring and compensate for this in their programming. Pupils will learn how robotics are used within industry and design a robot to fit certain specifications. Pupils must learn to use conditionals to be able to complete a physical maze built within the classroom and designed by the instructor. As they are coding on an external device pupils will also have to debug in real time and fix their code during their race time if it doesn't work. During the course pupils will learn about how the Sphero moves and begin to understand Pitch, Yaw and Roll axis.

Key vocabulary

Robotics	the branch of technology that deals with the design, construction, operation, and application of robots.
Industry	large-scale business activity
External Device	Any peripheral device that is not housed inside the computer cabinet.
Pitch	Rotation around the side-to-side axis is called pitch.
Yaw	Rotation around the vertical axis is called yaw.
Roll	Rotation around the front-to-back axis is called roll.
Efficiency	the state or quality of being efficient.
Gyroscope	a device consisting of a wheel or disc mounted so that it can spin rapidly about an axis which is itself free to alter in direction.
Motor	An electric motor is an electrical machine that converts electrical energy into mechanical energy.
Ballast	Gives stability
Accelerate	increase in rate, amount, or extent
Microprocessor	an integrated circuit that contains all the functions of a central processing unit of a computer.
Conditionals	Conditionals are expressions that evaluate to either true or false.
Interpret	explain the meaning of (information or actions).

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Learning Session 1:	Within iControl Learning Session 1 pupils will learn about Robotics within industry. Pupils will be shown real-world examples of how robotics and machines are used to make work environments easier, able to do larger projects, in a more streamlined way, and are more cost effective. Pupils will be introduced to the Starship delivery bots used within Milton Keynes and discuss as a class what they think the robot needs to do to carry out its tasks efficiently and effectively. The class will then be tasked with creating their own robot to fulfil one of a number of briefs given to them by their instructor. Pupils will have to think about the functionality of the robot to make sure it fulfils the need.
Learning Session 2:	During Learning Session 2 pupils will be introduced to the Sphero. This is the external device they will be controlling over the next half term. They will first learn how Sphero works. They will look at its internal components and learn about its internal workings. Pupils will learn the meaning of new words such as Ballast, Pitch, Yaw and Roll, and how all these things help the Sphero stay upright and know where it's going. The pupils will be given a simple task to introduce them to Sphero, its interface and its capabilities ready for a programming challenge next week.
Learning Session 3:	In groups of three pupils create a guide path for the Sphero to present what it can do. They must spend the lesson experimenting with prompt code given to them by the instructor. Pupils must string the code together to create a functioning program to run next lesson. Pupils will show their code to the instructor to ensure they are ready to run the code.
Learning Session 4:	Pupils will have a short amount of time at the beginning of the lesson before showing their presentation code to the rest of their class. Before any code runs the class will have the opportunity to say what they think the code does; the group will then give a short breakdown so the class can see if they were correct. Pupils will have a short time to fix any code they need to with help from the instructor to ensure that they can present their guide path smoothly and in its entirety.
Learning Session 5:	Now the pupils are familiar with the interface of the code and how the Sphero reacts to different external factors, pupils will have to guide Sphero around a maze built within the classroom. To be successful with their coding, pupils must learn about the conditionals, If/And or Else. E.g., if the path in front is purple, turn on purple light to enter. There will be an easy way around the maze and a more difficult way. Pupils can choose which path they wish to code for and begin in their groups of three.
Learning Session 6:	Within this lesson each group of three will have five minutes to present their code to the class, AirDrop their code to the instructor's iPad, run their code, and debug if needed. The fastest person to complete the maze will have their time and school submitted to the Junior Jam leader board. This will be a competition across the UK, featuring all the schools that run iMedia. See where your school is ranked (no names of pupils will be published on the leader board or on any post).
Learning Session 7:	This session will run either as part of a longer half term or a contingency for pupils or classes who have exceeded the lesson plans for the half term. During the final lesson pupils will be given time to complete the mazes if they didn't have the opportunity to in Learning Session 6. If all pupils have finished the class they will move on to learning about coding languages. So far in Level 1 they have concentrated on Blockly. Today they will look at Java and how the look of the coding is different