SCIENCE SIZZLE ACTIVITY - Learning Programming with the Khan Academy

Goals

By the end of this activity you should be able to **create a program** of your own!!

Instructions

Follow these instructions step-by-step.

Part 1. Figuring out how it works.

1. Go to the Khan Academy website:
   http://www.khanacademy.org/cs/1-welcome-to-codecanvas/882454257
   Watch the short movie called "Welcome to Computer Science". If you have headphones or earbuds you may want to use them so you can hear it better.

let's do this part together as a class.

2. After you have watched the movie scroll down to the Processing workspace below the movie. You should see some computer code on the left and a big yellow face on the right.

   Try commenting out the line that says "`noStroke();`" **What happens?**

   Now go down to the lines that say:
   ```
   fill(46, 46, 41);
   ellipse(157, 151, 40, 40);
   ellipse(304, 142, 40, 40);

   fill(252, 65, 65);
   ellipse(257, 240, 120, 136);
   ```
   Change a bunch of numbers and see what happens to the picture. Sometimes a box will pop up when you click on the number. What do you think the box is for?

   Other commands you can try are `triangle`, `stroke`, and `strokeweight`.

CHALLENGE:

MODIFY THE FACE. Here are some examples of what you could try. All of these were designed using the tool you are exploring.

Part 2. Variables

Go to http://www.khanacademy.org/cs/intro-to-variables/825241936 and listen to the explanation of the code. Click on the little green "play" button below the code to hear the explanation.

CHALLENGE:

Make the eyes blink when you press a key on the keyboard.

HOW TO DO THIS

o   Declare two variables, `eyeheight` and `eyewidth`, and put them into your ellipse calls like this: `ellipse(157, 151, eyewidth, eyeheight);`

o   Now put all of the drawing steps inside a function called draw. Your code should look like this.
```
// this is to make the picture get redrawn
// when an event takes place
var draw = function()
{
   // all your stuff should go here
};
```

o   Now you have to check if a key is pressed. We do this using the following format:
```
if (something)
{
   // do thing 1, for example make the eyeheight 3
}
else
{
   // do thing 2, for example make the eyeheight 100
}
```

o   You want the "`something`" to be checking if a key is pressed. Click on Documentation to see if there is some way to do this in the list of other commands.

> Click on this for more commands to try!

Questions   Tips & Feedback   **Spin-Offs**   Documentation

o   NOW what should you do for `thing 1` and `thing 2`? HINT: it has to do with changing the `eyeheight`! When you think you've figured it out put your `if…else` code *above* where you draw the face (inside the draw function).

Part 3. Animating Stuff

Go to http://www.khanacademy.org/cs/intro-to-animation/830742281 and listen to the explanation of the code.

CHALLENGE:

Create a a ball that bounces up and down.

HOW TO DO THIS:

o We'll just do this by changing the program you just heard explained. Sometimes (but not always) it's easier to create a program by editing one that you know works. So let's start by getting rid of the car and everything except one wheel – that can be our ball.

o Put everything about drawing into the draw function, so it now should look like this:

```
var draw = function() {
    // this is the draw loop! everything inside these
    // brackets will be run over and over again.

    background(252, 255, 214);
    // draw the ball
    fill(77, 66, 66);
    ellipse(x+75, 221, 24, 24);
};
```

o Now we want to make the ball move up and down. Wait a minute, that's changing the Y axis, not the X! Go back and change your variable name to be `y`. You'll have to update your ellipse call to look like this: `ellipse(75, y, 24, 24);`

   Now somewhere in the `draw` function we need to change `y`, so put in a line that says `y=y+5;`

o What happened? My ball dropped off the bottom of the screen. Try doing `y=y-5;`

o **NOW** I want it to stop at the top and come back down so we'll need another to know what direction we're heading in. Add another variable called `moveamount` and then replacing `y=y+5;` with these lines of code:

```
if (y === 0) // ball is at the bottom
{  moveamount=5;
}
else if (y === 380) // ball at the top
{  moveamount=-5;
}
y=y+moveamount;
```

FINAL CHALLENGES.   (you can try these at home!)

·   **Create a scene that uses all of the things you've learned today.**
·   **Can you make a face that bounces up and down on the screen?**
·   **How about making it bounce from side to side?**
·   **Can you add some interaction with the user – that is, make it move only when a key is pressed?**