C1

Getting Started with Tinkercad

CHAPTER ASSIGNMENT

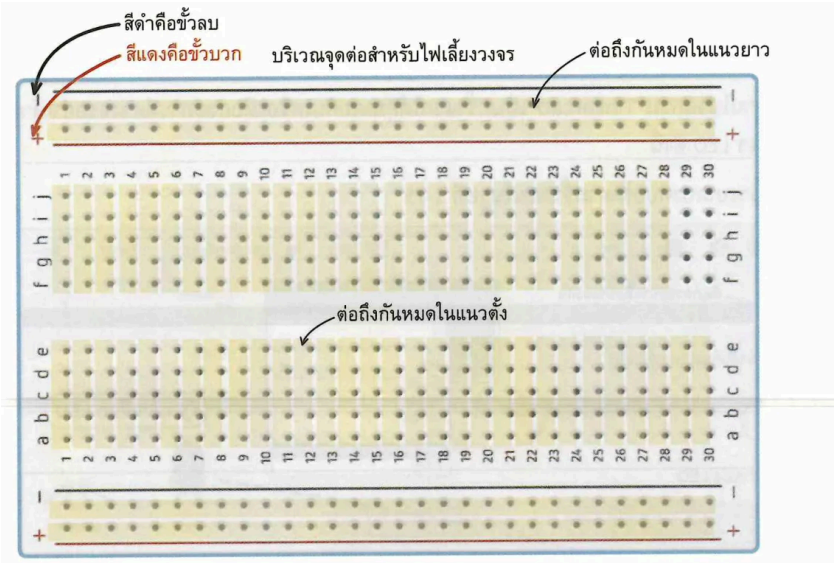
Name _____ Class _____ No. _____ Date _____

> Answer every question in the space given. Show your working. You may use the chapter page to help you.

Questions from the Guru Jazzy chapter page, for classroom use.

Try it

1 Try it: click a hole to see what it is connected to



2 Try it: how much current flows through the LED?

Current through the LED = (battery voltage − LED voltage) ÷ resistance. An ordinary LED is happy at about **5–20 mA** and is damaged above 20 mA.

Labs

1.1 Open Tinkercad and create an account

1. Search Google for **tinkercad** and click Circuits under the result, or go straight to www.tinkercad.com and choose Circuits on the home page.

2. On the Circuits page, scroll down to read more if you like, then click Start Tinkering.

3. First-time users need an account. There are two kinds: **educator** accounts for teachers and **student** accounts for joining a teacher's class. For your own use, click Create a personal account. Already registered? Click Sign In instead.

4. Choose how to sign up: with a **Google** (Gmail) account or an **Apple ID**. You only do this once.

5. When registration is finished you see your dashboard. Next time, go straight to it at tinkercad.com/dashboard.

1.2 Wire up an LED

1. **Place an LED.** Click LED in the panel, then click on the breadboard to drop it in. You can change its colour in the LED's settings. Look at the legs: the **bent, longer leg is the anode (+)** and the straight, shorter leg is the **cathode (–)**.

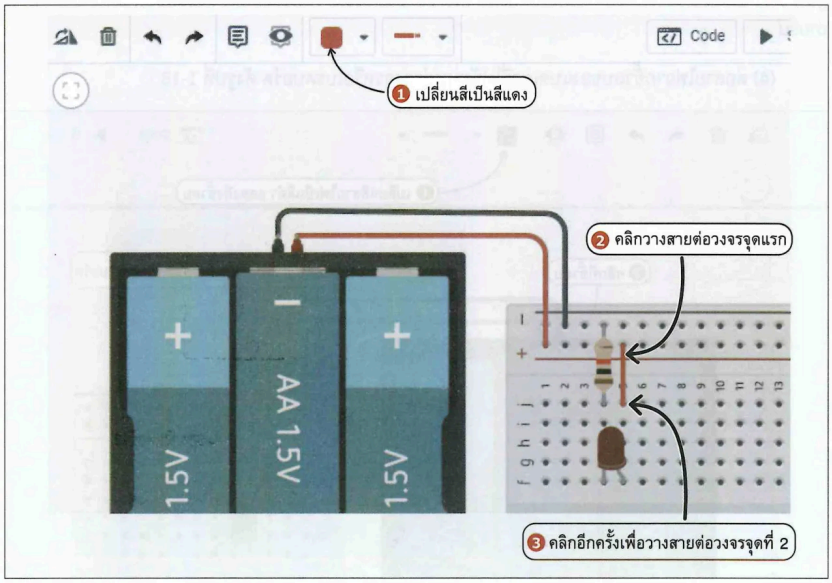
2. **Add the battery.** Choose the 1.5V Battery, set **Count** to **3 batteries** and **Type** to **AA**, then click to place it. Three 1.5 V cells in a row give 4.5 V.

3. **Wire the positive side.** Click the battery's **+** terminal, then click the **+** rail on the breadboard to draw a wire. Make it **red**. The colour is optional — it does not change how the circuit works — but it makes checking the circuit much easier.

4. **Wire the negative side.** Draw a wire from the battery's **–** terminal to the **–** rail and make it **black**.

5. **Add a resistor.** A resistor (called "R" for short) limits the current. Click Resistor and place it so one leg is in the same column as the LED's cathode and the other reaches the **–** rail. You can change its **Resistance** in its settings; the book uses **1 kΩ**.

6. **Finish the circuit.** Draw a red wire from the **+** rail to the LED's **anode (A)**. The circuit is complete: + rail → LED → resistor → – rail.



1.3 Run, break and record your circuit

1. Click Start Simulation.

2. The simulation starts at once and the timer counts up. If the circuit is right, the LED lights. Remove a supply wire and it goes out.

3. When you have seen enough, click the same button again — it now says Stop Simulation.

4. **Break it on purpose.** Take the resistor out and wire the LED's cathode (C) straight to the – rail, then simulate again. Tinkercad shows the LED as **damaged**: with nothing to limit it, far too much current flows. The pop-up in the book reads "Current through the LED is 322 mA, while absolute maximum is 20.0 mA."

5. **List your parts.** Click the component-list button at the top right to see every part in the circuit, then click Download CSV to save the list as a spreadsheet file.

Activity: Build it yourself

1. Rebuild the LED circuit from Lab 1.2 in your own account and give it a name.

2. Change the LED colour and the resistor to 220 Ω, then 10 kΩ. What happens to the brightness each time? Use the current calculator to explain why.

3. Add a second LED with its own resistor so both light at once.

4. Download the component list as a .csv file.

Chapter quiz

1. Which part of Tinkercad do you open to build and simulate electronic circuits?

   A. 3D Design B. Circuits C. Codeblocks D. Lessons

2. In the Components panel, what is the difference between "Basic" and "All"?

A	B	C	D
Basic shows only the basic parts; All shows every part	Basic is free; All needs a paid account	Basic shows photos; All shows circuit symbols	There is no difference

3. On a breadboard, holes a, b, c, d and e in column 5 are...

A	B	C	D
Not connected to each other	Connected to each other	Connected to every hole in row a	Connected to the + rail

4. Are holes e5 and f5 connected?

A	B	C	D
Yes, they are in the same column	No, the gap in the middle separates them	Only when the simulation runs	Only on the small breadboard

5. The long rail along the edge marked with a red line is for...

   A. The negative (−) supply B. The positive (+) supply C. Signals only D. Nothing; it is decoration

6. Which leg of an LED is the anode (+)?

   A. The short leg B. The long leg C. Either leg D. The leg with the flat side

7 You connect an LED straight to three AA batteries with no resistor and press Start Simulation. What happens?

A	B	C	D
The LED glows normally	Nothing, the LED needs a switch	The LED is damaged because too much current flows	The batteries are reversed

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8 Which file type does Tinkercad export for the component list?

A. .pdf B. .png C. .csv D. .stl

End of assignment · Check your answers against the chapter at gurujazzy.com/subjects/tinkercad/chapter-1-getting-started/