

Pixel art

Unplugged

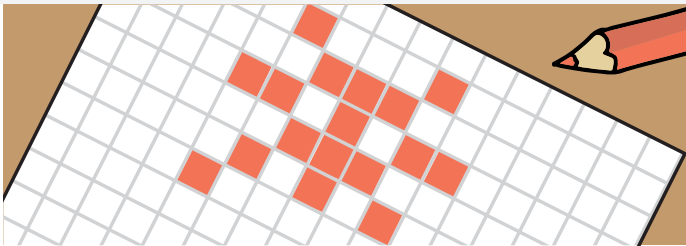
Download this worksheet at:

rpf.io/cc-unplugged-pixelart

1

Introduction

You will be working in pairs or threes and making your own pixel art pictures.

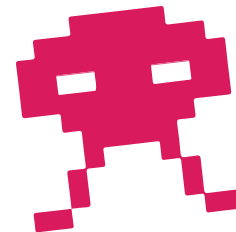
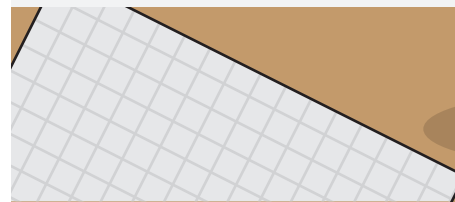
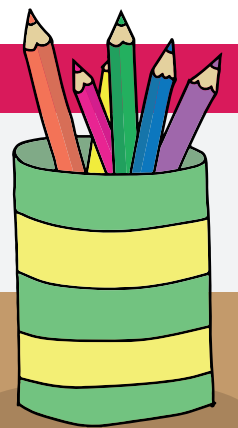


What you will learn

- How computers create and store images
- How to use (x, y) coordinates

What will you need

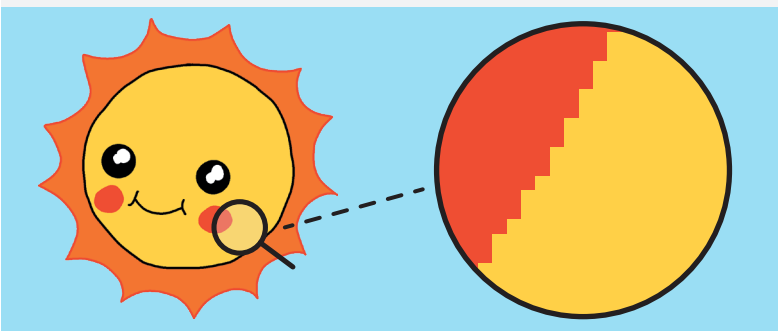
- Coloured pens or pencils
- Printouts of this project, or squared paper



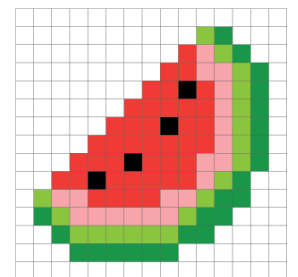
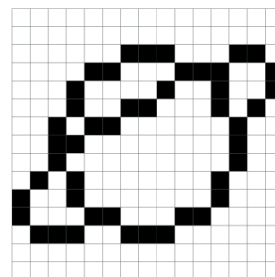
2

Pixels

Computer screens, and the pictures they show, are divided up into grids of very small dots called pixels (picture elements). When you zoom in on a picture, you can see its pixels.

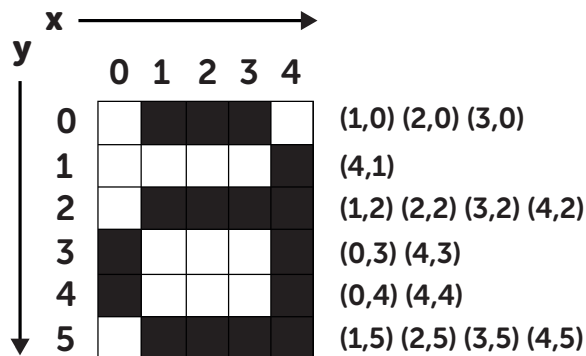


These images show how you can use pixels to make art.



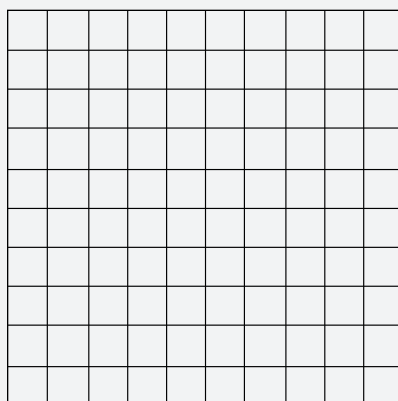
Computers represent everything, even pictures, with numbers. This means that when you design a picture for a computer, you need to turn the picture's pixels into numbers.

The grid numbering starts at (0, 0) in the top left-hand corner of the grid. This is because computers use the same (x, y) coordinates as old-fashioned televisions, which display images in horizontal lines from left to right, starting at the top and moving downwards.



Task:

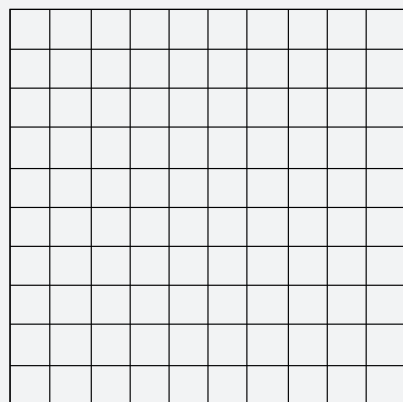
Decode this image by colouring in the right coordinates. You can use whichever colour you like. What does the image show?



(1,1) (2,1) (6,1) (7,1)
(0,2) (3,2) (5,2) (8,2)
(0,3) (4,3) (8,3)
(0,4) (8,4)
(1,5) (7,5)
(2,6) (6,6)
(3,7) (5,7)
(4,8)

3 Challenge: decode a bigger picture

Can you decode this image?



(3,0) (6,0)
(0,1) (4,1) (5,1) (9,1)
(0,2) (1,2) (2,2) (3,2) (6,2) (7,2) (8,2) (9,2)
(2,3) (7,3)
(0,4) (2,4) (7,4) (9,4)
(0,5) (1,5) (2,5) (7,5) (8,5) (9,5)
(2,6) (7,6)
(0,7) (1,7) (2,7) (7,7) (8,7) (9,7)
(0,8) (3,8) (6,8) (9,8)
(4,9) (5,9)

What do you see in the image?

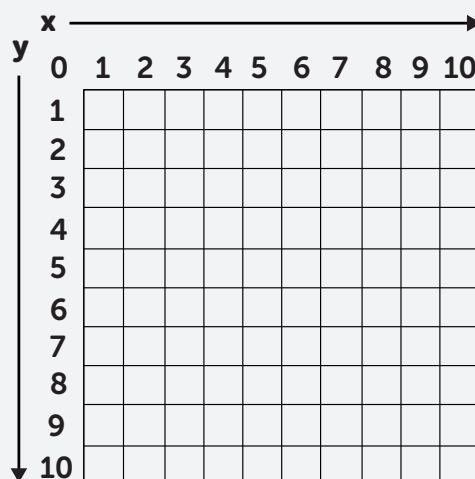
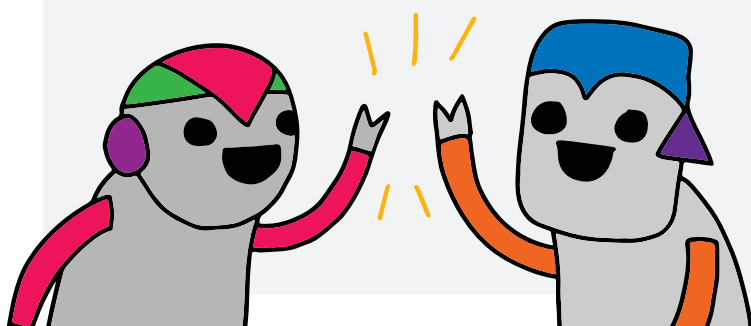
Hint: it is really important you keep them out of your code!



4 Task: create your own pixel art

Create your own pixel art image in the grid below by colouring in pixels.

The image can show anything you want.



Encode your picture

A cartoon drawing of a friendly robot. It has a grey rectangular body, a green dome head with a single antenna, and a smiling pink face with two black eyes. It has pink arms and green legs. Four green buttons are arranged vertically on its chest.

Write down
the (x, y)
coordinates
of the pixels
which you
coloured in.

[illegible]


Swap your coordinates with a friend so they can try to decode your image and you can decode theirs.

A 10x10 coordinate grid. The horizontal x-axis is at the top, with an arrow pointing right and labels 0 through 10. The vertical y-axis is on the left, with an arrow pointing down and labels 0 through 10. The grid consists of 10 columns and 10 rows of squares.



Challenge: create a multicolour picture

Can you create and then encode a pixel art image which has more than one colour?



(0,0, red)
(0,1, green)

For multicolour pictures, you need at least one more column to store the colour.

Task: 

Write down the (x, y) coordinates and colour of the pixels in your picture.

[illegible]

What next?

Create your own pixel art editor in HTML/CSS code, with the help of this online project:
rpf.io/pixel-art

