

Victorian Curriculum

Digital Technologies: Creating Digital Solutions Levels 5 and 6

**An example of how to use the
“Problem Solving Methodology”
and visual programming in the
primary school.**

Student Design Brief

To create a simple child's toy that will light up different colours depending on the movements of the Sphero robot.

Your solution will require:

- Different coloured lights when moved in different directions
- Sphero to make decisions based on the input from it's gyroscope

Levels 5 and 6 Content Descriptions

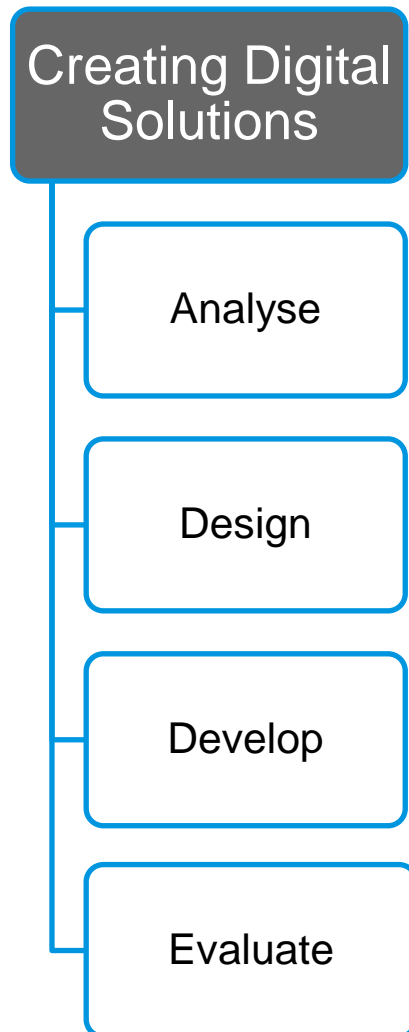
Creating Digital Solutions

Define problems in terms of data and functional requirements, drawing on previously solved problems to identify similarities (VCDTCD030)

Design, modify and follow simple algorithms represented diagrammatically and in English, involving sequences of steps, branching, and iteration (VCDTCD032)

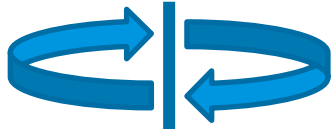
Develop digital solutions as simple visual programs (VCDTCD033)

Problem solving methodology

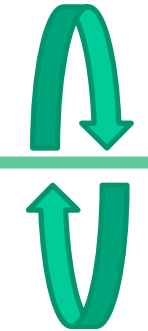


Students will be guided through the steps involved in solving problems and developing solutions.

YAW

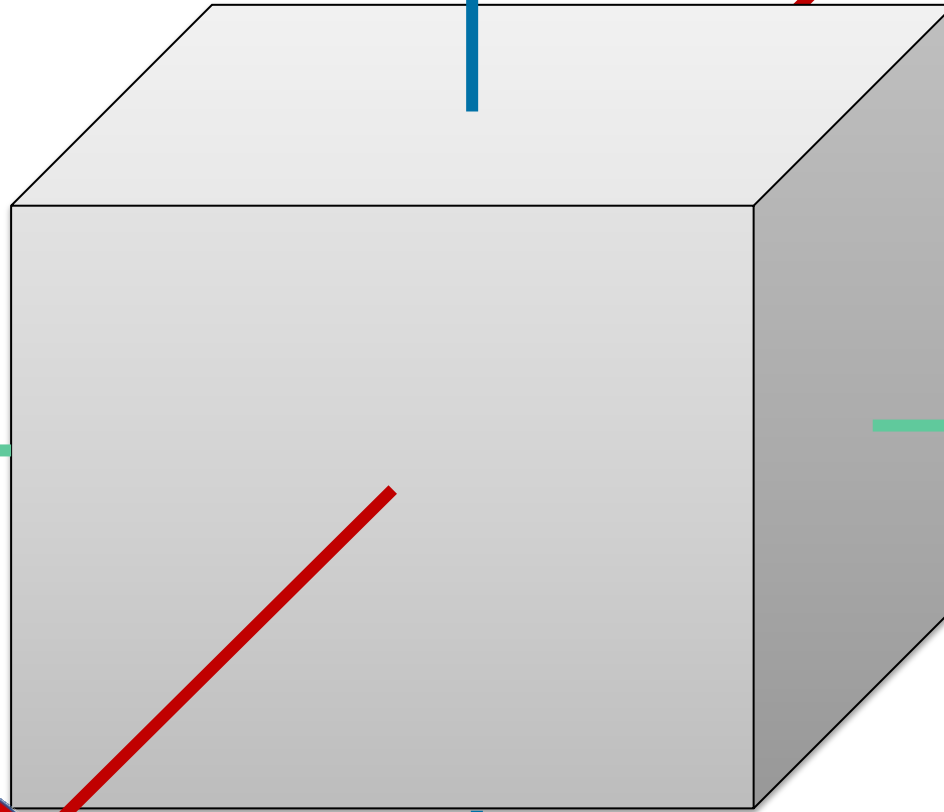


Gyroscope
Axes



Pitch

Roll



Analysing and designing solutions

Brainstorm what toys have lights on them that flash or change colour and what triggers the them.

Ask students to use the live sensor data to work out how their Sphero will react to different sensor input. This is then extended further for students to create their algorithm based on their table of values.

Sphero Robotic Toy Design

Use the live sensor data to work out what sensor input will change Sphero's lights.

What part of the gyroscope sensor? (Yaw, Roll, Pitch)	What 'greater than' or 'less than' number will trigger the event. (Use these symbols > or <)	Sphero color
If the _____	is ____ this number _____	then set main LED to _____
If the _____	is ____ this number _____	then set main LED to _____
If the _____	is ____ this number _____	then set main LED to _____
If the _____	is ____ this number _____	then set main LED to _____

Your Algorithm:

on start program

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

Evaluating the solution

Considerations:

- Can you explain how your solution has met the design brief?
- Has the solution solved the problem?
- Does it work? (every time!)
- Does it do what it is supposed to do?
- Does it meet ALL of the requirements specified in the problem?
- Can we make a better solution, a more efficient solution?
- This can be extended to what other sensor information can we use? What else might our toy ball do?

Creating Digital Solutions Content Descriptions Level 5 & 6

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Creating Digital Solutions

Analyse

Design

Develop

Evaluate

Levels 5 and 6 Achievement Standards

Levels 5 and 6 Achievement Standard

By the end of Level 6, students explain the functions of digital system components and how digital systems are connected to form networks that transmit data.

Students explain how digital systems use whole numbers as a basis for representing a variety of data types. They manage the creation and communication of ideas, information and digital projects collaboratively using validated data and agreed protocols.

Students define problems in terms of data and functional requirements and design solutions by developing algorithms to address the problems. They incorporate decision-making, repetition and user interface design into their designs and develop their digital solutions, including a visual program. Students explain how information systems and their developed solutions meet current and future needs taking sustainability into account.

Levels 5 and 6 Achievement Standards

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By the end of Level 6, students explain the functions of digital systems and how they are connected to other systems.

Students explain how numbers are used in different types. They describe the flow of ideas, information and using valid data.

Students describe functional requirements and developing solutions that incorporate user interface design into digital solutions. They explain how digital solutions meet current and future needs taking sustainability into account.

Students define problems in terms of data and functional requirements and design solutions by developing algorithms to address the problems. They incorporate decision-making, repetition and user interface design into their designs and develop their digital solutions, including a visual program. Students explain how information systems and their developed solutions meet current and future needs taking sustainability into account.