



STEAM CLOWN™ PRODUCTIONS

PULL UP / PULL DOWN RESISTORS



STEAM CLOWN™
& **Squeaky Hinge**
PRODUCTIONS

© Copyright 2018 STEAM Clown™

OBJECTIVE, OVERVIEW & INTRODUCTION

- Students will learn how to create a Pull-up and Pull-down circuit. They will be able to explain the electronics principle of a “pull” to a reference voltage
- Students will, using a breadboard create and measure the effect of a Pull-up/Pull-down circuit





STEAM CLOWN™ PRODUCTIONS



**Attribution-NonCommercial-ShareAlike
3.0 Unported (CC BY-NC-SA 3.0)**

SEE APPENDIX A, FOR LICENSING & ATTRIBUTION INFORMATION

by-nc-sa-3.0

<https://creativecommons.org/licenses/by-nc-sa/3.0/>

<https://creativecommons.org/faq/#what-does-some-rights-reserved-mean>



**STEAM CLOWN™
& Squeaky Hinge
PRODUCTIONS**

© Copyright 2018 STEAM Clown™



STEAM CLOWN™ PRODUCTIONS

CAN I GET A COPY OF THESE SLIDES? YES, PROBABLY...

Most presentation lecture slides can be found indexed on www.steamclown.org and maybe blogged about here on [Jim The STEAM Clown's Blog](#), where you can search for the presentation title. While you are there, sign up for email updates

If you are on of my SVCTE Mechatronics Engineering Students, Look here on the SVCTE Mechatronics Engineering Blog: <https://svctemechatronics.blogspot.com/>



STEAM CLOWN™
& **Squeaky Hinge**
PRODUCTIONS

© Copyright 2018 STEAM Clown™

RESOURCES & MATERIALS NEEDED

- Breadboard
- Breadboard jumper wires
- 10K Ω resistor
- Pushbutton switch



STEAM CLOWN™ PRODUCTIONS

PULL-UP/PULL-DOWN LAB

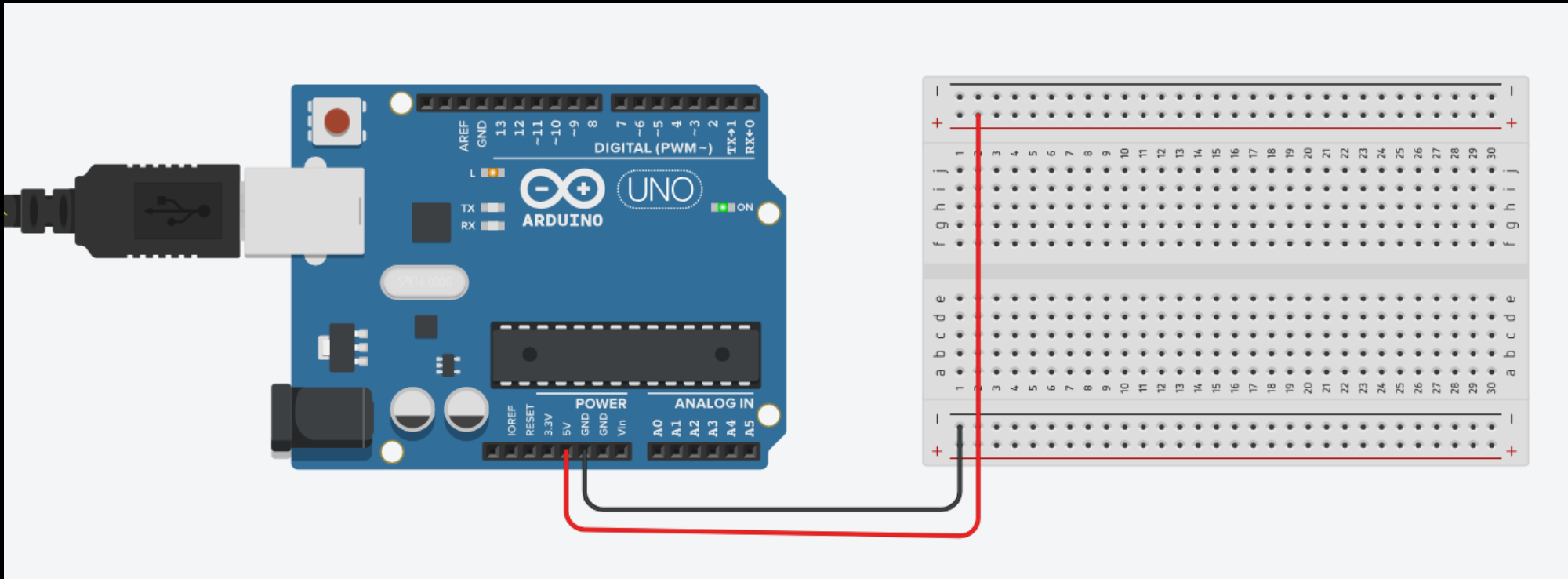


STEAM CLOWN™
& **Squeaky Hinge**
PRODUCTIONS

© Copyright 2018 STEAM Clown™

JUST CONNECT VCC(5V) & GND

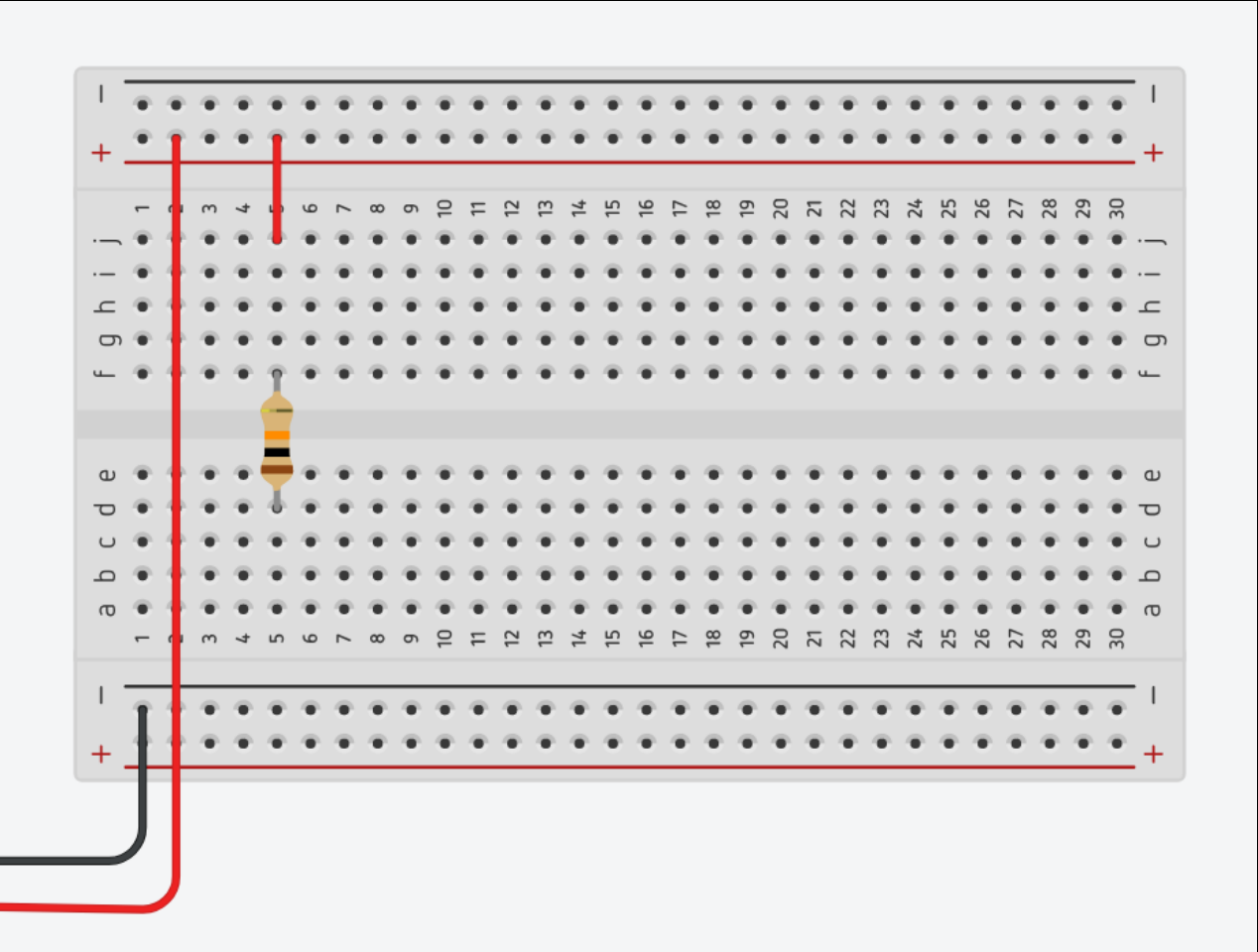
- Connect wires from VCC(5v) & GND to breadboard



STEAM CLOWN™
& **Squeaky Hinge**
PRODUCTIONS

© Copyright 2018 STEAM Clown™

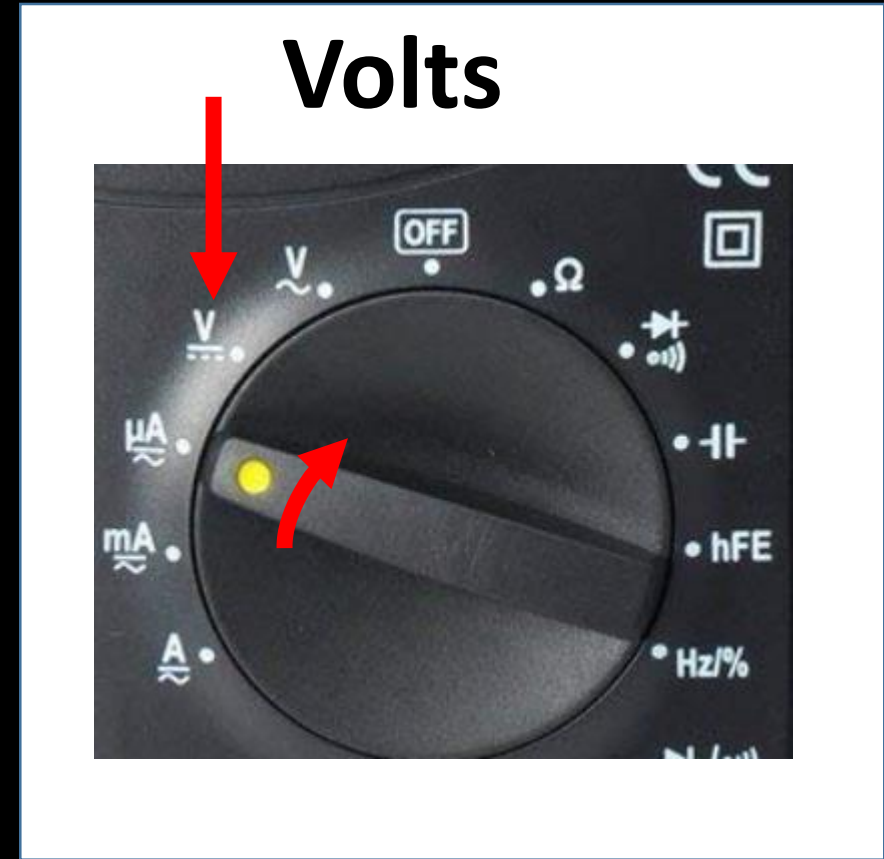
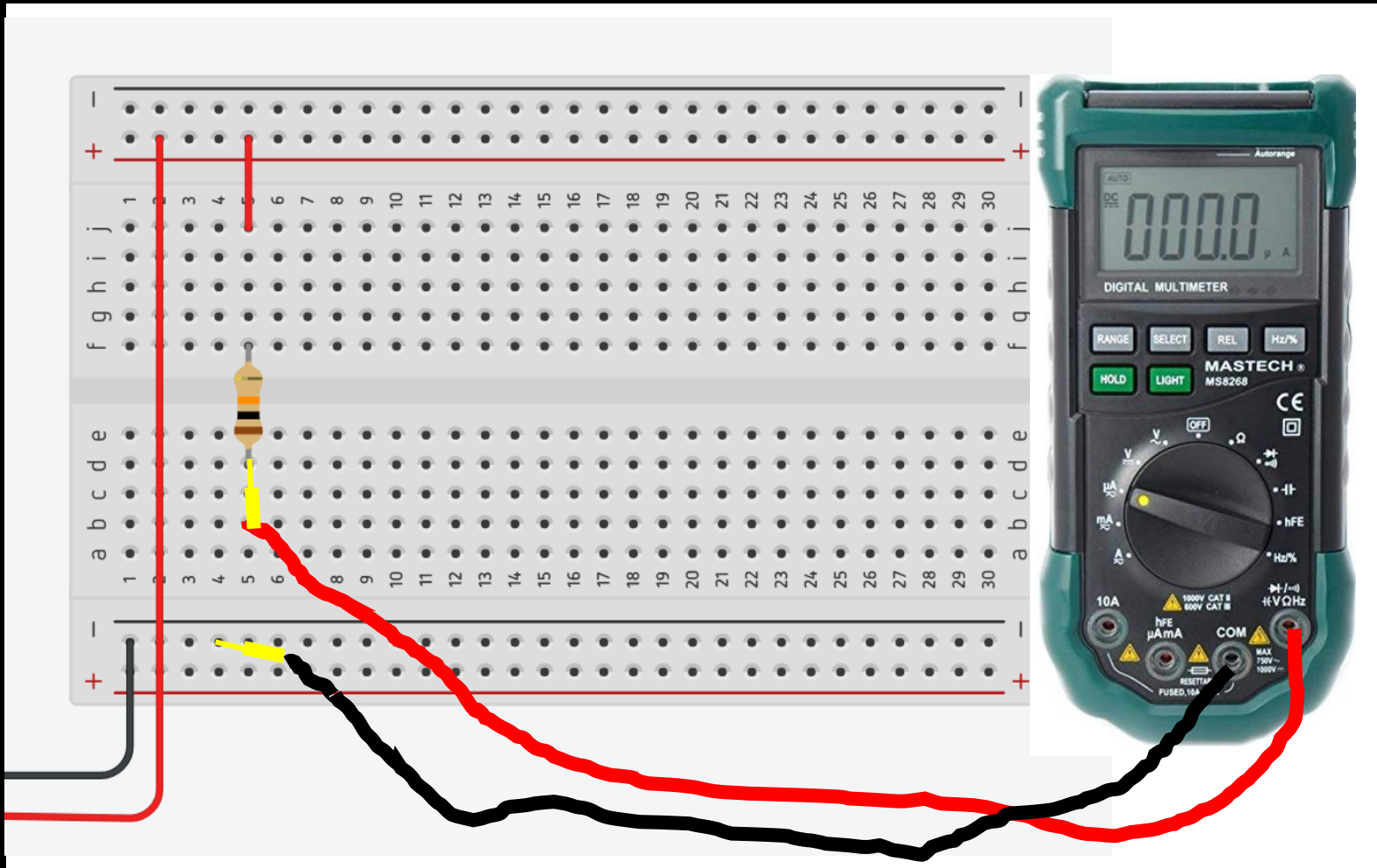
ADD 10KΩ RESISTOR CONNECTED TO VCC(5V)



STEAM CLOWN™
& **Squeaky Hinge**
PRODUCTIONS

© Copyright 2018 STEAM Clown™

MEASURING THE PULLUP EFFECT

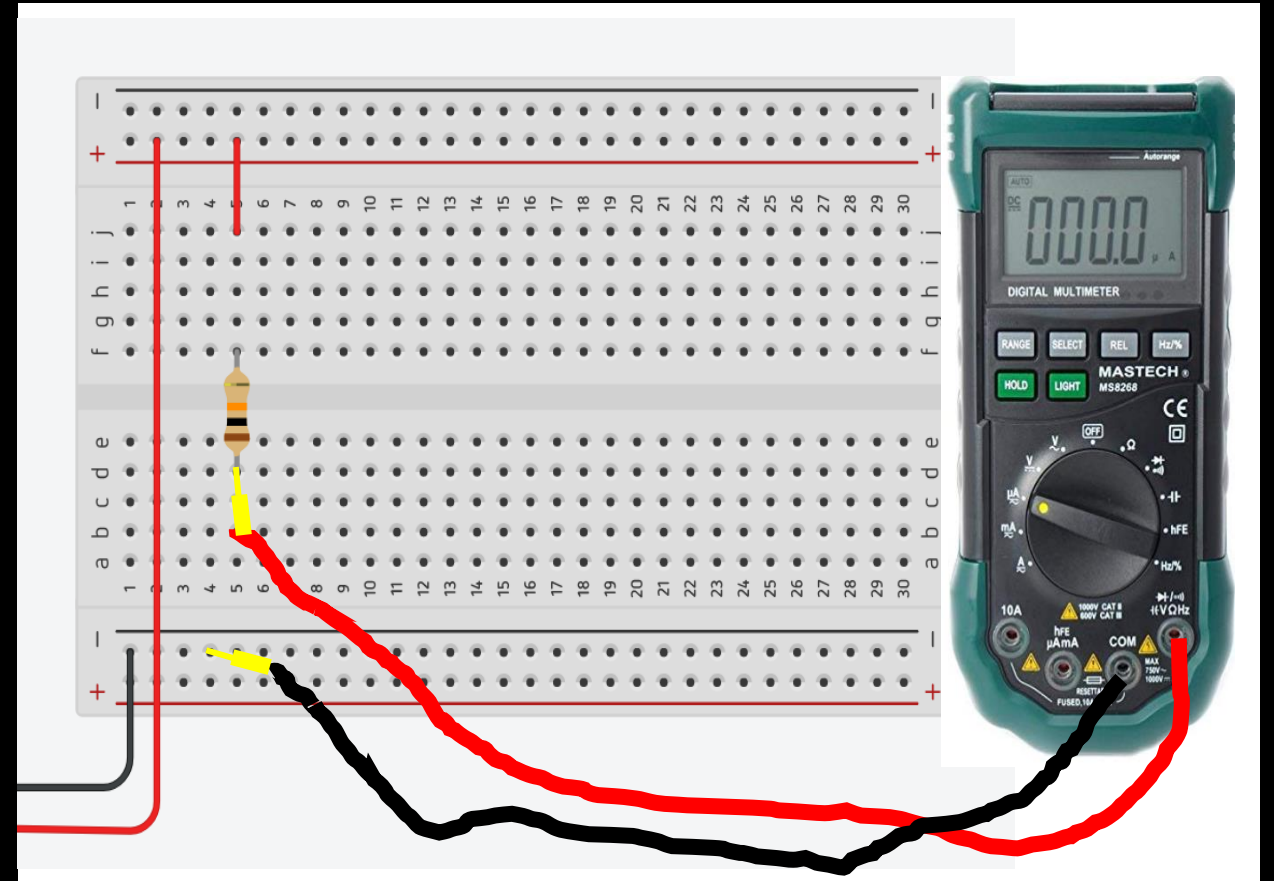


STEAM CLOWN™
& **Squeaky Hinge**
PRODUCTIONS

© Copyright 2018 STEAM Clown™

PULLUP

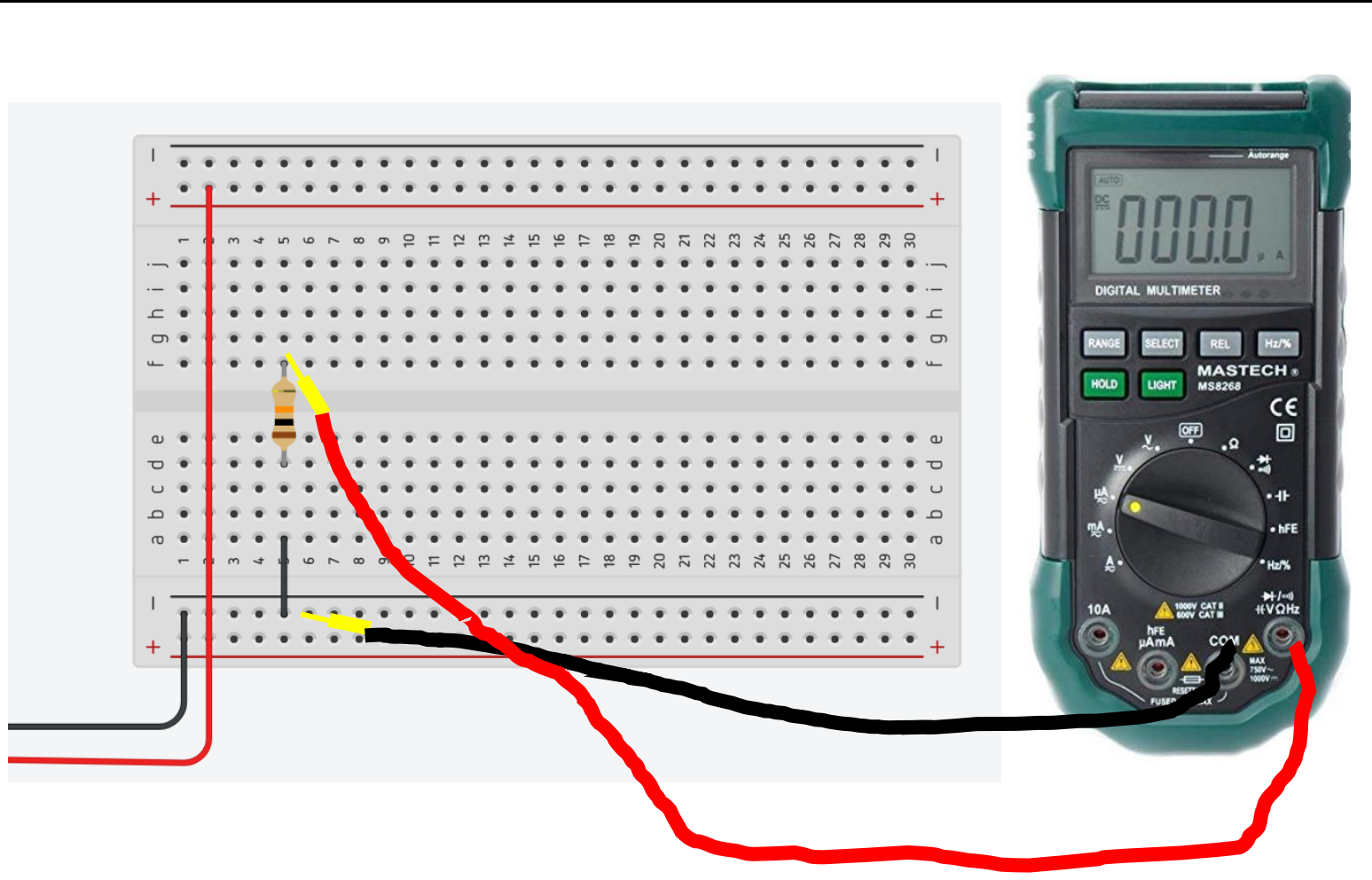
- Measure between the resistor and GND
- What is the voltage value measured?



STEAM CLOWN™
& **Squeaky Hinge**
PRODUCTIONS

© Copyright 2018 STEAM Clown™

MEASURING THE PULLDOWN EFFECT



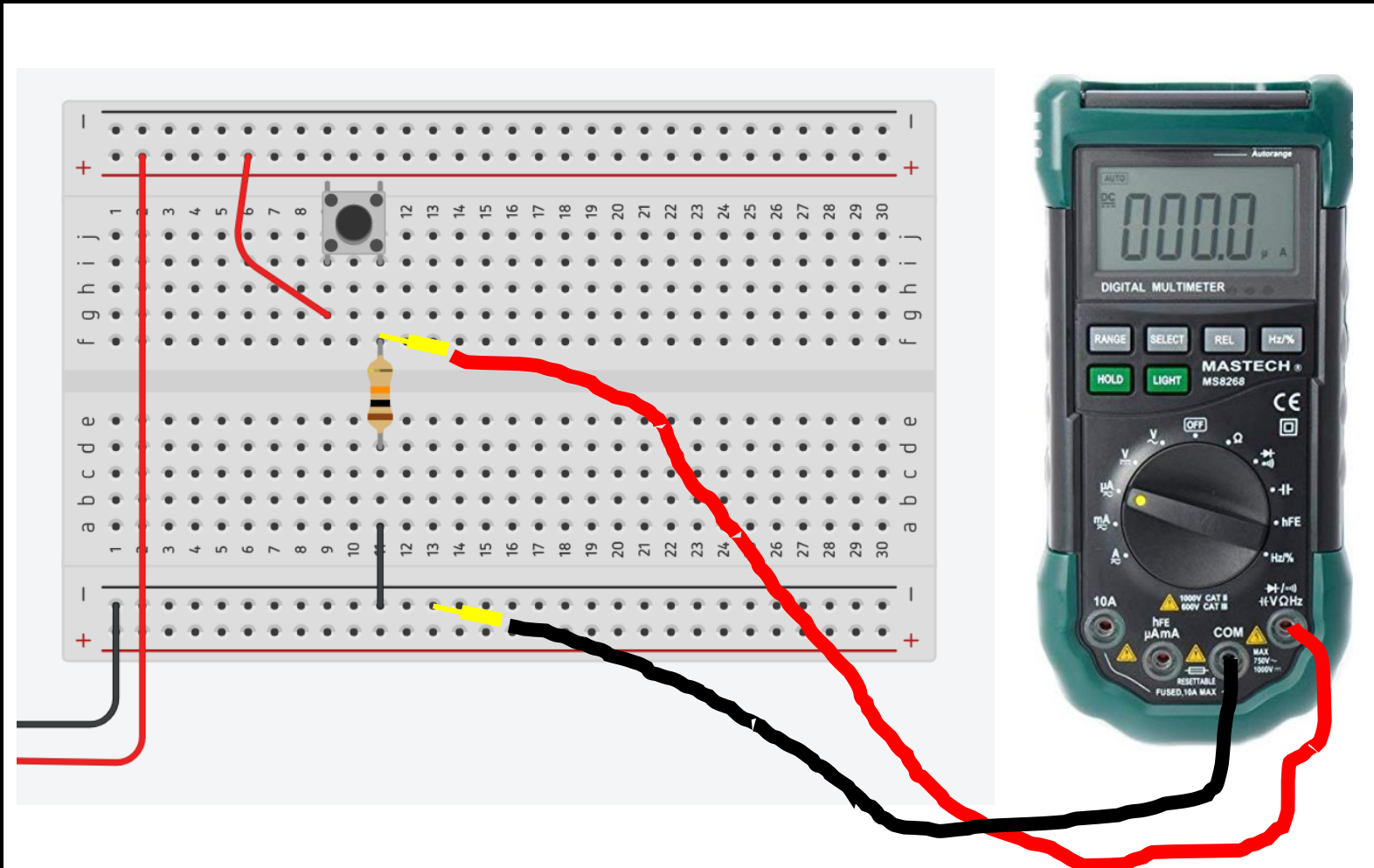
- Change resistor connection to GND
- What is the Voltage measurement now?



STEAM CLOWN™
& **Squeaky Hinge**
PRODUCTIONS

© Copyright 2018 STEAM Clown™

ADD A PUSHBUTTON SWITCH BETWEEN THE RESISTOR AND VCC(5V)



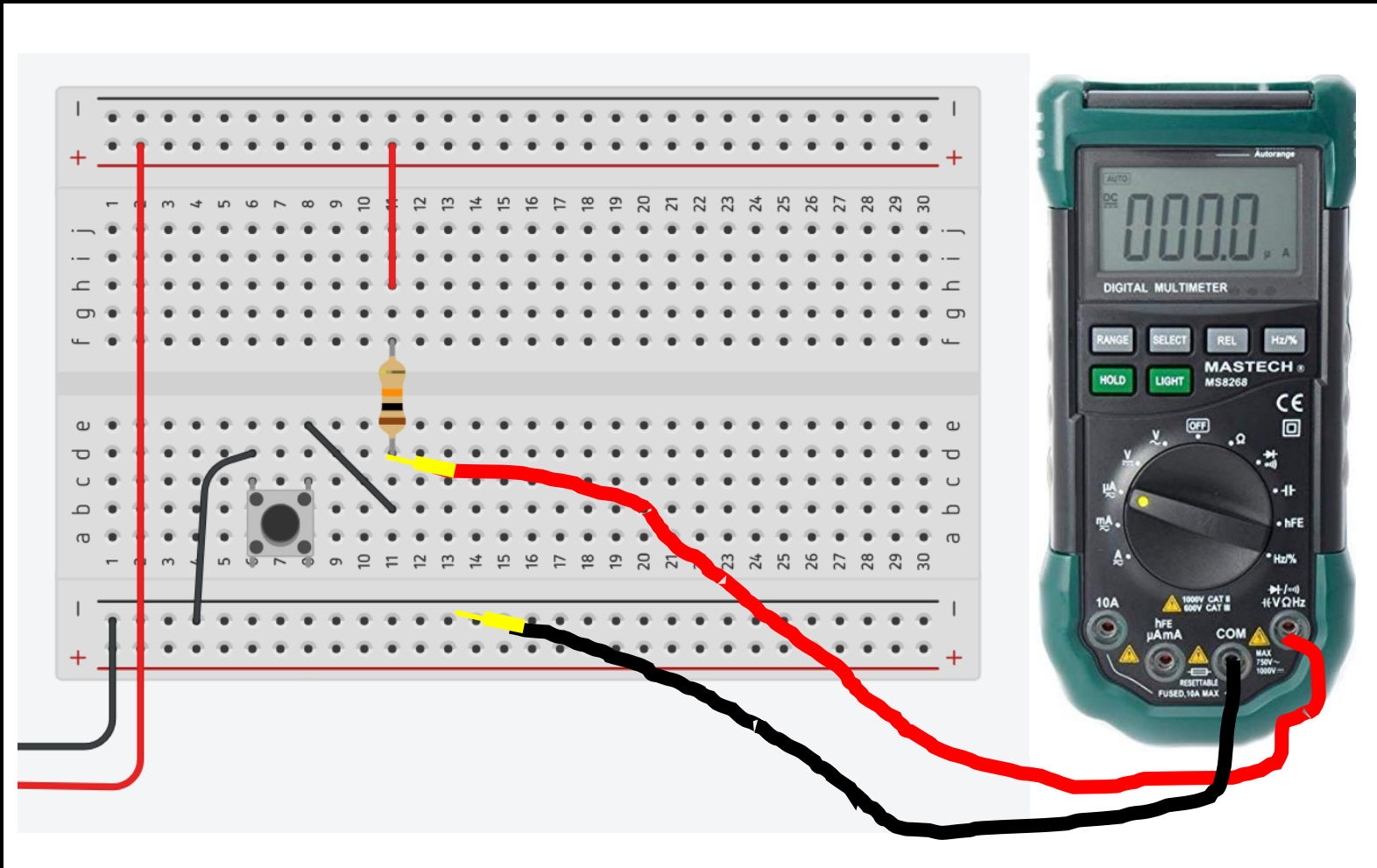
- What is the Voltage measurement now?
- What about when you push the button?



STEAM CLOWN™
& **Squeaky Hinge**
PRODUCTIONS

© Copyright 2018 STEAM Clown™

CHANGE BACK TO A PULLUP CONFIGURATION WITH THE PUSHBUTTON BETWEEN THE RESISTOR AND GND



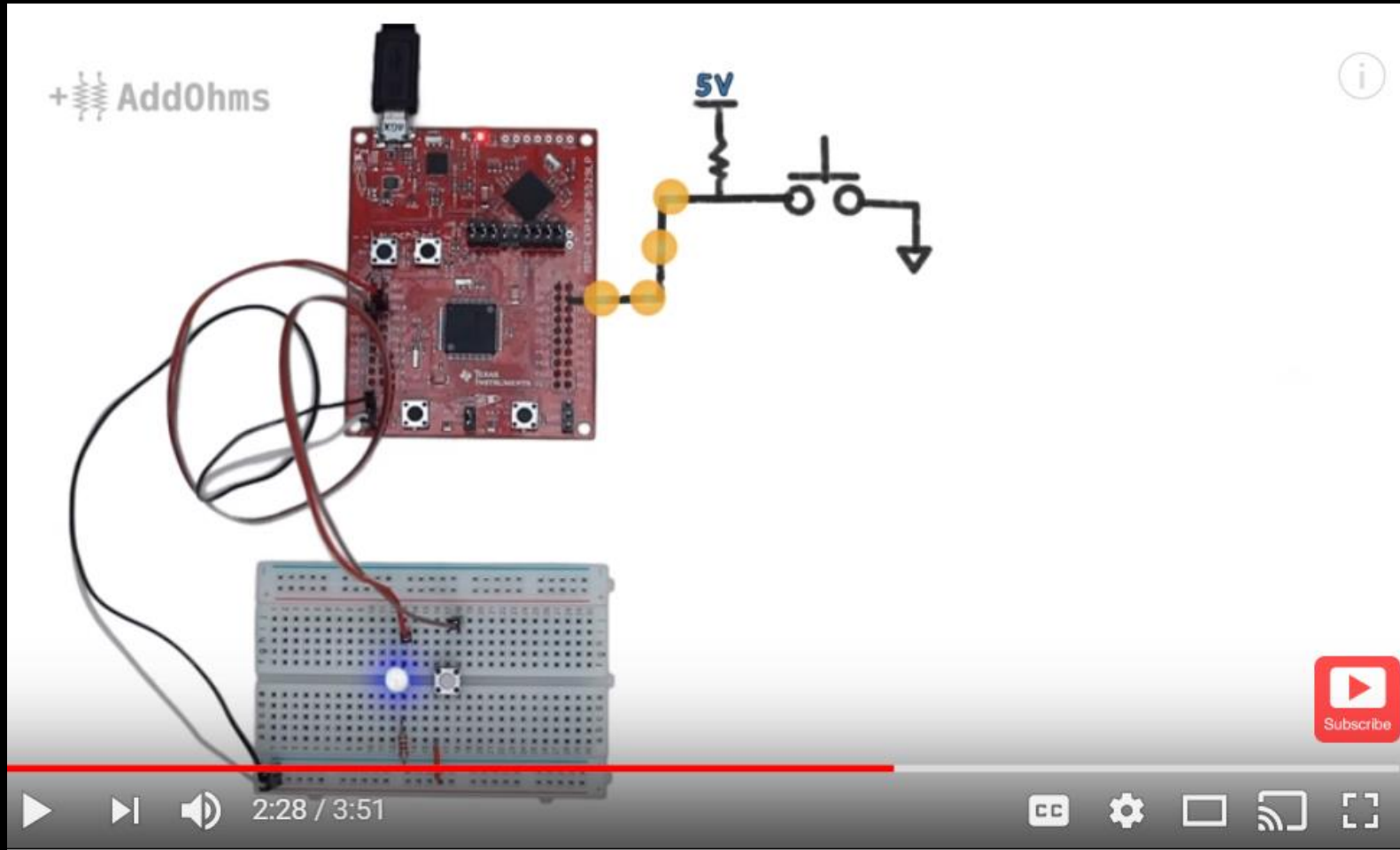
- What is the Voltage measurement now?
- What about when you push the button?



STEAM CLOWN™
& **Squeaky Hinge**
PRODUCTIONS

© Copyright 2018 STEAM Clown™

PULL-UP TUTORIAL



<https://www.youtube.com/watch?v=wxjerCHCEMg>



STEAM CLOWN™ PRODUCTIONS

REFERENCE SLIDES



STEAM CLOWN™
& **Squeaky Hinge**
PRODUCTIONS

© Copyright 2018 STEAM Clown™



STEAM CLOWN™ PRODUCTIONS

APPENDIX



STEAM CLOWN™
& **Squeaky Hinge**
PRODUCTIONS

© Copyright 2018 STEAM Clown™

APPENDIX A: LICENSE & ATTRIBUTION

- This interpretation is primarily the Intellectual Property of Jim Burnham, Top STEAM Clown, at STEAMClown.org
- This presentation and content is distributed under the Creative Commons License CC-by-nc-sa-3.0
- My best attempt to properly attribute, or reference any other images, sources or work I have used are listed in Appendix B



Under the following terms:



Attribution — You must give [appropriate credit](#), provide a link to the license, and [indicate if changes were made](#). You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.



NonCommercial — You may not use the material for [commercial purposes](#).



ShareAlike — If you remix, transform, or build upon the material, you must distribute your contributions under the [same license](#) as the original.

No additional restrictions — You may not apply legal terms or [technological measures](#) that legally restrict others from doing anything the license permits.



STEAM CLOWN™
& **Squeaky Hinge**
PRODUCTIONS

© Copyright 2018 STEAM Clown™