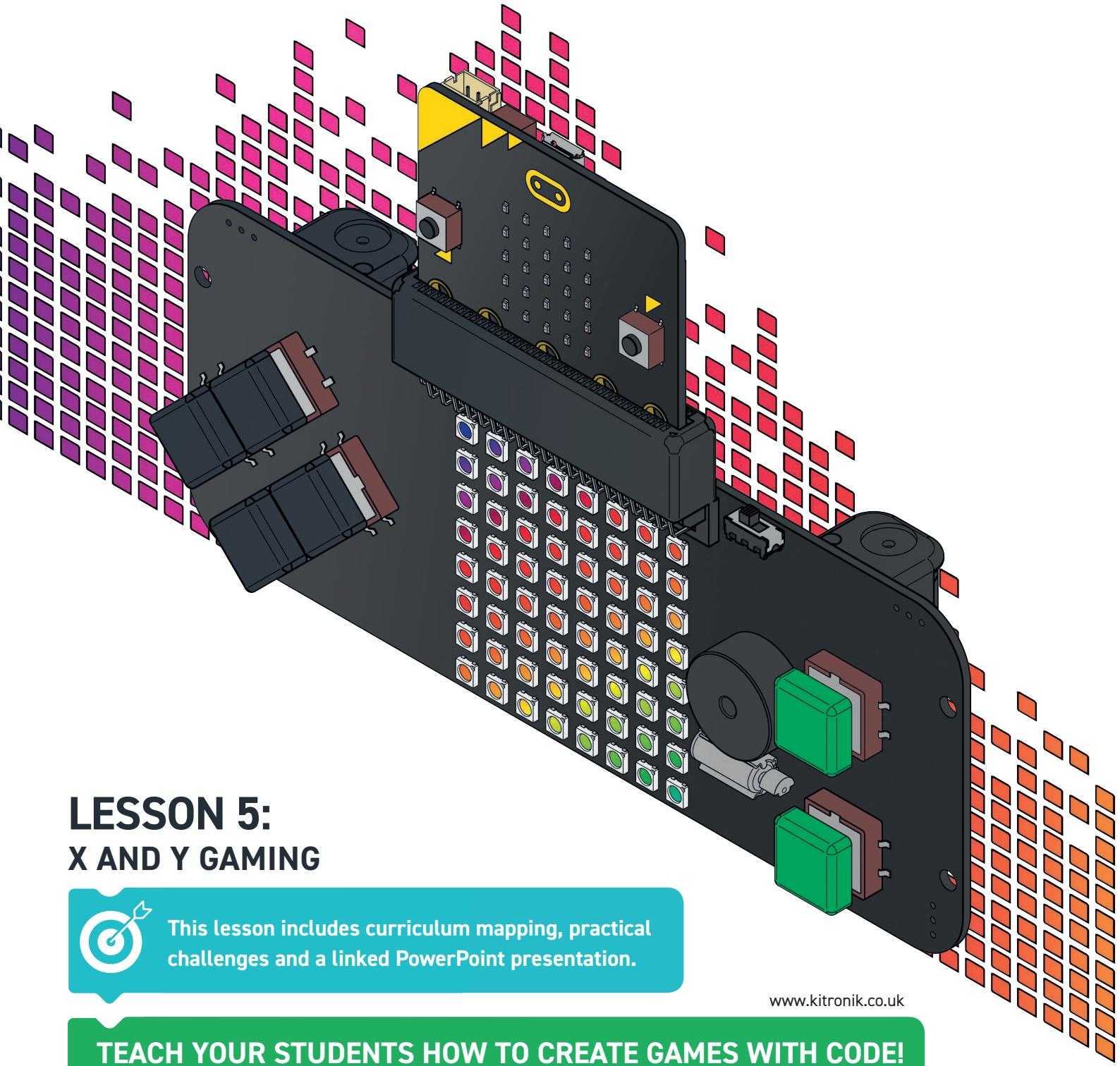
Kitronik

:GAME ZIP 64

THE TEACHERS LESSON GUIDE TO THE :GAME ZIP 64



LESSON 5:
X AND Y GAMING

This lesson includes curriculum mapping, practical challenges and a linked PowerPoint presentation.

www.kitronik.co.uk

TEACH YOUR STUDENTS HOW TO CREATE GAMES WITH CODE!

LESSON 5

X AND Y GAMING

This is the fifth and final lesson for students in Key Stage 3 to the KITRONIK :GAME ZIP64 controller. This lesson gives the students a chance to change their game to use the matrix created last week and add any extra features to it. This lesson is the final lesson in the series using blocks.
Recommended ratio of students to :GAME ZIP64 is 2:1.

Classroom setup

Students will work be working in pairs. They will need:

- A computer/laptop with a USB port and Internet access
- A :GAME ZIP64
- A BBC micro:bit
- 3 x AA batteries
- A micro USB cable

The teacher will be writing on the board as well as demonstrating code on a projected board (if available).

Timings

The lesson is expected to take 1 hour. It can be shortened or lengthened if needed. As it's the final lesson in the unit you may want to add an assessment or collect the students work at the end of the lesson.

Suggested shortening

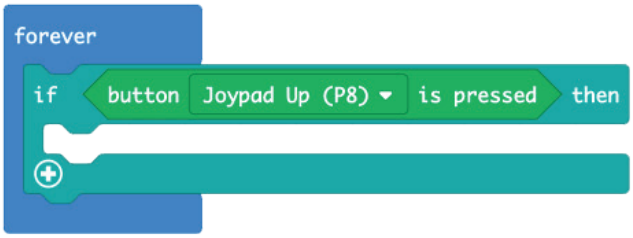
You could leave out the Boolean lesson.

Suggested lengthening:

The final game is quite complicated and long. If students have completed it before the end of the lesson you could challenge them to add extra lights and add extra points, e.g. a green light is 5 points and a blue light is 10 points.

Differentiation

For younger or less able students there is differentiation in the lesson plan.
The controller can be controlled using the NeoPixel and digital read blocks described below. There are simpler custom blocks available to use. See **www.kitronik.co.uk/blog/game-zip-64-makecode-blocks/** for more details.



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KEY

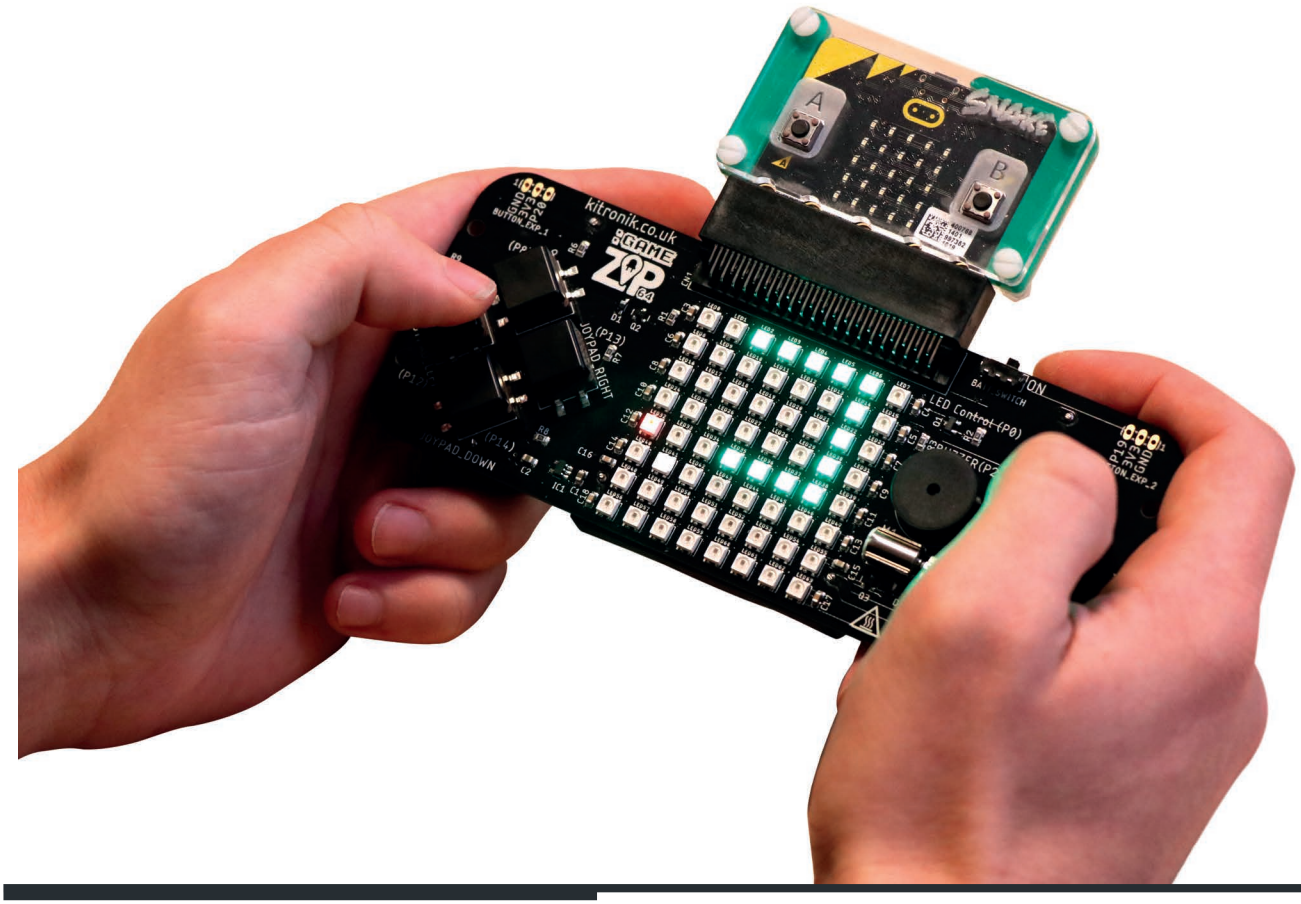
Teacher asks this question to the class and discusses the answers with them.

Where this content maps onto the curriculum.

Teacher writes the text in this box on the board.

Students take notes, either on paper on in their electronic workbooks.

This part of the lesson aligns to Slide 1 of the attached PowerPoint.



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LESSON 5

X AND Y GAMING

INTRODUCTION

Main Lesson

Let's get coding!

Curriculum mapping
Use two or more programming languages, at least one of which is textual, to solve a variety of computational problems... design and develop modular programs that use procedures or functions.

Students may need extra time at the start to get their controller working using the matrix from last week. You want all four direction buttons working using x and y coordinates and functions.

We're now going to change the game from week3 to use the matrix. There are a lot of changes that need to be made. Give the students the algorithms (or not!) to help them.

Work through the algorithm together. Anything that doesn't have X and Y needs to be changed to X and Y If the students wrote out the algorithm from 2 lessons ago ask them to change the notes in red as you change it on the board.

Algorithm
(Keep your code of moving the light around the matrix using the direction buttons).
Set CurrentPositionX to 0
Set CurrentPositionY to 0
Turn the CurrentPositionX, CurrentPositionY light red
Set score to 0
Display the score on the micro:bit
Set BallX to 1
Set BallY to 7
Turn the BallX, BallY to blue
Show the lights

Forever:
When the CurrentPositionX = BallX AND CurrentPositionY = BallY
Change the score by 1
Display the score on the micro:bit
Set BallX to a random number between 0 and 7
Set BallY to a random number between 0 and 7
Turn the BallX, BallY to blue
Show the lights

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The students have done all the code they are about to do, except for the Boolean logic:
When the CurrentPositionX = BallX AND CurrentPositionY = BallY
Go through the difference between AND and OR.

Curriculum mapping
Understand simple Boolean logic [for example, AND, OR and NOT] and some of its uses in circuits and programming.

AND Truth Table

0	0	0
0	1	0
1	0	0
1	1	1

The result of an AND is only 1 when both values are 1. AND is a very strict condition.
I want chocolate AND ice cream. Not either, both.

OR Truth Table

0	0	0
0	1	1
1	0	1
1	1	1

The result of an OR is 1 when either values are 1. OR is a bit vague.
I want chocolate OR ice cream. Either will do.
In the case of the light catching the Ball. X and Y of the light must match X and Y of the Ball. If it was just X it would catch the ball if it was above or below it, which doesn't make sense.

When would matching the X coordinates make sense?
Answer: If you were shooting at the Ball – checking that you were directly above or below it would make sense.

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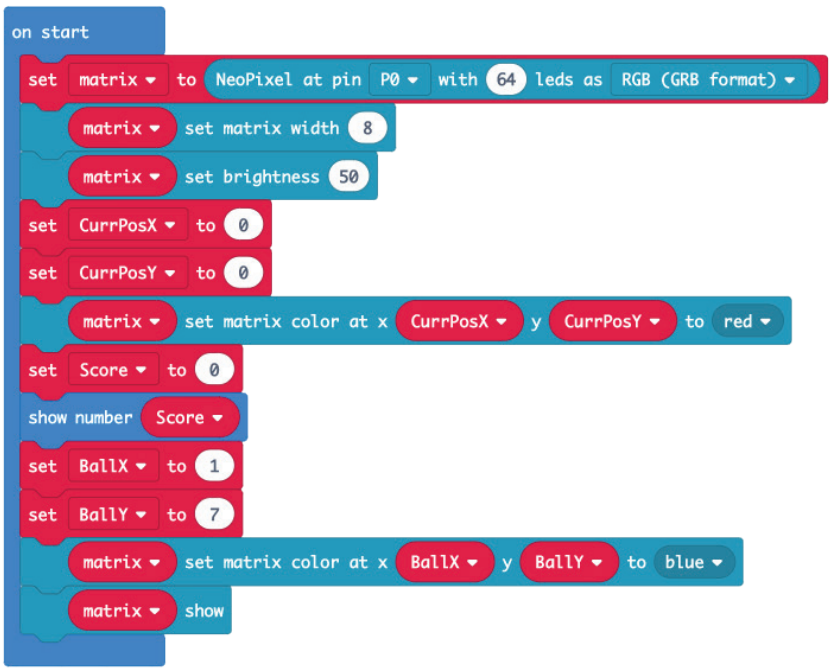
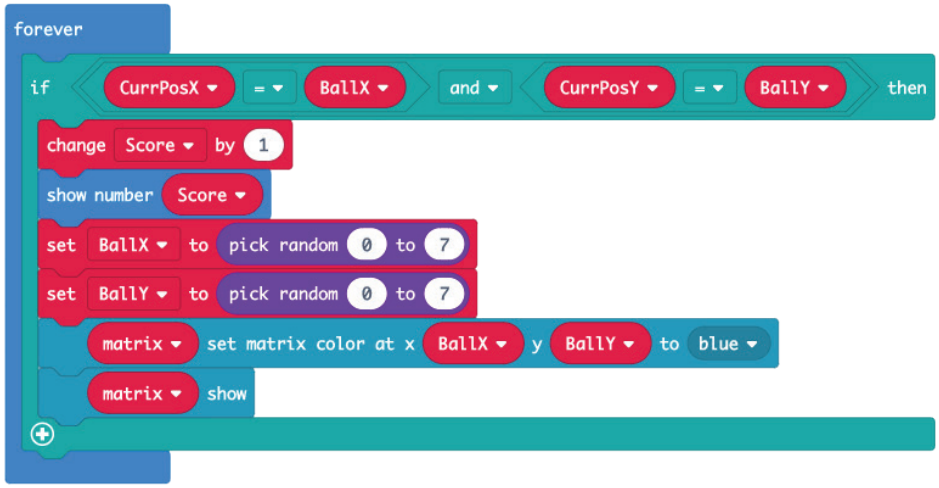
X AND Y GAMING

Answer:





Extra Features

The game is not complicated but the coding is. There will be a lot of bugs! Encourage the students to work together in their pairs. Two sets of eyes are always better than one. Get one student to explain the problem to the other.

If a pair does finish the entire game encourage them to add extra features to their game. Some ideas:

- Every time they hit a boundary their scores decreases by 1.
- Every 5 seconds a new light appears – green. It is worth 5 points but it disappears after 3 seconds.
- Put a timer on the game, e.g. if they don't collect 5 Balls in 20 seconds they lose.
- Button A on the micro:bit resets the score to 0.

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Before the end of the lesson:

Ask the students to take notes.

They will need a copy of the algorithms and their code for each challenge they've completed today. Take screenshots of their code and explain it.

If a pair has finished and added extra features ask them to demo it to the class. Give the students some time to play their games and each other's.

Summary

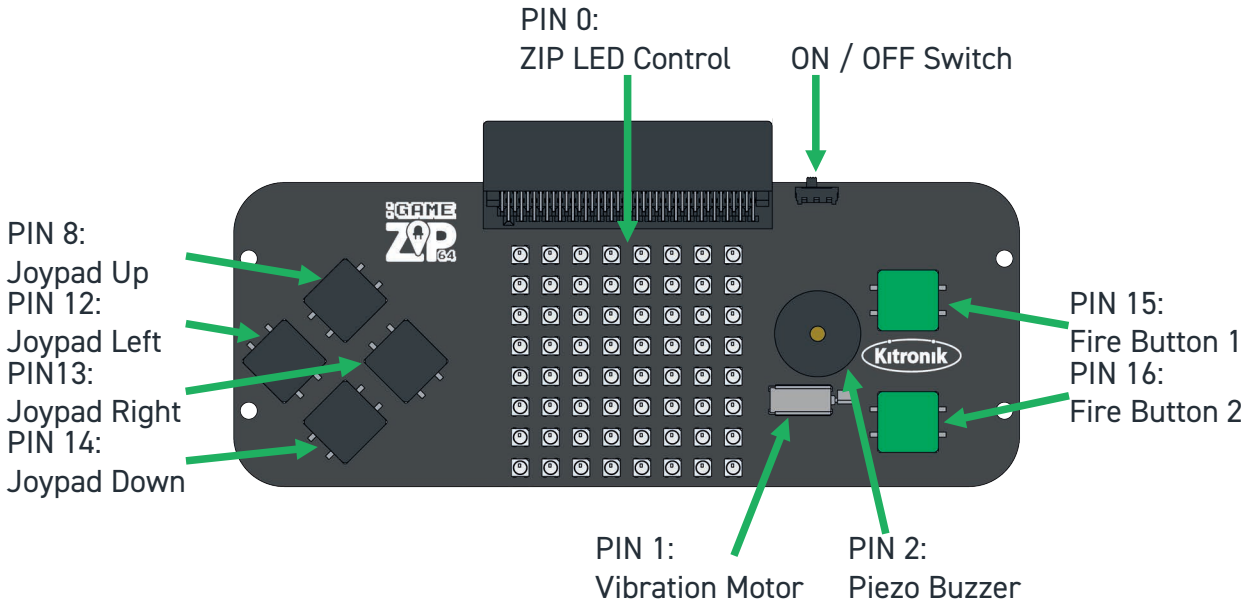
This is the final lesson in coding with the zip controller. Students learnt how to code using blocks. They coded loops, conditional statements, functions and how to use a matrix to control a game.

This is the fifth and final lesson for students in **Key Stage 3** for the **Kitronik :GAME ZIP64** controller for **BBC micro:bit**. This lesson gives the students a chance to change their game to use the matrix created last week and add any extra features to it. This lesson is the final lesson in the series using blocks. The recommended ratio of students to :GAME ZIP 64 is 2:1. Please find additional lesson plans, accompanying **PowerPoint** presentations and more at **www.kitronik.co.uk/5626.**

The Kitronik :GAME ZIP 64 is the ultimate retro gaming accessory for the BBC micro:bit. This all in one hand held gaming platform includes a built in 64 (8x8) individually addressable full colour ZIP LED screen.
It features on-board sound, 4 directional buttons, 2 fire buttons, and haptic feedback. All features are fully programmable. Breakout points are also included allowing for shoulder buttons or I2C devices to be added, as well as the use of additional LEDs.
All the BBC micro:bit features are still available when plugged in to the :GAME ZIP 64, so your games can still make use of the LED matrix, accelerometer etc.

LESSON REQUIRES:

- Pen & Paper including coloured pens (grid paper)
- A computer/laptop with a USB port and Internet access
- A :GAME ZIP64
- A BBC micro:bit
- 3 x AA batteries
- A micro USB cable



WARNING : Contents may inspire creativity

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