Introduction to P5

Creating with Shapes

Vocabulary

- Function
- Parameter
- Argument
- Canvas
- JavaScript
- HTML/CSS
- Syntax
- Pixel

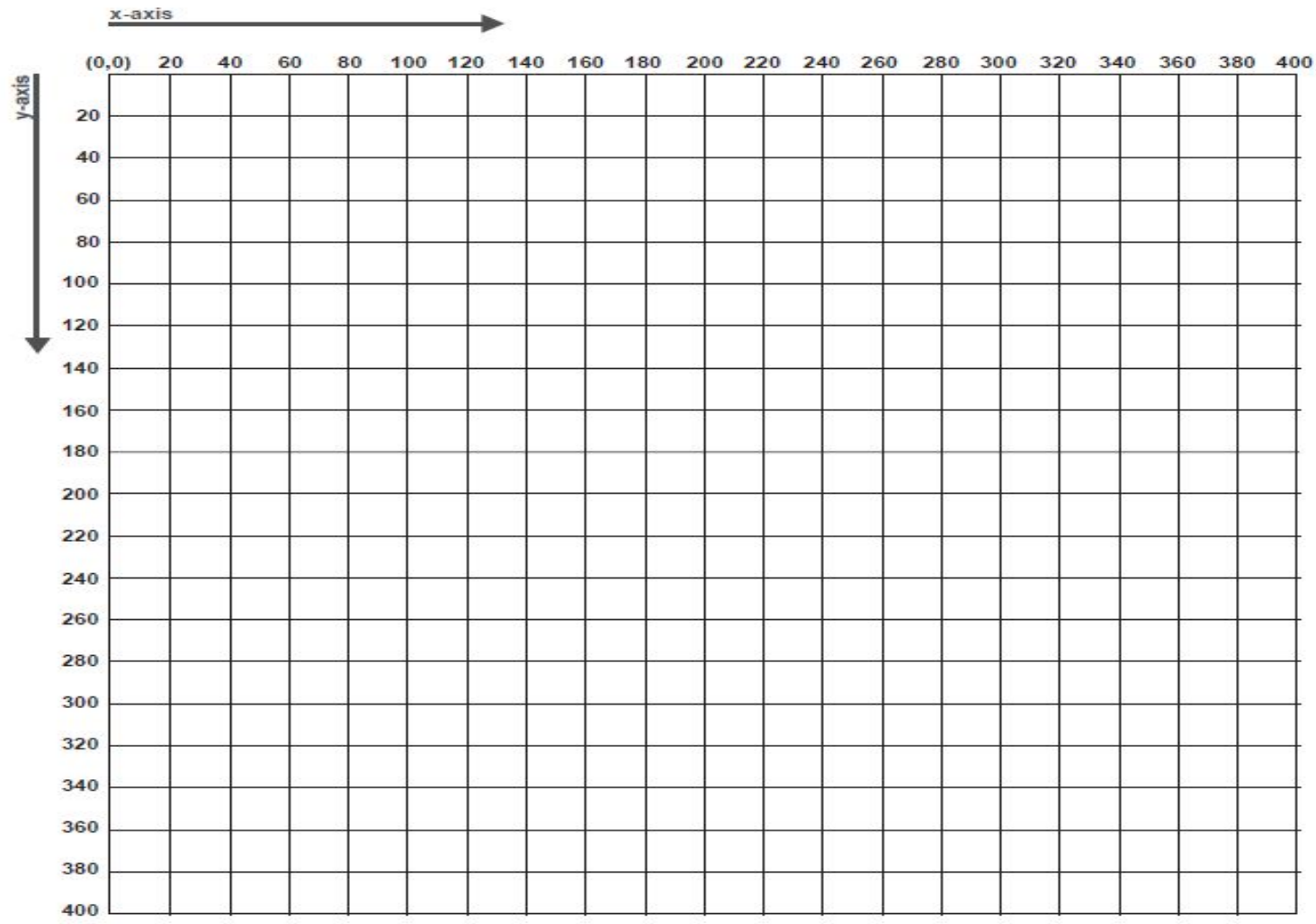
Think Write Pair Share with your partner

What do you think JavaScript can do to help your web pages be more expressive in combination with HTML/CSS? - first jot your answer down on paper or in a doc, and then discuss with your partner. Once you have come to a consensus, then answer on the pear deck here in the space provided.

Mini Lesson:

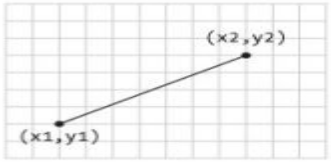
How can we break down a drawing into basic shapes in P5.js?

We will be looking at a graph that helps us pre-plan our sketches in P5 to learn the layout of the canvas/background. Unlike what you are used to in Scratch where the center coordinates for x and y are: 0, 0 are located in the upper left hand corner of the canvas on P5. We will practice on the handouts first to see how to identify points for lines and then plot a rectangle and an ellipse and finally will try in the P5 editor. Included in the lesson is also a helpful handout to show you how to draw basic shapes with their necessary parameters. We will do a **code along** for these shapes to help you transfer your shapes to the P5 program.

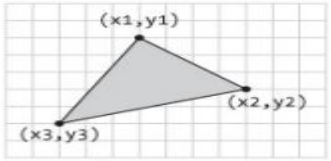

x-axis
y-axis
(0,0) 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
320
340
360
380
400

Quick Check:

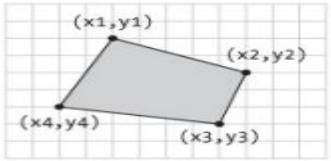
What do you think the center points: x and y are in a canvas that measures 400 px by 400 px?



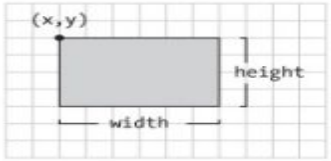

```
line(x1, y1, x2, y2)
```



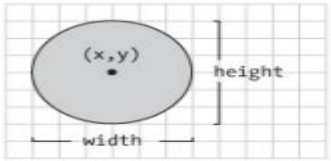

```
triangle(x1, y1, x2, y2, x3, y3)
```



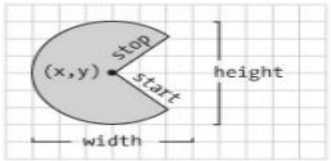

```
quad(x1, y1, x2, y2, x3, y3, x4, y4)
```




```
rect(x, y, width, height)
```




```
ellipse(x, y, width, height)
```

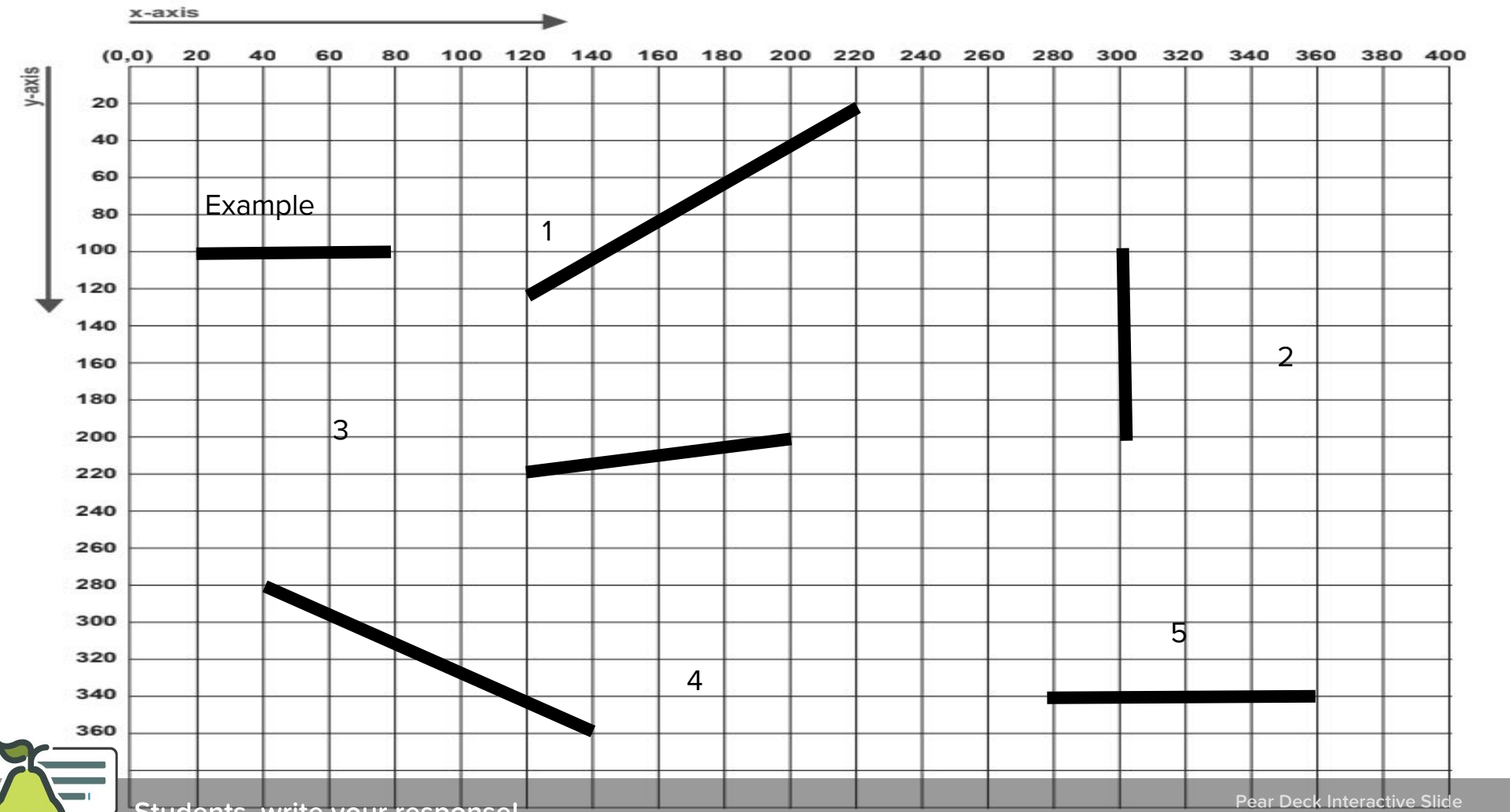



```
arc(x, y, width, height, start, stop)
```

Figure 3-1. Shapes and their coordinates

Deconstructing Lines

One the following slide you will be identifying the x and y points for the lines that are shown. We will do the example together and then you will work with your partner on the other 5 examples. When you complete it, you can put your responses on this pear deck or the following pear deck.



Students, write your response!

Syntax for Rectangle

rect(x, y, w, h)

Parameters

X - Number: x-coordinate of the rectangle

Y - Number: y-coordinate of the rectangle

W - Number: Width of the rectangle

H - Number: height of the rectangle

Syntax for Ellipse

Ellipse (x, y, w, h)

Parameters

X - Number: x-coordinate of the ellipse

Y - Number: y-coordinate of the ellipse

W - Number: Width of the ellipse

H - Number: height of the ellipse

How the P5 program runs:

the `setup()` and `draw()` functions:

- These functions are special because p5 calls them automatically when a sketch is run. They don't have parameters, so the parentheses are empty.
- We use the `setup()` function to *set up* a sketch. In order to draw anything in p5, we need to make a canvas and give it a size (like 400 x 400) by calling `createCanvas()` **inside** `setup()`. When you hit play, anything that is inside the `setup()` function will run **one time**.
- In this unit, all of our shape functions will be called inside `draw()`.
- The code inside the `draw()` function actually runs in a **loop**. Every function we use inside draw is being called over and over again until the program is stopped. The loop happens so fast that the preview looks like one image, but in reality, the shapes are constantly being drawn on top of each other. Note: This loop will become relevant when students add color to their shapes, and later when they learn to animate shapes.

```
function setup() {
  createCanvas(400, 400);
}

function draw() {
  background(220);
  rect(150, 150, 100, 100);
  ellipse(200, 200, 100, 100);
}
```

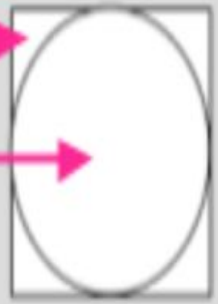
- ellipse is on top of the rectangle, and it's because the program draws the rectangle first then ellipse. Everything in the `draw()` loop (and the p5 sketch as a whole) will run from top to bottom.
- For additional help visit YouTube on the Coding Train:
- https://www.youtube.com/watch?v=yPWkPOfnGsw

```
1  function setup() {
2    createCanvas(400, 400);
3  }
4
5  function draw() {
6    background(220);
7    rect(150, 150, 100, 100);
8    ellipse(200, 200, 100, 100);
9  }
10
11
12
13
14
15
```

Program Flow

This shape is drawn first.

This shape is drawn second.



Closing: Answer the following questions

What did you learn in this lesson?

What did you find easy about this lesson?

What do you think you need more help with?