

## Computing – Random numbers and simulations

Year Five



variable

generate

random

simulate

x-axis

random number

angle

coordinates

variable

degrees

condition

position

range

degrees

event

heading

hit

By the end of this unit, you will be able to use a range of techniques and code to add elements of randomness to your games that will be exciting for the player.

### Important information



What is coding?

Coding is the method of giving a computer instructions to perform a specific task. You may also hear coding referred to as software programming or computer programming. These instructions are communicated using a language that computers can understand, like visual blocks, JavaScript, Python, HTML, and CSS. Code fuels our world's technology, from microprocessors in everyday items like refrigerators and water heaters to sophisticated programs that operate our cars and buildings. Learning to code has become an essential element of a child's education and a great way for them to express their creativity.

Why should kids learn to code?

As technology becomes more prevalent in our lives, coding is becoming a valuable- if not necessary- 21st century skill, revolutionising every aspect of today's world – think self-driving cars, robot-assisted surgery, social media, banking, the environment, and more. Coding empowers kids of all ages to become makers of technology by tapping into their ability to bring their imagination to life. Kids and teens who code often excel at school in Maths, Science and even Reading whilst also developing a skill that will prepare them for future job opportunities.

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|   | Game & learning question   | What you will learn   | Learning Review |
|---|--|---|-----------------|
| 1 | Racing at Random<br><br>How does rolling a die make a game more interesting?                               | You will complete the code to generate a random number and be able to demonstrate that clicking the button generates a new random number each time. You will understand the connection between the random numbers being generated and the distance the car moves. You might change the x-position of the cars using x- and y- co-ordinates.   |                 |
| 2 | Caterpillar Catcher<br><br>What is the difference between the x- and y-axis?                               | You will be introduced to the idea that random numbers can control the object's heading. You will discuss components of the game, including the scoring system, and the key press events that control the bird's movement. You will know how to add code for these. You will understand how the random x-position and random y-position blocks add an element of randomness to the game. You will give the caterpillar random movements, before going on to add the other components. |                 |
| 3 | Cross the Road<br><br>How is an 'if ... else' block different from code you've used before?                | Looking at the list of components generated at the start of the lesson and you will consider what code you could use for each of these and will be able to describe this in terms of 'events', 'actions' and 'objects'. You will experiment with different values for each property, to see how this affects the car. You will know how to nest their 'if ... else' blocks inside the hit events for the cars.  |                 |
| 4 | Ping Pong<br><br>Which direction did you want the ball to move in?<br>Can you describe this with a number? | You will use your knowledge of headings and how these are described in code to predict which direction the ball will travel in. You may be able to identify areas of the screen to which the ball will not move because the heading value will always be too high or too low. You will use a table to record your predictions for the values needed for each wall and to show these changed when you tested your code.  |                 |
| 5 | Pinball<br><br>Which way did the ball move? Why?   | After playing a finished version of the pinball game, you could identify the extra features that still need to be added to their games. You will discuss the idea of adding in extra obstacles, and making the ball move in any direction when it hits these. You will know that the range here needs to be zero to 360 so that the ball can move at any heading.   |                 |