



Cartesian Coordinates

Computer Science Concepts

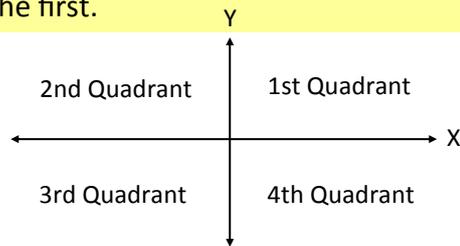
- X & Y coordinates to place sprites
- Simple Sequence of code
- Simple turtle blocks (pen up, pen down and clear)

Maths Concepts

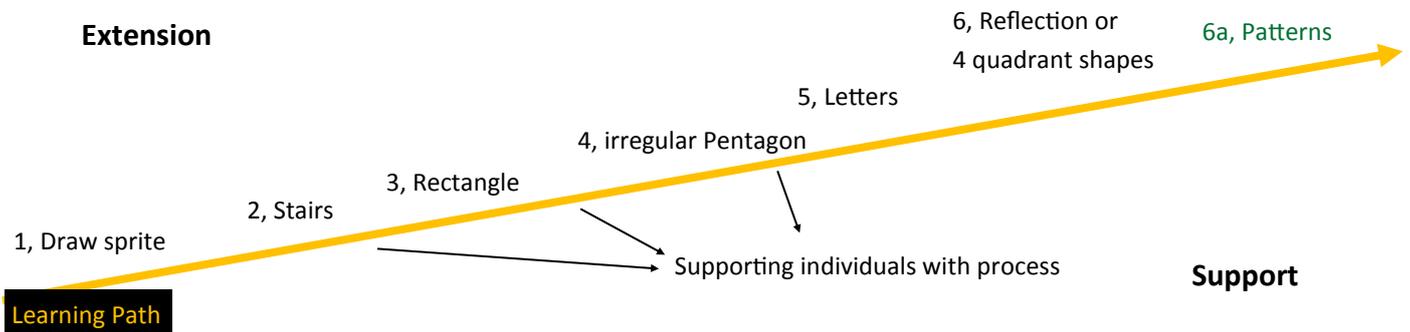
- Cartesian Coordinates
- Reflection of shapes into second third and fourth quadrants

Differentiation and Assessment for Learning At the beginning of each session the *learning intention sheet* is shared and the learning journey expanded through success criteria. Pupils feed their progress back to the teacher through annotating this sheet with smiley faces during or at the end of each lesson. Teachers can also annotate the sheet to indicate those who need more or less help in future lessons. All extra resources can be found on the code-it.co.uk website.

Program Aim Simple programming designed to expand pupils knowledge of coordinates and introduce some to reflection into other quadrants other than the first.



Extension



Learning Path

2, Stairs

Show pupils how to open the XY Grid background. Stage, Background, Import.
 Point out the quadrants and explain that the first quadrant is the one that they are used to using in the past. Open the first quadrant resource and demonstrate drawing a simple triangle and then recording each coordinate on the planner. Stress how important it is to plan first before coding. Now change this into coding blocks similar to these for a triangle. Finally send them off to plan and code stairs.

1, Draw Sprite

Open a blank copy of Scratch
 Delete the cat (right click and select delete)
 Paint new sprite button
 Place one small red dot on the screen (third brush size up)

```

when green flag clicked
  clear
  pen up
  glide 1 secs to x: 50 y: 50
  pen down
  glide 1 secs to x: 100 y: 100
  glide 1 secs to x: 0 y: 100
  glide 1 secs to x: 50 y: 50
  
```



Cartesian Coordinates P2

3, Rectangle

As pupils finish direct them to code a large rectangle still keeping to the 1st Quadrant

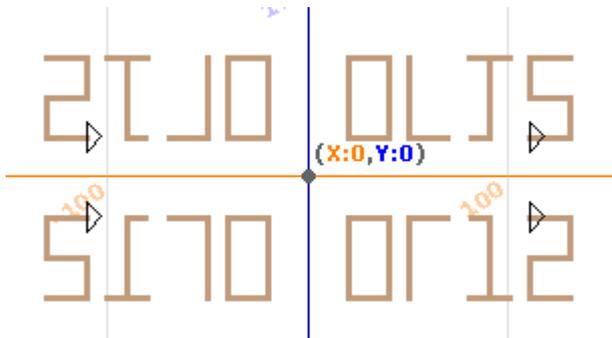
Look for those who are not recording on the sheet and go over it with them showing them how to do a few coordinates and then leave them to do some themselves

5, Letters

As pupils finish direct them to letters. These must be all the same height. You may wish to show them the letters code

<http://scratch.mit.edu/projects/17198623/>

Run this using the green flag and it draws four letters in the first quadrant



4, Pentagon

As pupils finish direct them to code a pentagon make sure they know it can be irregular.

6, Reflection or 4 quadrant shapes

Bring all the pupils together and explain that you can make your letters reflect in every quadrant and that it took just a few minutes.

<http://scratch.mit.edu/projects/17198623/>

Open the example and explain how you just duplicated the code and changed just one thing.

Attach the green flag blocks unconnected inside 2, 3 & 4 sprites and run the code.

← The finished reflected pattern looks like this.

Now show pupils the code in sprite 1 and ask them to look at the first four x and y blocks. Open up the code in sprites 2, 3 and 4 and ask them what is different? They will spot that either X or Y or both has been changed to a negative number. Can they use that knowledge to make their shape or letter reflect?

```

set pen size to 3
glide 1 secs to x: -20 y: 60
glide 1 secs to x: -40 y: 60
glide 1 secs to x: -40 y: 20
glide 1 secs to x: -20 y: 20
pen up
  
```

4 Quadrant shapes

Map a shape on the 4 quadrant planner and get pupils to work out the coordinates and then convert this into code. 2D and 3D letters are good as challenges. (I sometimes do this first before reflection)

```

set pen size to 3
glide 1 secs to x: 20 y: -60
glide 1 secs to x: 40 y: -60
glide 1 secs to x: 40 y: -20
glide 1 secs to x: 20 y: -20
pen up
  
```

7, Patterns

Anyone who finishes early can use their knowledge or reflections to create a reflected pattern in all four quadrants.