

Start Simulating -

<https://www.tinkercad.com/things/3iTY7AXqynb/editel?lessonid=EHD2303J3YPUS5Z&projectid=OT2JZ1PL20FZRM0&collectionid=undefined&title=Start%20Simulating#/lesson-viewer>

Let's learn how to test a circuit design with the simulator!

<https://images.ctfassets.net/jl5ii4oqrdmc/SXR3TGDKihniD6EoLmxsk/5a80038a590cbe7b3d9a0dcc9ce688e2/FCVDQAJJKIKEHJl.jpg?w=300&fm=webp>

Click the Start Simulation Button

<https://images.ctfassets.net/jl5ii4oqrdmc/505Wa57gpxysYVAPgljppS/50b6d071e19c5aa951b717fbde904b14/F030XFXJ3YQ2HTG.png?w=300&fm=webp>

Instructions

1. Click on the Start simulator button located at the right of the toolbar

Congratulations!

Congratulations - you simulated your first circuit. You can use the simulator to test your circuit design at any time.

<https://images.ctfassets.net/jl5ii4oqrdmc/2ZZFY7t1TW4CnivdnLBfTA/5848e9f4222d7c92fcbd01de3aa89839/FITBSN1J3YQ2HS2.gif?w=300&fm=webp>

Instructions

1. If you want to simulate other pre-made designs, check out the Starter Circuits, which you can find by selecting the "components" dropdown, and selecting Starters > All from there.

https://images.ctfassets.net/jl5ii4oqrdmc/1RPvdys48uo9j6ujxxOfim/8aa5e8397cef6532bcf468472d7e2e29/Screenshot_2025-02-14_at_2.46.56_PM.png?w=100&&fm=webp

2. Continue onto the next lesson to learn how to edit component properties in Circuits.

Editing Components -

<https://www.tinkercad.com/things/e8WoW8ukOM6/editel?lessonid=EFU6PEHIXGFUR1J&projectid=OGK4Q7VL20FZRV9&collectionid=undefined&title=Editing%20Components#/lesson-viewer>

Let's learn how to edit components in your circuit.

Click next to get started!

<https://images.ctfassets.net/jl5ii4oqrdmc/3qDh8xJFsfK6YwqK5KWrut/df7c0fec62d0fac02b150a2ddf049ec0/F4KTEFLIXGFUR3O.gif?w=300&fm=webp>

Click the Top LED

In the workplane, you'll find three blue LEDs, three resistors, and an Arduino. (Don't worry about the Arduino for now – we'll get to that soon!)

We're going to go ahead and edit the LEDs so that we have a traffic light.

<https://images.ctfassets.net/jl5ii4oqrdmc/2w9lAsMlvS6djDHLLaYmMq/75cc7732701469f3c133448a53886cba/FM5K4A3IXGFURTR.png?w=300&fm=webp>

Instructions

1. Click on the top-most LED. You'll see an **inspector** appear that lets you edit the properties of the component. Change the color of the LED to **red**.

2. Click and change the middle LED to **yellow**.
3. Click and change the bottom LED to **green**.

Test Your Circuit

Let's check that our traffic light works as expected.

<https://images.ctfassets.net/jl5ii4oqrdmc/7onzE4ZBjn2U5cmz8oeZYYV/3ced00c41b0130591c34b8dee1ea81f3/FJNFBHHIXGFUTKC.png?w=300&fm=webp>

Instructions

1. Click on the **Start Simulation** button on the top right to test out your traffic light.

Congratulations!

Your traffic lights should be blinking!

Continue Tinkering

- You can also change the color of your wires. Try selecting different components in this design and see what properties you can change.
- What happens to the brightness of the LEDs when you edit the resistance of the resistor its attached to? The resistor helps reduce current in the circuit so that the LED does not exceed its maximum rated current.
- In later tutorials, you'll learn how to program an Arduino to make your designs interactive. If you want to take a peek at the code that's running your traffic lights, click the Code Editor button in the toolbar.

Continue onto the next lesson to learn how to wire up components in Circuits.

<https://images.ctfassets.net/jl5ii4oqrdmc/7HRt7v6yX21L9g1UHziIrnX/08f61e9d81ef6be180cc3d9544af5349/FER56CIIXGFUTVL.gif?w=300&fm=webp>

Wiring Components -

<https://www.tinkercad.com/things/bYoVbOfR1sV/editel?lessonid=EB4XNWQJ1WEOONK&projectid=OLORC06L20FZRZ7&collectionid=undefined&title=Wiring%20Components#/lesson-viewer>

Let's learn how to wire components together to create electrical connections!

<https://images.ctfassets.net/jl5ii4oqrdmc/3ISytzKZbqcZebWlBq8sRo/e7264d7dc52165ab85be2b8b2a46eaab/FCVVJ6YJ1WEOOQF.png?w=300&fm=webp>

Wire the Positive Side of the Battery

In the editor, you'll see a 9V battery on the left. We need to add wires to connect the battery to our circuit.

<https://images.ctfassets.net/jl5ii4oqrdmc/6x6TLXveqymJoQhNLRNrhj/d63e752b0a971fc383349db136bb31d4/FJMjHFAJ1WEOQMR.gif?w=300&fm=webp>

Instructions

1. Hover over the red terminal of the 9V battery until you see the Positive label. Click to begin adding the wire.
2. Hover over the breadboard (the white component that all the other electronics are connected to) and click on the hole next to the "+" symbol to complete the wire.
3. Click on the wire and change the color to red in the inspector.

Wire the Negative Side of the Battery

Now we'll connect the negative side of the battery.

<https://images.ctfassets.net/jl5ii4oqrdmc/4talyt2rO8CdPuFXFsS5Ne/6238d90de4e78d545b93ec2a4b64b4ee/FYUALSKJ1WEOQJ4.gif?w=300&fm=webp>

Instructions

1. Hover over the black terminal of the 9V battery until you see the Negative label. Click to begin adding the wire.
2. Hover over the breadboard (the white component that all the other electronics are connected to) and click on the hole next to the "-" symbol to complete the wire.
3. Click on the wire and change the color to black in the inspector.

Start Simulation

Now that we've powered our circuit, let's test it out with the simulator!

<https://images.ctfassets.net/jl5ii4oqrdmc/7F70RMY9X6zY2lRjYksnoa/26598a119f4656afbc2fa81017e2127c/FEL0HC8J1WEOOQL.gif?w=300&fm=webp>

Instructions

1. Click the Start Simulation button.
2. Ensure that your computer's sound is not muted.
3. On the breadboard, you'll see 8 buttons. While the simulator is running, clicking on the button will trigger each switch. Try clicking on each of the buttons to hear what happens.

Congratulations!

Congratulations – you learned how to add wires to power a piano circuit!

Here are some pro-tips:

- When a wire is selected, you can also cycle between wire colors by typing any number on your keyboard. For example, typing 0 will give you a black wire.

- If you press the shift key and then click on a button, the button will stay pressed. Clicking again on the button will release it.
- Breadboards are a powerful tool for prototyping with electronics. If you're interested in learning more about using one, check out our tutorial on [Introducing the Breadboard!](#)

Continue onto the next lesson to learn how to add more components in Circuits.

<https://images.ctfassets.net/jl5ii4oqrdmc/4Sw2LluDSkW0OoRzWvgopI/8940d4116054af32b2c91be4f6f95f01/F3U9ZWWJ1WE00QJ.gif?w=300&fm=webp>