

Name: _____

Processing - The Beginning

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Today we are going to start learning how to write code using a program called processing. Our goal by the end of the year is to learn how to make figures that move around the screen.

To start off, we will need to create a 'canvas' so that we can draw. The first thing you will do once you open up Processing is to type in the following line:

```
size ( 400, 400);
```

Now let's investigate the line of code that will draw an ellipse.

```
ellipse (____, _____, _____, _____);
```

Put a number in for each of the four blank spots in the line of code. For example, you might type:

```
ellipse ( 100, 200, 40, 60);
```

Your goal is to figure out what each number does to the ellipse. Make a prediction, and then change a number and run the program again. How did the ellipse change? Once you have a good idea of what each number does, fill in the following blanks.

The first number _____.

The second number _____.

The third number _____.

The fourth number _____.

Challenges -

- 1) Make a circle in the middle of the screen. Can you make it so that the sides of the circle touch the edges of the canvas?
- 2) Draw three ellipses that are side by side. Can you make the ellipses touch, but not overlap?
- 3) Draw three ellipses that are stacked vertically (top to bottom). Make the one on top smallest and the one on the bottom the largest.

//notes for teacher

Started off lesson talking about computer engineering and Dr. Zoe Wood from Cal Poly who did so much work to create these lessons. What does an engineer do? Where do we see computer graphics used?

Code should look like this:

```
size(400,400);  
ellipse(100,200,40,60);
```

For the investigation, pushed the idea of changing one number at a time (when a scientist runs experiments, how many variables should he/she change at a time? Why?...connected to the Scitrek experiments run the first week of school). Gave the example of just changing the first number...over and over...to see what happens. Think about what you suppose will happen, test, were you correct?

After the kids discovered what the first value did, we put an 'x' in the first line of the ellipse line of code that has blank lines in it. We talked about the first value being the 'x-coordinate' and that it moves the ellipse 'horizontally' or 'left and right'. That all took one lab session.

The following week, we reviewed that first two lines of code, and talked about the first value of the ellipse being the x-coordinate. We revisited the idea that only one variable may be changed at a time if we are to determine exactly what affects the change seen. The kids then went off and experimented to find out what the other three values did. We put in 'y', 'width' and 'height' on the line with four blanks.

Then we talked about how the 'y' in Processing behaved differently than it does when graphing in the first coordinate on a coordinate grid.

A word followed by parenthesis can be termed a function or a command. For example, size() and ellipse () are two functions/commands from this lesson. The elements inside of the parenthesis can be called arguments.

Challenges – Pushed the kids to get the second and third challenge to also have the ellipses touching but not overlapping. We then looked (with a few individuals) at the code to discover why...talking about the x,y being the center of the ellipse, taking half of the value of the width (or height for final challenge) and then how the next ellipse's x,y would use that information. Below are just examples of possible code.

```
ellipse(100, 200, 100, 100);  
ellipse( 200, 200, 100, 100);
```

and

```
ellipse( 200, 100, 40, 40);  
ellipse( 200, 160, 80,80);  
ellipse(200,260,120,120);
```