Halloween Hacks: Dracula Clyde

Friday, October 24, 2014

Clyde sits cloaked in the corner, and suddenly he comes to life! Add a motion sensor and a piezo speaker to Clyde to create spooky Halloween decor.

Overview

Summary

In this tutorial you'll learn how to add piezo speaker and motion sensor to Clyde and how to program Clyde to play a song when the motion sensor is triggered.

This tutorial is presented in three steps (four, if you count costume-making). You'll start by adding the piezo speaker and then the motion sensor. Next, you'll program Clyde to play a scary tune, and turn on his lights when the motion sensor is triggered. As a finishing touch, you can make Clyde a little cloak and vampire teeth to complete the Dracula look. Let's get started!

The Steps

Step 1: Build the piezo speaker circuit
Step 2: Connect the motion sensor to the board
Step 3: Program Dracula Clyde behavior
Step 4: Outfit Clyde in a cloak and fangs.

What you'll need

Clyde
PIR Motion Sensor, https://www.sparkfun.com/products/8630
Piezo Speaker, https://www.sparkfun.com/products/7950
Mini breadboard, https://www.sparkfun.com/products/12044
1K ohm through hole resistors, brown-black-red-gold
Female/male jumper wires, http://www.adafruit.com/products/1954
Male/male jumper wires, http://www.adafruit.com/products/1956
22-24 AWG wire, *2 wires of about 17 inches each*

Tags: Clyde Hacks, Halloween Hacks

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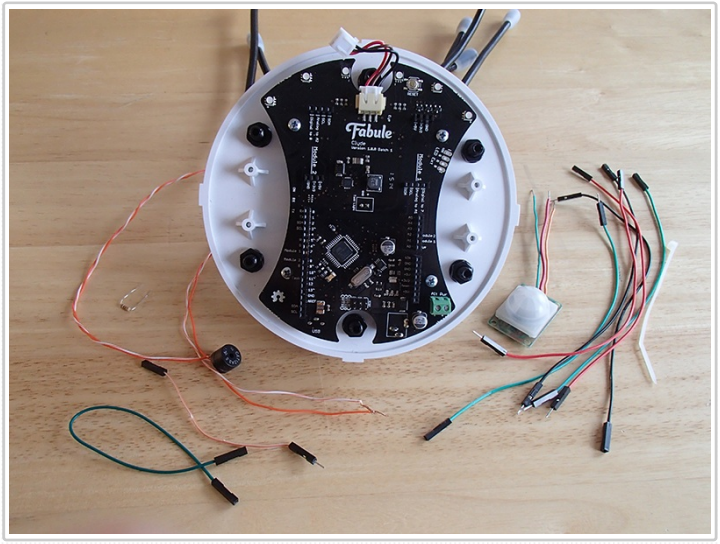
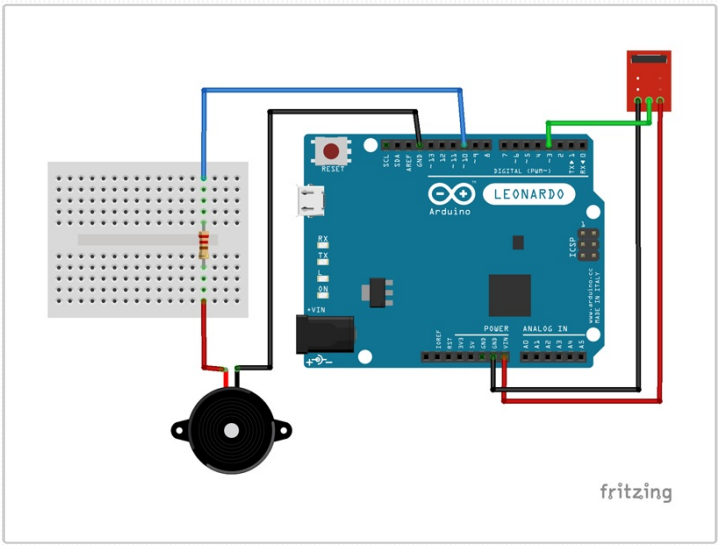
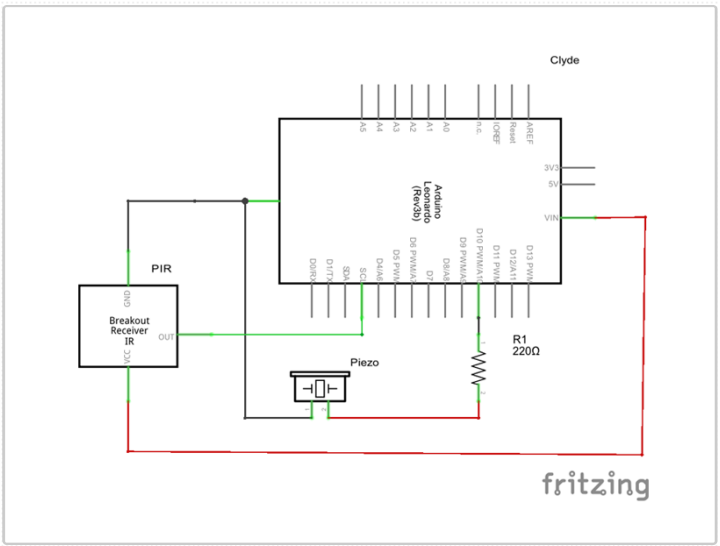


Schematics and Diagrams

Dracula Clyde Breadboard Diagram



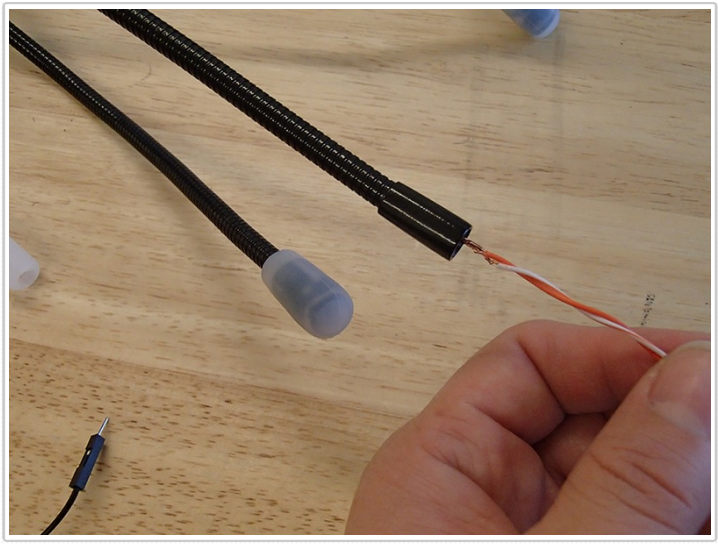
Dracula Clyde Schematic Diagram



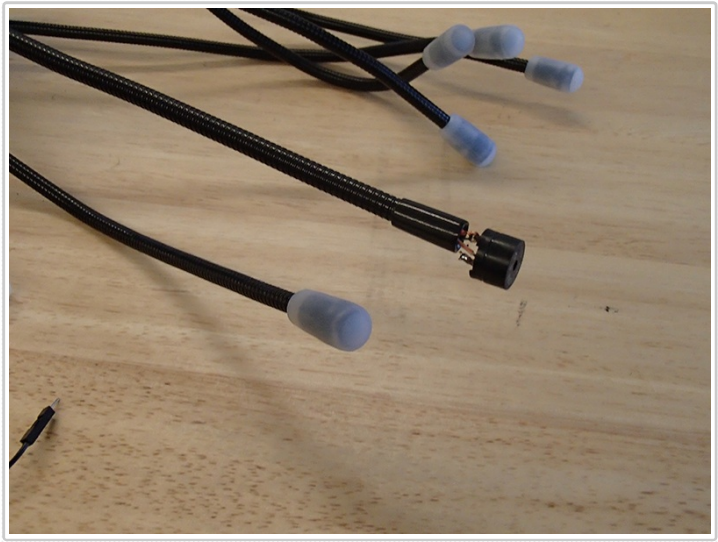
Step 1: Build the piezo speaker circuit

In this step you will need the piezo speaker, the 22-24 AWG wires, female/male

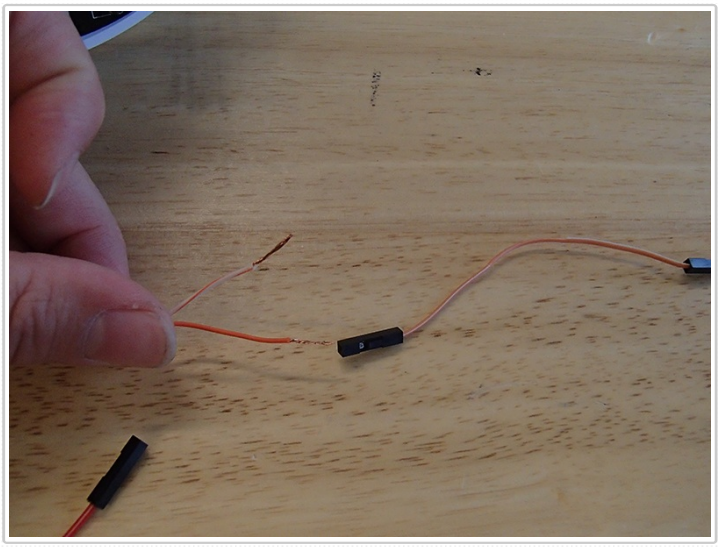
and male/male jumpers, the bread board and the resistor. Solder the two 17 inch wires to each of the piezo speaker leads. Wrap the 2 wires together and string the piezo speaker wires up Clyde's leg.



My piezo speaker sticks out of Clyde's leg a little bit.

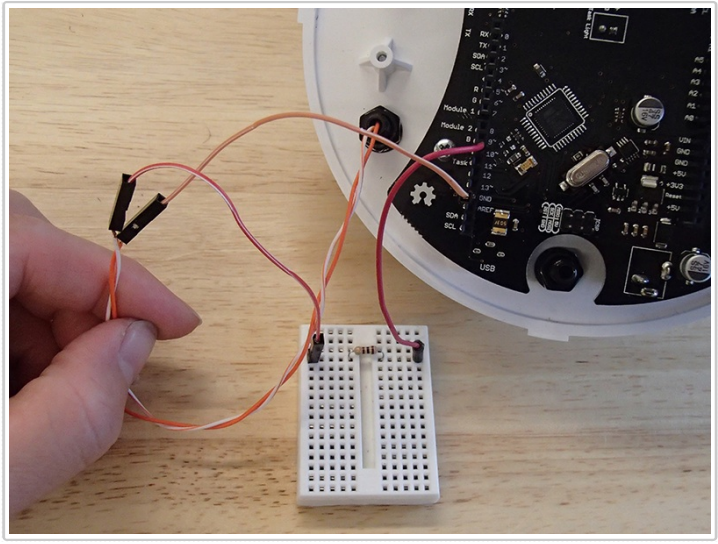


Connect the speaker leads to wire jumpers in order to have a nice stable connection with the breadboard.



Connect one of the leads to GND. The other connects to the breadboard, then to the resistor. The other lead of the resistor connects to pin 10. The piezo speaker

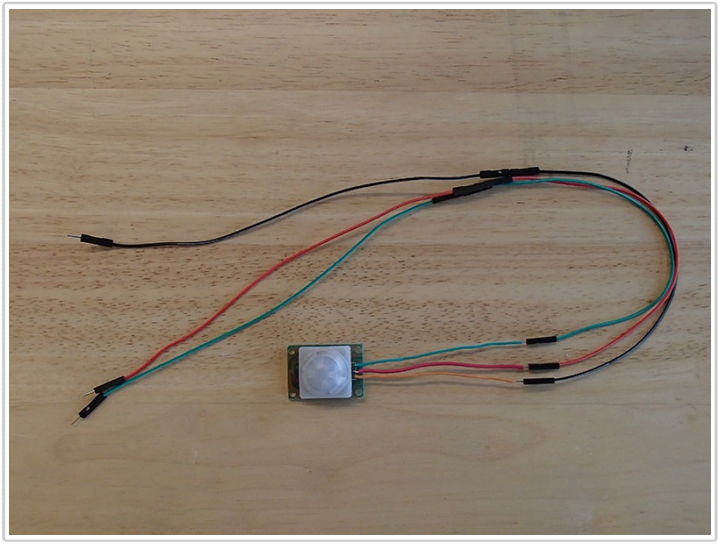
circuit is complete. Quite simple really.



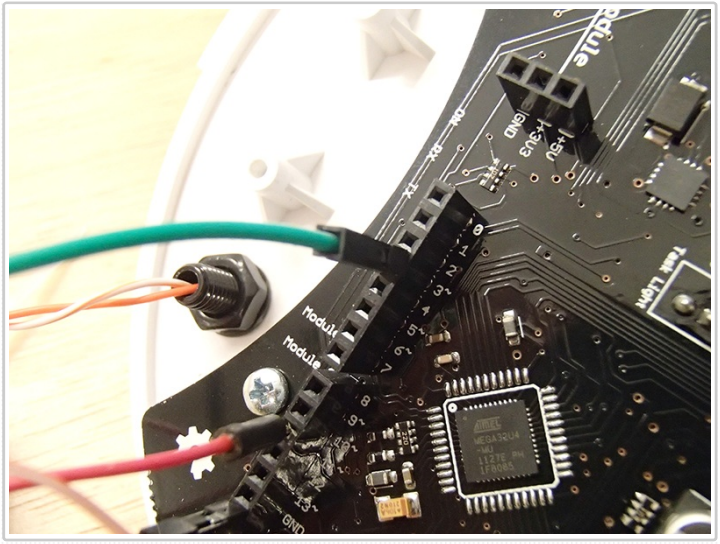
Step 2: Connect the motion sensor to the board

The motion sensor does not require any additional electronic components to work with Clyde. It needs to be wired to Clyde's board. You'll need the PIR motion sensor and the female/male jumper wires.

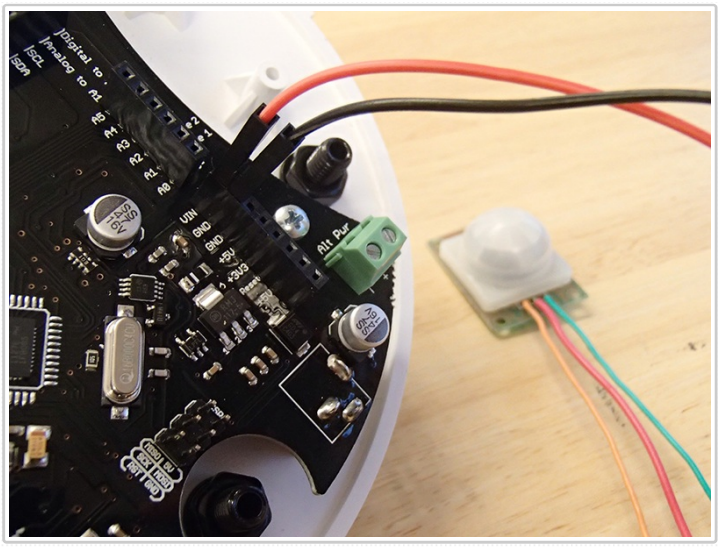
Connect the female/male jumper wires to the motion sensor.



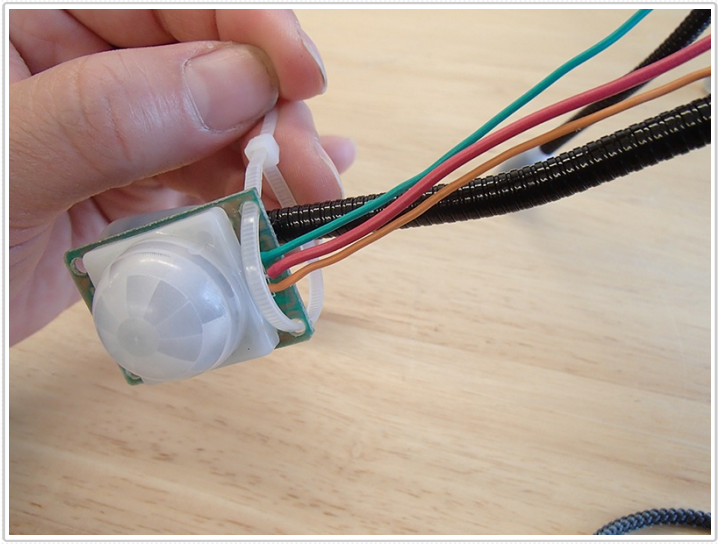
Connect the motion sensor's signal wire to pin 3.



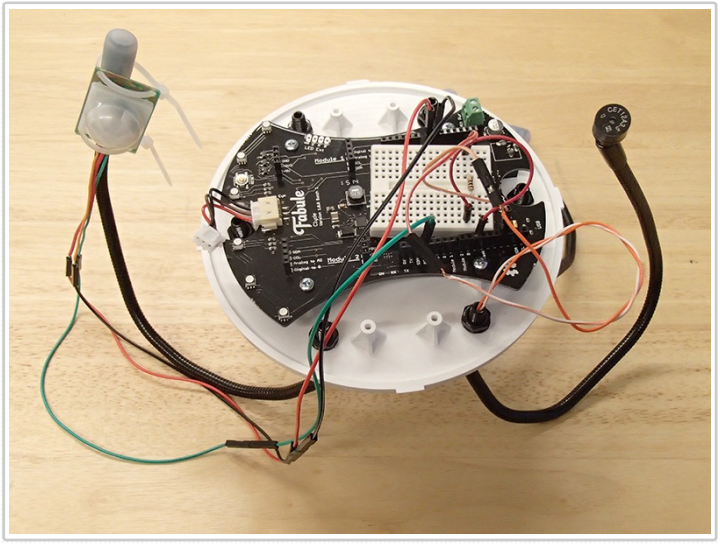
Connect the motion sensor's V+ wire to VIN pin, GND to GND



Attach the motion sensor to one of Clyde's feet with the zip tie.

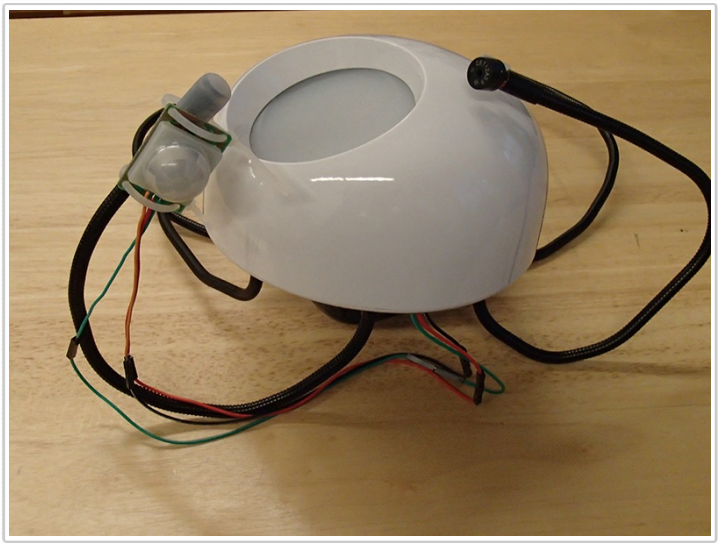


Ta-da! Time to for the finishing touches.



Carefully place Clyde's lid back onto the base with the wires for the motion sensor sticking out.

That's it for the electronics. You are now ready to move onto programming Clyde's behavior.



Step 3: Program Dracula Clyde behavior

Create a new Arduino sketch, save it, call it DraculaClyde. Copy and paste the

following code into your Arduino IDE.

```
/*
  Ghost Clyde
  Halloween Hacks
  Fabule Fabrications
  by Angela Gabereau
  Oct 21, 2014

 Motion triggers the haunting, Clyde's eye light turns on, and the task li
 and fan fade in and out several times, then the ghost goes silent again.

 Arduino's basic fade example was the starting points of this code.
 */
int taskLight = 11;           // the pin that Clyde's task light is attache
int fan = 13;           // the pin that the fan is attached to
int R = 5, G = 6, B = 9;    // the pins for the red, green and blue of th
int rColor = 255, gColor = 255, bColor = 255;  // The color values for tl

int pirPin = 10;    //the digital pin connected to the PIR sensor's outpu
int calibrationTime = 30;   //the time we give the sensor to calibrate (1
boolean haunting = false;       // should the task light and fan fade in a
int spookCount = 0;  //The number of times the spooky light/fan cycle has
int spookLimit = 3;  //The number of times the spooky light/fan cycle rur
int brightness = 0;    // how bright the LED is
int fadeAmount = 5;    // how many points to fade the LED by

// the setup routine runs once when you press reset:
void setup()  {

  //Initialize pins.

  // Declare Clyde's task light pin to be an output:
  pinMode(taskLight, OUTPUT);
  // Turn off Clyde's task light by setting pin high.
  digitalWrite(taskLight, HIGH);

  // Declare fan pin to be an output:
  pinMode(fan, OUTPUT);
  // Turn off fan by setting pin low.
  digitalWrite(fan, LOW);

  // Declare R,G and B pins to be outputs, for Clyde's eye light.
  pinMode(R, OUTPUT);
  pinMode(G, OUTPUT);
  pinMode(B, OUTPUT);
  // Turn Clyde's eye light red to show that it is calibrating.
  digitalWrite(R, 255);
  digitalWrite(G, 0);
  digitalWrite(B, 0);

  calibrateMotionSensor();

  // turn Clyde's eye light off to show that calibration is complete
  digitalWrite(R, 0);
  digitalWrite(G, 0);
  digitalWrite(B, 0);
}

// The loop routine runs over and over again forever:
void loop()  {

  // Does Ghost Clyde perform his haunting behaviour?
  if(haunting){

    // Fade light and fan.
    spookyClyde();

    // Check if the spooky light and fan fading cycle has run enought time
    if(spookCount>spookLimit){
      // Who you gonna call?!
      ghostbusters();
    }
  }else{
    checkMotionSensor();
  }

}


//  Fade Clyde's task light and fan, turn on his eye light.
void spookyClyde(){

  // Set Clyde's eye light to color
  digitalWrite(R, rColor);
```

```
  digitalWrite(G, gColor);
  digitalWrite(B, bColor);

  // Set the brightness of the task light:
  analogWrite(taskLight, 255-brightness);
  // Set the brightness of the fan:
  analogWrite(fan, brightness);

  // Change the brightness for next time through the loop:
  brightness = brightness + fadeAmount;

  // Reverse the direction of the fading at the ends of the fade:
  if (brightness == 0 || brightness == 255) {
    fadeAmount = -fadeAmount ;
  }

  //A moment of darkness.
  if (brightness == 0){
    delay(1000);
    spookCount++;
  }

  // Wait for 30 milliseconds to see the dimming effect
  delay(30);
}

// Turn off all haunting behavior.
void ghostbusters(){

  // Reset haunting values.
  haunting = false;
  spookCount = 0;

  // Turn Clyde's eye light off
  digitalWrite(R, 0);
  digitalWrite(G, 0);
  digitalWrite(B, 0);

  // Turn off Clyde by setting pin high.
  digitalWrite(taskLight, HIGH);

  // Turn off fan by setting pin low.
  digitalWrite(fan, LOW);
}

//Wait a little while so that the motion sensor can calibrate.
void calibrateMotionSensor(){

  for(int i = 0; i < calibrationTime; i++){
    delay(1000);
  }
  delay(50);
}

void checkMotionSensor(){
  //If the PIR pin is high, trigger the haunting behavior.
  if(digitalRead(pirPin) == HIGH){
      haunting = true;
  }
}
```


The sketch uses Arduino's Tone example sketch as a base. This requires the file *pitches.h*. Open a new tab by clicking the arrow on upper right-hand of Arduino IDE, select "New Tab". Name it "pitches.h". Copy and paste the following:

```
/*************************************************
 * Public Constants
 *************************************************/

#define NOTE_B0  31
#define NOTE_C1  33
#define NOTE_CS1 35
#define NOTE_D1  37
#define NOTE_DS1 39
#define NOTE_E1  41
#define NOTE_F1  44
```

```
#define NOTE_FS1 46
#define NOTE_G1  49
#define NOTE_GS1 52
#define NOTE_A1  55
#define NOTE_AS1 58
#define NOTE_B1  62
#define NOTE_C2  65
#define NOTE_CS2 69
#define NOTE_D2  73
#define NOTE_DS2 78
#define NOTE_E2  82
#define NOTE_F2  87
#define NOTE_FS2 93
#define NOTE_G2  98
#define NOTE_GS2 104
#define NOTE_A2  110
#define NOTE_AS2 117
#define NOTE_B2  123
#define NOTE_C3  131
#define NOTE_CS3 139
#define NOTE_D3  147
#define NOTE_DS3 156
#define NOTE_E3  165
#define NOTE_F3  175
#define NOTE_FS3 185
#define NOTE_G3  196
#define NOTE_GS3 208
#define NOTE_A3  220
#define NOTE_AS3 233
#define NOTE_B3  247
#define NOTE_C4  262
#define NOTE_CS4 277
#define NOTE_D4  294
#define NOTE_DS4 311
#define NOTE_E4  330
#define NOTE_F4  349
#define NOTE_FS4 370
#define NOTE_G4  392
#define NOTE_GS4 415
#define NOTE_A4  440
#define NOTE_AS4 466
#define NOTE_B4  494
#define NOTE_C5  523
#define NOTE_CS5 554
#define NOTE_D5  587
#define NOTE_DS5 622
#define NOTE_E5  659
#define NOTE_F5  698
#define NOTE_FS5 740
#define NOTE_G5  784
#define NOTE_GS5 831
#define NOTE_A5  880
#define NOTE_AS5 932
#define NOTE_B5  988
#define NOTE_C6  1047
#define NOTE_CS6 1109
#define NOTE_D6  1175
#define NOTE_DS6 1245
#define NOTE_E6  1319
#define NOTE_F6  1397
#define NOTE_FS6 1480
#define NOTE_G6  1568
#define NOTE_GS6 1661
#define NOTE_A6  1760
#define NOTE_AS6 1865
#define NOTE_B6  1976
#define NOTE_C7  2093
#define NOTE_CS7 2217
```

```
#define NOTE_D7  2349
#define NOTE_DS7 2489
#define NOTE_E7  2637
#define NOTE_F7  2794
#define NOTE_FS7 2960
#define NOTE_G7  3136
#define NOTE_GS7 3322
#define NOTE_A7  3520
#define NOTE_AS7 3729
#define NOTE_B7  3951
#define NOTE_C8  4186
#define NOTE_CS8 4435
#define NOTE_D8  4699
#define NOTE_DS8 4978
```

Upload to Clyde and allow him to frighten you with a terrifying tune!

Step 4: Outfit Clyde in a cloak and fangs.

Dracula Clyde is not complete without a cloak and fangs. I sewed a simple cloak using black and red fabric, and a bit of decorative string as a finishing touch. Here is a tutorial on how to make a cloak: Fast and Easy DIY Vampire Cape, http://www.thebottletree.net/2012/10/30/fast-easy-diy-vampire-cape/

I had to get creative for the fangs. Initially I was planning on drawing some fangs on sticker paper, and then sticking them to Clyde's head. But then I discover something even better! I found some bloody-tipped fake nails at the Halloween store. I cut the fake nails into points, filled them with removable adhesive putty, and then stuck them to Clyde's head. Viola! Terror! If you cannot find these fake nails, then you could make some yourself with either clear or white fake nails and a bit of red nail polish.

The final finishing touch is a bowl of candies placed inside Clyde's cloak. When the motion sensor is triggered, Clyde's task light turns on and reveals the bowl of candy. I chose candies that look like eyeballs!

Don't forget to share your Clyde Halloween Hacks with us! We have a Clyde Halloween Costume Contest until Nov 10th. Learn more about it here: https://fabule.com/eng/blog/clyde-halloween-costume-contest

Happy Halloween from the Fabule Team!

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